

# How is Social Media Used in the Context of Complementary and Alternative Medicine? A Scoping Review

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## Systematic Review

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# Abstract

## Background

Despite the increased use of social media to share health-related information and the substantial impact that complementary and alternative medicine (CAM) can have on individuals' health and wellbeing, currently, to our knowledge, there is no review that compiles research on how social media is used in the context of CAM. The objective of this study was to summarize the research on how social media is used in the context of CAM.

## Methods

A scoping review was conducted to investigate how social media is used in the context of CAM, following Arksey and O'Malley's five-stage methodological framework. MEDLINE, EMBASE, PsycINFO, AMED, and CINAHL databases were systematically searched, in addition to the Canadian Agency for Drugs and Technology in Health (CADTH) website. Eligible articles had to have investigated how at least one social media platform is used in the context of a single or multiple types of CAM treatments.

## Results

Searches retrieved 1714 items following deduplication, of which 1687 titles and abstracts were eliminated, leaving 94 full-text articles to be considered. Of those, 65 were not eligible, leaving a total of 29 articles eligible for review. Four themes emerged from our analysis: 1) social media is used to share user/practitioner beliefs, attitudes, and experiences about CAM, 2) social media acts as a vehicle for the spread of misinformation about CAM, 3) there are unique challenges with social media research in the context of CAM, 4) social media is effective in delivering CAM-related therapy and information.

## Conclusions

This scoping review is the first, to our knowledge, to provide a descriptive analysis of the literature regarding how social media is used in the context of CAM. In addition to social media being a useful tool to share user/practitioner beliefs, attitudes, and experiences about CAM, it has shown to be accessible, effective, and a viable option in delivering CAM therapies and information. Social media has also shown to spread a large amount of misleading and false information in the context of CAM. Additionally, this review highlights the challenges with conducting social media research in the context of CAM, particularly in collecting a representative sample.

## Background

Over 3.6 billion people worldwide used social media in 2020 [1]. This number has been predicted to increase to 4.41 billion by 2025. The American population using at least one social media platform such as Facebook, Snapchat, Instagram, Twitter or YouTube, has continuously increased over the past 15 years from just 5% of Americans in 2005 to 72% of Americans in 2019 [2]. Similarly, in 2017, 94% of Canadian internet users had at least one social media account [3]. It has been shown that 80% of internet users search for health information online and social media is used by 74% of these individuals [4, 5]. One of the ways in which social media is used to discuss health information is with regards to complementary and alternative medicine (CAM) [6, 7]. How social media is used in the context of CAM would be valuable to better understand as 72% of internet users have looked online for health information and 35% of internet users have looked online for information about CAM specifically, according to surveys done by the Pew Research Center [6, 7].

CAM is frequently used across the world and consists of a variety of health care approaches that are not typically part of conventional medicine, including but not limited to natural products, chiropractic and osteopathic manipulation, and meditation [8, 9]. While the terms “complementary” and “alternative” are often used interchangeably when describing unconventional medicine, they have different definitions and meanings [10]. The National Center for Complementary and Integrative Health (NCCIH) defines “complementary” approaches as those that are used together with conventional medicine and “alternative” approaches as those that are used in place of conventional medicine [8]. The prevalence of CAM users varies widely ranging from 9.8–76% of the population depending on the country, with the highest prevalence of CAM usage being in East Asian countries such as Japan, South Korea, and Malaysia [9]. However, even in North America, billions of dollars are spent yearly on CAM treatments given that CAM has been used at least once by over 70% of North Americans [11, 12]. Positive motivations for trying CAM which may have led to its popularity include factors such as its accessibility, non-invasive nature, and perceived effectiveness and safety while negative motivations include factors such as dissatisfaction with conventional medicine, rejection of science and technology, and desperation [13]. How CAM is portrayed in social media is important considering the ever-growing popularity and usage of social media [2]. In the context of CAM, social media can be used to enhance patient’s access to health care related resources and support [14, 15]. Media sharing platforms such as YouTube are usually free, easy to use, and accessible on both mobile and desktop devices [16]. Also, unlike health information in the medical literature, when health information is shared on social media it is often written in layman’s terms [15, 17]. By allowing individuals to engage, interact, and contribute health information, social media creates an environment that encourages patient conversation [18]. Sharing health information on social media can motivate and inspire others but also has the power to facilitate the spread of misinformation about health-related topics [19]. There are several features of social media that may contribute to the spread of health-related misinformation. Firstly, the low cost of generating and disseminating information over social media allows misinformation to spread globally at a rapid pace. Additionally, virtually anyone can post about CAM on social media regardless of academic or professional knowledge or skills [20]. Furthermore, social media can make it hard to determine credibility as users are self-publishers and often are not subject to scrutiny or accountability [19]. Moreover, since social media feeds are personalized to

individual beliefs, values, preferences and biases, there is information silo and echo chamber effects which result in decreased exposure to differing opinions, reinforcement of confirmation biases, and the amplification of misinformation [21, 22]. There have been various studies that have investigated the spread of misinformation about CAM on social media [23, 24].

