

Social Psychology

Quick Natural Cure-Alls: Portrayal of Traditional, Complementary, and Alternative Medicine in Serbian Online Media

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To describe how Serbian online media cover the topic of traditional, complementary, and alternative medicine (TM/CAM), we conducted a content analysis of 182 articles from six news and six magazine websites, published July–December 2021. Biologically based treatments, predominantly herbal products framed as Serbian or Russian folk medicine, were the most common (70.9%, 205/289 practices). The practices were often presented as general health enhancers (18.4%, 71/386 claims); other common reasons given for the use of TM/CAM were to alleviate respiratory problems, boost the immunity, and detox. The tone was overwhelmingly positive, with most of the positive articles (82.4%, 145/176) neglecting to present information on potential harms of TM/CAM use. Few articles provided a recommendation to speak with a healthcare provider (13.6%, 24/176); in contrast, the recommended dosage was often explained (59.7%, 105/176). TM/CAM practitioners (15.9%, 28/176) and conventional medicine practitioners (12.5%, 22/176) were most commonly cited sources. Articles tended to appeal to TM/CAM's tradition of use (65.3%, 115/176), naturalness (45.5%, 80/176), and convenience (40.9%, 72/176), used pseudoscientific jargon (59.7%, 105/176), and failed to cite sources for the claims that TM/CAM use is supported by science (22.2%, 39/176). Much of the information provided in Serbian online media seems to be uncritical, with a potential for misleading consumers.

Introduction

Traditional, complementary, and alternative medicine (TM/CAM) encompasses a variety of health care practices that fall outside the scope of conventional medicine (World Health Organization, 2019). Despite the insufficient empirical scrutiny, research consistently documents their rising popularity (Fjær et al., 2020; Harris et al., 2012; Kempainen et al., 2018). For instance, a recent study from Slovakia reports that as many as 82.4% of citizens tried TM/CAM at least once (Souček & Hofreiter, 2022). In European countries, on average, one in four people used TM/CAM in the previous 12 months, ranging from 10% in Hungary to 40% in Germany (Fjær et al., 2020; Kempainen et al., 2018). However, these average rates increase two to four times among people who are experiencing health problems. The use of TM/CAM practices was particularly widespread during the early outbreak of the COVID-19 pandemic (Dehghan et al., 2022; Teovanović et al., 2021), suggesting their rising impact at times of uncertainty and concern.

Recent studies have shown that TM/CAM use is quite prevalent in Serbia. As many as 99% of the community sample participants reported having ever used TM/CAM (Purić et al., 2022), with practices often including various herbal medicine products (balms, creams, potions) and other biologically based treatments (vitamins, minerals, antioxidants), but also yoga, holy water, and homeopathy (Lazarević et al., 2023; Purić et al., 2022).

The popularity of TM/CAM is also evidenced by the amount of out-of-pocket spending. In 2007, for example, US citizens spent \$33.9 billion out-of-pocket on visits to complementary and alternative medicine practitioners and purchases of products, classes, and materials; 44% of these costs was spent on natural products alone (Barnes et al., 2009). In low- and middle-income countries, this kind of spending can be so high in relation to income that it might increase the risk of “financial catastrophe” (as was found among patients with cancer in southeast Asia, Kong et al., 2022).

While WHO recognizes TM/CAM practices as potentially vital contributions to quality health care, it also highlights

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the need to establish their effectiveness and safety through empirical research (WHO, 2019). Research supports at least three risks related to TM/CAM use: (a) adverse effects (e.g., liver damage caused by herbal remedies, Ernst, 2019); (b) diminished effectiveness of prescription drugs (e.g., among HIV patients, Ladenheim et al., 2008, or cancer patients, Werneke et al., 2004); and (c) avoidance of recommended treatment, leading to an increased risk of death (e.g., in cancer patients, Johnson et al., 2017). Thus, safe and efficient use of TM/CAM relies on the public being provided with valid recommendations about its use (Ernst, 2019).

Guidelines for Media Health Reporting

Media coverage can have a significant effect on health behaviors (Wakefield et al., 2010) and utilization of health services (Grilli et al., 2002). This is why guidelines for health reporting have been put forward (Goldacre, 2014). To be reliable, a piece of health reporting should contain a clear statement about its goals (e.g., whether it is educational or promotional). It should be as accurate and balanced as possible, that is, clear about the strength of evidence in favor and against a treatment, without unrealistic claims about its effectiveness and honestly reporting about the areas of uncertainty. Overstatements and sensational labels such as “cure”, “miracle” or “breakthrough”, which can mislead the consumers, are to be avoided; the language should not be obfuscating, but rather direct and widely understandable. Reporting about safety should be even more meticulous, and reporters are advised to be skeptical about all emphatic claims, such as those that a treatment has few or no adverse side effects. Good media coverage should cite the sources for the information and present diverse viewpoints in context (Schwitzer, 2005; World Health Organization, 2004).

Although these general guidelines also apply to reporting on TM/CAM practices, due to their specificities and growing popularity, WHO issued a separate document to flag additional areas of concern (WHO, 2004). For example, apart from citing the evidence base for a particular treatment, consumers need to be made aware of its legal status; reporting on risks and adverse effects of a treatment must have a section about its direct harm, but also its potential interactions with conventional medical treatments. Especially if it advocates for self-medication, a news piece should contain so-called posology information (time, dosage, method, and length of administration), as well as a clear recommendation to consult the conventional healthcare provider when deciding whether to start with the treatment and if there is no general improvement or if symptoms are worsening (WHO, 2004).