Currently, to our knowledge, there is no review that compiles research on how social media is used in the context of CAM. Due to the increased impact of social media as a form of information sharing in North America, and the significant impact that CAM can have on people's health and lives, it is important that a scoping review is performed to outline the research on this topic and identify the gaps. The results from this scoping review could help inform various stakeholders such as clinicians, policy makers, patients, and researchers. Thus, the aim of our scoping review is to provide a summary of the research on how social media is used in the context of CAM.

## Methods

### Approach

The method for conducting this scoping review was based on Arksey and O'Malley's five-stage scoping review framework [25]. This method will also be supplemented by modifications proposed by Levac, Colquhoun, & O'Brien and Daudt, van Mossel, & Scott [26, 27]. This five-stage scoping review framework was used to ensure that all scoping review prerequisites, which include finding and analyzing the current literature on the topic, summarizing it, and recognizing knowledge gaps that could potentially be looked into by future research, were met [27].

### Step 1: Identifying the Research Question

Our research question is the following: how is social media used in the context of CAM? While both CAM and social media have been defined in various ways [10], for the purpose of this scoping review, we referred to the Cochrane Complementary Medicine group's operational definition of CAM [28]. For social media, we have referred to the definition by Obar et al. 2015 as it is comprehensive, containing four parts, and has been used by many others in the academic community [29]. This definition states that social media consists of the following four main characteristics:

1. Social media services are (currently) applications that are Web 2.0 Internet-based
2. The lifeblood of social media is user-generated content
3. For a site or app designed and maintained by a social media service, individuals and groups create user-specific profiles
4. The development of social networks online by connecting a profile with those of other individuals and/or groups is facilitated by social media services

## **Step 2: Finding Relevant Studies**

After identifying the research question, we found relevant studies to include in our scoping review using a comprehensive and systematic search strategy. This strategy was used to search the academic databases MEDLINE, EMBASE, PsycINFO and AMED. Medical Subject Headings and keywords relating to social media and CAM were used in the search strategy. Additionally, the Canadian Agency for Drugs and Technology in Health (CADTH) was searched for any grey literature related to our topic. Search terms on CADTH included “complementary and alternative medicine” and “social media”. Moreover, the Cumulative Index to Nursing and Applied Health Literature (CINAHL) was searched for nursing-related articles. The search of these various databases and websites included literature from inception until 2020. Medical Subject Headings and keywords found in the literature when referring to CAM and social media were used to develop the search strategy. A search strategy we used can be found in **Table 1**.

## **Step 3: Selecting the Studies**

Research articles and protocols were included in this scoping review. While review articles were not eligible, we screened the reference lists of review articles that appeared relevant to our research question to identify eligible articles. Conference abstracts, commentaries, editorials, letters to the editor, opinion pieces, and articles that were not published in the English language were ineligible. Additionally, articles that could not be publicly accessed, found through our library system, and ordered via interlibrary loan were excluded. In order to be eligible, it had to be evident in the article’s title and/or abstract that the article was about how any form(s) of social media is used in the context of any form(s) of CAM. Two authors (JYN and NJV) pilot-screened a subset of titles and abstracts individually and then met to verify their application of the inclusion criteria. Then, all full articles were screened independently in duplicate by JYN and NJV. In the case of disagreement about article eligibility, when discussion between the two authors (JYN and NJV) was not sufficient to resolve the disagreement, a third author (JS) partook in the discussion and a majority vote took place to determine eligibility.

## **Step 4: Charting the Data**

Arksey and O’Malley’s descriptive narrative method was used to critically assess articles meeting the inclusion criteria [25]. To chart the eligible articles, the following information was extracted: last name of first author, article title, year article was published, country of researchers, study setting (where participants were located), study design (methodology), population and sample size, types of CAM discussed/used, primary outcomes, how primary outcomes were measured, secondary outcomes, how secondary outcomes were measured, main findings, challenges encountered, and conclusion. A pilot data extraction was performed by two authors (JYN and NJV) on a subset of eligible articles. Any discrepancies between the pilot data extraction of the two authors were discussed and resolved by three authors (JYN, NJV and JS). Then, data from all eligible articles was independently extracted by JYN and NJV and all authors discussed and resolved discrepancies. Only data relevant to the research question was extracted and charted from the eligible studies. Additionally, we created a descriptive map of the literature on our topic and highlighted key themes that emerged from our analysis.

## Step 5: Collating, Summarizing, and Reporting the Results

Tables were used to summarize charted data, and thematic analysis was performed on descriptive data. The descriptive data was reviewed by all authors. NJV and JS then identified codes for the findings and organized them into thematic groups. NJV and JS also created a narrative connecting the results to the research question and identified knowledge gaps in the current literature. Any discrepancies were discussed and resolved by all authors.

## Results

### Search Results

Searches retrieved 1714 items following deduplication, of which 1687 titles and abstracts were eliminated, leaving 94 full-text articles to be considered. Of those, 28 were not eligible because they did not fit our definition of social media, 18 did not fit our definition of CAM, 7 did not focus on how social media is used in the context of CAM, 6 were an abstract, and 6 were a review. This left 29 articles for inclusion in this scoping review [30–58]. In Figure 1, a PRISMA diagram can be found.

### Eligible Article Characteristics

Eligible articles were published from 2012 to 2020 and were conducted by researchers from the United States (n=17), Canada (n=4), Australia (n=2), France (n=1), Germany (n=1), Spain (n=1), and Taiwan (n=1). Additionally, one study was conducted by researchers from China, Australia, and the United Kingdom (n=1), and another study was conducted by researchers from Iraq and Jordan (n=1). Of these 29 eligible articles, 10 focused on a study population from a single country, meaning that only social media content posted by users from a specified country was included in the study. These countries included the United States (n=5), Australia (n=1), Germany (n=1), Iraq (n=1), Spain (n=1), and Taiwan (n=1). The remaining 19 eligible articles focused on social media content from more than one country, 13 of which focusing on an international sample of social media content (i.e., all of Twitter). While a diverse array of CAM was explored, the most common were yoga (n=4), medicinal marijuana (n=4), dance therapy (n=2), music therapy (n=2), and spinal manipulation (n=2). The most commonly discussed social media platforms were Twitter (n=6), Facebook (n=5), and YouTube (n=4). The articles used a variety of qualitative and mixed methods in their social media research approaches. Of the 29 eligible articles, 24 were described generically as qualitative without naming a specific design or were described in terms of data collection techniques (e.g., focus group and interview) or analytic techniques (e.g., content analysis and discourse analysis). Of the remaining 5 eligible articles, two were identified by the authors as following a case study design, one was identified as following quantitative approaches, and two were identified as mixed methods studies based on its methodology and the presence of a combination of qualitative and quantitative approaches. The details associated with all eligible article characteristics, including study aims, can be found in Table 2; the main findings, challenges encountered, and conclusions of all eligible studies can be found in Table 3. No studies reported any secondary outcomes.

## Findings from Thematic Analysis

Four main themes were identified through our thematic analysis. These themes are described in the paragraphs below.

### **Theme 1: To Share User/Practitioner Beliefs, Attitudes, and Experiences about CAM**

Several studies provided insight into the beliefs, attitudes, and experiences of CAM users and practitioners [35, 36, 38, 40, 41, 43, 45, 48, 49, 53, 55]. Three subthemes developed among the studies: negative beliefs and attitudes about CAM use, positive beliefs and attitudes about CAM use, and experiences of using CAM.

#### *Subtheme 1.1: Negative Beliefs and Attitudes about CAM Use*

The first of the three subthemes found among the studies was negative beliefs and attitudes about CAM use. Numerous studies identified negative beliefs and attitudes about CAM treatments that were posted on social media [38, 40, 49, 53]. One study conducted in Spain analyzed the discourse of skeptics of complementary therapies on Twitter [38]. The authors reviewed more than 6000 posted tweets and found that 79.1% were against or not in favour of CAM treatments. The common themes among the tweets were “anti-science”, “fighting against harmful, for-profit practices”, and protecting “the most vulnerable [who have] little knowledge of science”. Another study investigated social media as a platform to share information about the safety of Chinese patent medicine [40]. The authors found that there were a significant number of posts to online blogging platforms about individuals experiencing adverse effects while undergoing Chinese patent medicine. In addition, a study investigated the presence of critiques and debates surrounding the effectiveness and risk of chiropractic and spinal manipulation therapy (SMT) on Twitter [53]. It was found that the efficacy of these CAM treatments was rarely questioned or doubted. Additionally, the potential risks were rarely mentioned or debated. However, of the few tweets that were skeptical or critical about the use of chiropractic and SMT, most had been liked and retweeted significantly, demonstrating that many skeptical or critical perspectives of CAM use had an impact on social media users even though their voices were marginal in number.

#### *Subtheme 1.2: Positive Beliefs and Attitudes about CAM Use*

Three studies intended to analyze the public beliefs and attitudes expressed about CAM use on social media and assess whether they were predominantly in favour of or against CAM use [35, 48, 55]. One study analyzed descriptions of CAM treatments used by young women diagnosed with cancer who kept an online cancer blog [55]. The descriptions of CAM treatments were uniformly expressed in a positive and empowering manner by the young women. Additionally, two studies assessed how cannabidiol (CBD) products were presented on popular social media platforms, including Twitter and Pinterest [35, 48]. Both studies found that the majority of posts presented CBD in a positive light, with many citing physical or mental benefits, such as relief from anxiety, depression, pain, and inflammation. Similarly, a study investigating posts on Instagram related to yoga found that most posts emphasized the physical

benefits of yoga and used words like “fitness” when describing yoga [41]. Another study that focused on cannabis-related conversations on Twitter discovered that the topics of conversation ranged from using cannabis for the first time to the legality and therapeutic value of cannabis [36]. Regarding the therapeutic value, posts discussed numerous medical conditions such as Crohn’s disease, cancer, post-traumatic stress disorder, anxiety, and depression that are being treated or have the potential to be treated by cannabis.

### *Subtheme 1.3: Experiences of Using CAM*

Four studies found that the information most sought by consumers on social media sites was relating to the experiences of past users of CAM treatments [43, 45, 49, 55]. For example, one study analyzed questions posted on Yahoo! Answers relating to dietary supplement ingredients under subsection, “Alternative medicine” under the section, “Health” [45]. It was found that the information most sought by consumers, defined by the greatest number of posts, was relating to the uses and adverse effects of dietary supplements. The most common uses of the dietary supplements were respiratory, thoracic & mediastinal disorders, cardiovascular & lymphatic system disorders, and psychiatric disorders, while the most common adverse effects were diarrhea, abdominal pain, palpitations, and headaches. Another study examined descriptions of CAM use among women diagnosed with cancer who maintained an online cancer blog [55]. The study found that the women used CAM treatments for a multitude of reasons, including the feeling of a loss of control, negative symptom experiences, as a means of reconnection to their bodies, and as a result of the desire to have a more active engagement in their care. A different study analyzed posts on Instagram related to KandyPens, an e-cigarette company that markets its products as aromatherapy devices [43]. The most predominant themes displayed in the posts were user experience and product appearance. Additionally, one study found that individuals had both negative and positive experiences with a popular CAM treatment, chiropractic [49]. The study explored debates surrounding chiropractic in the comment section of popular chiropractic-related videos on YouTube. The comments section was split between individuals with negative and positive beliefs, attitudes, or experiences regarding chiropractic. On the negative side, individuals tended to argue that chiropractic was not supported by sufficient evidence or “science”. While on the positive side, individuals usually alluded to personal experiences and raised issues with conventional medicine and the pharmaceutical industry.

## **Theme 2: Misinformation about CAM on Social Media**

Numerous studies discussed how social media acts as a vehicle for the spread of misinformation about CAM [34, 35, 42, 47, 48, 53]. For example, since the onset of the COVID-19 pandemic, the amount and popularity of tweets suggesting a link between spinal manipulation therapy (SMT) and immunity increased substantially [34]. Furthermore, posts about CAM on breast cancer patient social forums and Facebook groups have raised critical concerns about the reliability of information accessible to patients [42]. For example, it was found that some patients test CAM therapies that have not yet been proven or whose manufacturing quality have not been verified [42]. Additionally, information that is

potentially dangerous can be shared on social media and avoid review from regulatory and monitoring systems [42]. However, a study also found that features of social media posts and their comments can impact how credible social media users deem them to be [33]. Thus, not all information about CAM on social media, whether it be factual or inaccurate, may be equally trusted by social media users. For example, for naturopathic physicians, citing research articles in their blogs has been suggested as a valuable tool to build credibility both for them individually and for their discipline as whole [57]. Additionally, a study found that if comments criticize researchers' intentions rather than their expertise, they are more likely to effectively reduce perceived credibility of social media posts about homeopathy [33]. Various studies found that there is a lack of credible voices represented in social media posts about CAM [35, 47, 53]. For example, out of the 100 most widely viewed YouTube videos on cupping therapy, only 16 were created by qualified professionals [47]. Studies also stated that the high prevalence of misinformation about CAM on social media can help policymakers better understand and devise strategies to mitigate it, and raises questions about regulatory authorities' role in labelling, approval, and surveillance [34, 42].

### **Theme 3: Challenges with Social Media Research in the Context of CAM**

More than a third of studies identified challenges with social media research in the context of CAM [31, 34–36, 40, 42, 45, 47, 48, 50, 55, 57]. There were three subthemes that emerged across these studies, each representing a specific challenge with performing high-quality social media research in the context of CAM including: the inherent sampling biases, the privacy standards of social media platforms, and the difficulty identifying posts that represent the actual attitudes of the public. These subthemes highlight the difficulty in collecting a representative sample in social media research in the context of CAM. Although studies utilized different definitions of CAM and surveyed distinct CAM treatments on social media, all made specific determinations as to where to draw their search criteria [31, 34–36, 40, 42, 45, 47, 48, 50, 55, 57]. Studies with a narrow search criterion within a subset of CAM did not necessarily have a small sample size, therefore having a narrow search criterion was not viewed as a challenge with social media research in the context of CAM.

#### *Subtheme 3.1: Sampling Biases are Inherent*

More than a third of studies reported that a challenge with social media research in the context of CAM was that sampling biases are inherent and surveying a representative sample is difficult [31, 34, 36, 40, 45, 47, 48, 50, 55, 57]. Studies that analyzed activity on Facebook or Twitter mentioned that they may have missed potential participants that were not Facebook/Twitter users, had private accounts, or did not have access to the internet [31, 34, 36, 48]. Studies that utilized qualitative methodology to analyze activity on online blogs recognized that their data lacked generalizability beyond the experiences presented [50, 55]. Additionally, since the participants in these studies were only accessed through online blogs, identity was not captured. Thus, no medical condition or treatment-related details could be confirmed by medical record. Additionally, various studies focused on posts from a single social media platform (i.e. Twitter) and acknowledged that their findings may not extend to other social media

platforms [31, 34, 36, 55, 57]. On the other hand, some studies only collected data on a single CAM treatment (i.e. chiropractic), and thus recognized that its findings may not extend to other CAM treatments on social media [40, 45]. Two studies also acknowledged that the views of social media users who posted in languages other than English were not captured [47, 50].

### *Subtheme 3.2: Privacy Standards of Social Media Platforms*

Furthermore, some studies mentioned that the reason there are challenges with social media research is because of the rigid privacy restrictions that prevent collecting detailed demographic information about users who were exposed to or interacted with a post on social media, but chose not to respond [31, 35, 42]. Three studies, which explored either Facebook and Pinterest, discussed this challenge in their research [31, 35, 42]. For example, a study analyzed the use of Facebook to recruit a target group of people to a survey on a CAM product [31]. The study discussed its recruitment method, which was primarily through Facebook advertisements, and the challenge of having a limited ability to assess the magnitude of any differential response bias because so little is known about nonrespondents (i.e., those who viewed the study recruitment advertisement, but did not click on it). Similarly, another study discussed the difficulty with conducting social media research because social media platforms like Pinterest do not share demographic information, the time of activity, or the extent to which users act upon the items they pin [35].

### *Subtheme 3.3: Challenges with Identifying Posts that Represent the Actual Attitudes of the Public*

Some studies described that one of the challenges of working with social media data was identifying posts that represent the actual attitudes of the public [47, 48]. One study analyzed the public attitudes on medicinal marijuana use for PTSD on Twitter [48]. The study reported that over 10% of all marijuana-related tweets were posted by the top 10 most popular cannabis-related Twitter accounts. This suggests that some of the tweets included in the study may have been sent through power users or Twitter bots [48, 59]. One study analyzed user-generated content found on YouTube on the practice of cupping therapy as a form of pain management [47]. The authors focused the study on the 100 most widely viewed English-language YouTube videos on cupping and noted that the results may not be generalizable to the less popular YouTube videos.

## **Theme 4: Studies Measuring the Efficacy of Social Media as a Platform for Delivering CAM Related Therapy or Information**

There were a variety of studies that measured the efficacy of social media as a tool for delivering CAM related therapy and information [39, 44, 51, 52, 54, 56]. Despite technology related challenges, such as technical issues when delivering dance therapy over Skype or Fuze, delivering CAM therapy over social media was found to be feasible, cost-effective and a viable future option [52, 56]. Additionally, using social media to deliver CAM therapy and information is accessible and is an especially good alternative when time is limited or when patients find it difficult to travel to receive services [39, 51, 54]. Moreover, social media has shown to be effective at both delivering information about CAM as well as CAM

therapies [39, 54]. For example, when gut-focused hypnotherapy was delivered over Skype to patients with irritable bowel syndrome (IBS), a clinically significant amount of research participants (65%) experienced a reduction in their IBS Severity Scoring System (SSS) score [39]. Additionally, primary care providers' understanding of neonatal intensive care unit (NICU) music therapy services, as well as knowledge of new research findings critical to the success of music therapy in the NICU, was increased through blogs [54]. Studies also suggested that more trials, and large non-inferiority randomized control trials (RCTs) in particular, are required to fully determine whether social media is just as effective for delivering CAM therapies as face-to-face treatment [39, 56]. However, a study also noted that for hypnotherapy used to treat irritable bowel syndrome (IBS), as hypnotherapy is not very invasive and IBS is a fairly serious condition, it would be inappropriate to wait for the results of RCTs to deliver this CAM therapy over social media for patients with IBS as preliminary findings have shown it is highly effective in this population [39].

## Discussion

The purpose of our scoping review was to provide a summary of the research on how social media is used in the context of CAM. This study identified 29 eligible articles which were published between 2012 and 2020. The amount of available literature on this topic, while not overly voluminous, presents a broad range of social media platforms analyzing a variety of CAM treatments such as chiropractic, yoga, Chinese patent medicine, and medicinal cannabis. Given that, to our knowledge, this is the first study to perform a systematic search of the peer-reviewed and grey literature on how social media is used in the context of CAM, it is hoped that these findings will provide both practitioners and researchers with an awareness of the research that has taken place at the intersection of social media and CAM.

### **Resources for Practitioners, Researchers, and Patients: Abundant, but of Unclear Quality**

This scoping review also provides readers with the list of eligible articles included in the present study which may aid in their understanding of how CAM is portrayed in social media. While the eligible articles that were included in this scoping review have been developed and evaluated to some degree by academic researchers, the present study was only designed to scope out the number of CAM-related social media studies and their key characteristics. As expected, most eligible studies analyzed well-known social media platforms such as Instagram [41, 43, 46] and Twitter [36, 48, 53], however, some others examined lesser-known social media platforms such as online illness blogs [55] and patient forums [42]. Furthermore, 12 eligible articles lacked generalizability due to challenges with conducting social media research including the inherent sampling biases [31, 34, 36, 40, 45, 47, 48, 50, 55, 57], the rigid privacy standards of social media platforms [31, 35, 42], and the difficulty identifying posts that represent the actual attitudes of the public [47, 48]. In addition, most studies analyzed data on a single type of CAM treatment (i.e., chiropractic) instead of multiple types of CAM treatments, which may have resulted in a lack of generalizability of study findings to other social media platforms and/or other CAM treatments.

### **Comparative Literature**

With regard to comparative literature pertaining to how social media is used to disseminate healthcare information, one scoping review focused on social media use as a recruitment method for medical research subjects [60]. The study found that the use of social media for recruitment has been understudied and suggests it as a promising research area. Following this suggestion, the present scoping review explored research on social media use to recruit participants for studies investigating CAM products. For example, one eligible article included in the present scoping review discovered that Facebook helped recruit a large number of study participants for a low cost [31]. Another scoping review found that there was an extensive and rapidly growing amount of literature exploring the use of social media in patient and caregiver populations, and that social media has the potential to have widespread utility within the healthcare system [61]. However, the authors agreed that this requires further research into the effectiveness of social media in improving patient outcomes.

With regard to comparative literature pertaining to the use of social media to share information and interact with others about CAM therapies, several studies reported that social media can be a useful tool for patients, physicians, and other healthcare professionals because it pools information on patients' evaluations of, and health outcomes from CAM therapies [18, 42, 62, 63]. For example, one study explored the interest of patients with breast cancer in CAM-related social media posts [42]. The study indicated that patients during and after treatments for breast cancer had a strong interest in social media posts about CAM interventions to complement their approved treatments. Another study found that 8% of cancer related information shared on Facebook was about CAM therapies [62]. Moreover, one study found that social media has been used to discuss CAM related therapies for glaucoma, with 40% of glaucoma related tweets associated with CAM therapies [63]. Furthermore, the concept of self-quantification, where individuals capture, record, analyze and share data about their personal health, has increased in prominence largely due to social media [18]. On the other hand, various studies have investigated the spread of misinformation about CAM on social media [23, 24]. For example, a study evaluating how hypertension is portrayed on YouTube found that 33% of the videos are misleading and 70% of the misleading videos are on unproven alternative treatments [23]. Similarly, another study found that social media influencers shared inaccurate and potentially harmful information about CAM on Instagram, an example being the claim that garlic makes the pancreas secrete "double-acting insulin" [24].

With regard to comparative literature pertaining to how other forms of media are used in the context of CAM, one scoping review focused on how eHealth technologies assisted in identifying potential adverse drug interactions with CAM, adverse CAM-CAM interactions, and standalone CAM adverse events and side effects [64]. The study identified 41 articles at the intersection of CAM and eHealth that are available to practitioners, patients, and researchers. However, similar to the present scoping review, the authors encouraged users to exercise caution when using these resources as the quality and update frequency varied widely. Another scoping review surveyed research on CAM and mass media and found a lack of reporting on issues related to safety and risk [65].

## **Areas Identified for Further Research**

We have identified a couple of areas for future research based on our findings.

Currently, there exists more information on social media about the use of CAM, CAM products, and CAM adverse events than ever before, yet the quality of studies exploring social media research in the context of CAM is questionable [15, 66–69]. We hypothesize that this research gap can be explained based on a number of reasons, including a lack of academic research funding, a lack of strategic approach, and a prioritization of conventional medicine research [70–73]. Patients, healthcare professionals, researchers, and policymakers alike all need resources that provide them with reliable, credible, and up-to-date information. This justifies a need for an updated review of social media research in the context of CAM along with a quality appraisal of relevant studies. It is also important to identify how consumers are searching and how social media platforms are being used in the context of CAM. Thus, further research is needed to explore the seeking and sharing behaviour of CAM information on social media. Furthermore, in addition to future research continuing to examine social media platforms, patient-authored texts in online health forums and medical blogs could offer a valuable resource to further understand individuals' attitudes and beliefs regarding CAM treatments [74, 75].

Moreover, research has shown that group polarization is prevalent on social media platforms involving controversial issues, which limits information dissemination among those with opposing views [76–78]. However, to our knowledge, it has not yet been explored as to whether this is also the case with CAM discussion on social media. If it is the case that the increasingly personalized algorithms on popular social media platforms expose individuals more often to posts that reinforce their beliefs and less often to posts containing novel information, it is possible that the confirmation bias is being magnified [79–82]. One study found that social media users who were exposed to health articles that conformed to their initial beliefs were more likely to share the article on social media [83]. Further research should explore the degree to which information is shared among dissimilar individuals on social media in the context of CAM [53, 77].

## **Strengths and Limitations**

A main strength of the study includes the fact that the titles and abstracts screening, and data extraction were completed independently and in duplicate. Limitations of this study include that only articles written in the English language were included, thus, important findings from non-English language articles may have been missed. Additionally, there are numerous types of CAM. Thus, while our search strategy and the definition of CAM we used when determining article eligibility were comprehensive, certain types of CAM may have been missed. Similarly, many types of social media exist. Thus, while our search strategy likely captured the most prominent types, some forms of less well-known social media may have been missed.

## **Conclusions**

The present scoping review involved a systematic search of the literature to identify the quantity and type of studies investigating how social media is used in the context of CAM. From 29 eligible articles, we

identified four major themes including: 1) social media is used to share user/practitioner beliefs, attitudes, and experiences about CAM, 2) social media acts as a vehicle for the spread of misinformation about CAM, 3) there are unique challenges with conducting social media research in the context of CAM, specifically regarding collecting a representative sample of data, and 4) social media has shown to be effective and a feasible option in delivering CAM therapies and information. Additionally, we highlight that while a substantial number of articles are available to practitioners, patients, and researchers, the quality and update frequency for many of these articles vary widely, and until formally assessed, remain unknown. Furthermore, we identify that a need exists to conduct an updated and systematically searched review of CAM-related healthcare or research resources on social media.

## **Abbreviations**

CADTH

Canadian Agency for Drug and Technologies in Health

CAM

Complementary and alternative medicine

CBD

Cannabidiol

CINAHL

Cumulative Index to Nursing and Allied Health Literature

IBS

Irritable bowel syndrome

NCCIH

National Center for Complementary and Integrative Health

NICU

Neonatal intensive care unit

PTSD

Posttraumatic stress disorder

RCT

Randomized control trial

SMT

Spinal manipulation therapy

SSS

Severity scoring system

## **Declarations**

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None.

# Authors' Contributions

JYN: designed and conceptualized the study, collected and analysed data, critically revised the manuscript, and gave final approval of the version to be published.

NJV: collected and analysed data, co-drafted the manuscript, and gave final approval of the version to be published.

JS: collected and analysed data, co-drafted the manuscript, and gave final approval of the version to be published.

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# Availability of Data and Materials

All relevant data are included in this manuscript.

# Ethics Approval and Consent to Participate

This study involved a scoping review of peer-reviewed literature only; it did not require ethics approval or consent to participate.

# Consent for Publication

All authors consent to this manuscript's publication.

# Competing Interests

The authors declare that they have no competing interests.

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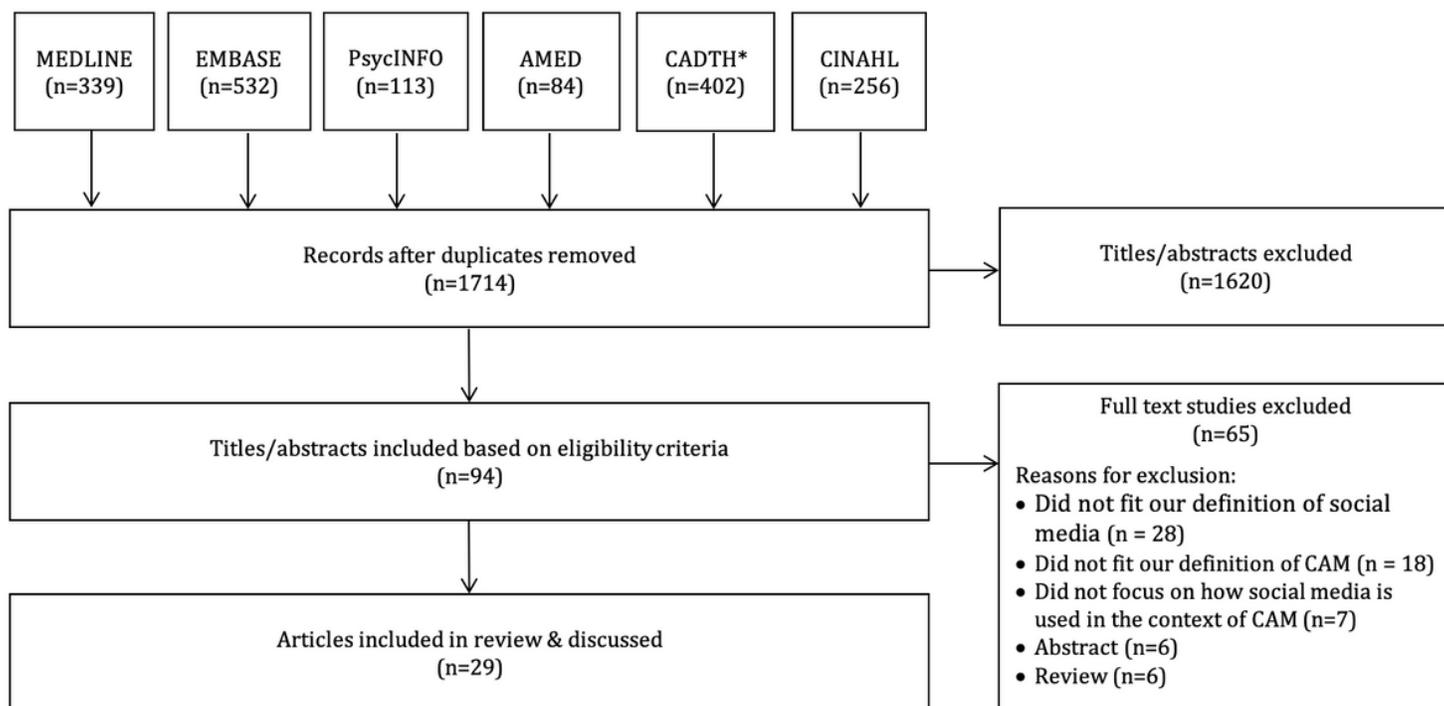
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## Tables

Tables 1-3 are available in the Supplementary Files section.

## Figures



\*List of Abbreviations: CAM = complementary and alternative medicine, CADTH = Canadian Agency for Drugs and Technologies in Health

Figure 1

PRISMA Diagram

## Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

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