Previous studies suggest that the media’s adherence to health reporting guidelines is low. TM/CAM coverage was found to be, for the most part, positive in tone (Dunne & Phillips, 2010; Ernst & Weihmayr, 2000; Kava et al., 2002; Weeks et al., 2007), with some recent exceptions (Lavorogna & Di Ronco, 2018; Lopera-Pareja & Cano-Orón, 2021). Positive reporting was marked by the lack of information about potential risks and safety issues associated with TM/CAM use (Bonevski et al., 2008; Kava et al., 2002; Mercurio &

Elliott, 2011; Murdoch et al., 2018; Weeks et al., 2007) and by language exaggerating its potential benefits (e.g., “revolutionary”, “cure”, “magical”) (Murdoch et al., 2018). Additionally, it appears that advice to discuss TM/CAM with a healthcare provider was rarely provided (Mercurio & Elliott, 2011; Weeks et al., 2007). The most common sources were conventional medicine doctors and researchers as well as TM/CAM practitioners, with personal testimonials being prevalent in the case of TM/CAM therapies for cancer (Lavorogna & Di Ronco, 2018; Mercurio & Elliott, 2011; Weeks et al., 2007).

Appeals and Scienceplotiation Techniques Used to Promote TM/CAM

Despite its growing popularity, TM/CAM tends to claim that it is prejudiced against, overlooked, and easily discarded, especially by the scientific community (Ernst & Fasce, 2017; Singh & Ernst, 2008). Simultaneously, TM/CAM’s popularity can at least partly be ascribed to its often-lauded supposed virtues, which are used to frame TM/CAM as intrinsically superior to the biomedical approach (Ernst, 2019; Mijatović et al., 2022). People perceive TM/CAM as patient-centered and prepared to relinquish control of the healing process to the patient (Nissen et al., 2012), while also having a holistic approach that tackles the cause of the illness instead of just its symptoms (Ernst, 2019; Nissen et al., 2012). TM/CAM is also often praised as being natural, which could lead people to perceive it as safe and risk-free (Ernst, 2019; Nissen et al., 2012). Proponents of TM/CAM tend to point to the long-standing tradition of its use, evidenced by its continual popularity (Ernst, 2019; Ernst & Fasce, 2017) as well as to its inexpensiveness and the fact that it is readily available to administer (Ernst, 2019).

These appeals can also be found in the media. For example, previous studies point to some ways in which CAM is typically framed, such as (a) portraying it as a pragmatic collection of tools, without referencing the wider philosophical principles; (b) placing it in the broader context of health and wellbeing, moving away from the focus on illness; and (c) placing it at the heart of a “natural” or “alternative” lifestyle, concerned with internal balance (more often than with environmental issues) (Doel & Segrott, 2003; Lopera-Pareja & Cano-Orón, 2021; Weeks & Strudsholm, 2008). Other popular themes in the media include linking CAM benefits to its “naturalness” or tradition of use, emphasizing individual responsibility, sharing negative experiences with conventional medicine, and positioning CAM as a quick and convenient way to stay healthy (Dunne & Phillips, 2010; Peacock et al., 2019).

While TM/CAM makes an effort to position itself as the more compassionate and benevolent alternative (Ernst, 2019), its communication strategy can also, paradoxically, be to rely on the epistemic authority of science or on “scienceplotiation” (Caulfield, 2011). By exploiting the often limited knowledge of science the average person holds, it may co-opt the features of science people find impressive, including its language or refined “gadgets” (Blancke et al., 2017; Singh & Ernst, 2008). Previous media analysis studies have found that such jargon often references vague con-

cepts and intangible benefits (such as “boosting the immunity” or “improving circulation”), rarely providing any scientific evidence (Dunne & Phillips, 2010; Fogarty & Chalmers, 2021; Peacock et al., 2019). These scienceploitation techniques, in short, allow for the use of the cultural capital of science, while forgoing its institutional restraints (Boudry et al., 2014).

The Present Study

The objective of the present study was to explore Serbian online media coverage of TM/CAM by describing (a) the reported TM/CAM practices and their claimed health effects; (b) the media’s adherence to recommended health reporting guidelines (e.g., disclosing potential harms, recommending consultations with a healthcare provider, citing sources); and (c) dominant communication appeals and scienceploitation techniques used to promote TM/CAM to the audience. Such a design is able to both accommodate more descriptive research goals and collect rich qualitative data on the communication techniques employed by the media. To the best of our knowledge, this study is the first to analyze TM/CAM reporting in the Serbian media.

Method

Preregistration

We preregistered the research aims as well as the data collection and analysis plan at <https://osf.io/pc6x7>.

Positionality Statement

This study is part of a larger project investigating how irrational beliefs, personality traits, and cognitive styles relate to non-adherence to official medical recommendations and TM/CAM use and mapping the prevalence of these behaviors in Serbia. We believe that TM/CAM should be held to the same scientific standard as conventional medicine and that, given that its use may lead to harmful outcomes, media reporting on it should be critical, factual, and complete. Furthermore, we believe that information provided in the media should assist consumers with informed decision-making rather than deceive or mislead them.

Selection of Articles

We searched news websites and online lifestyle magazines in Serbia for articles discussing TM/CAM. We selected seven news websites in Serbia that, according to Gemius Audience (<http://rating.gemius.com>), had the largest number of real users in December 2021: *Blic.rs*, *Mondo.rs*, *Kurir.rs*, *Telegraf.rs*, *Novosti.rs*, *Alo.rs*, and *Nova.rs*. We selected seven online lifestyle magazines: *Zena.rs*, *Sensa.rs*, *Lepaisreca.rs*, *Stil.Kurir.rs*, *Lepotaizdravlje.rs*, *Elle.rs*, and *WannabeMagazine.com*; the first four were the magazines of the top three selected news websites while the latter three were recommended to us by health journalists.

In February 2022, we used [Google.rs](https://www.google.rs) (the Serbian version of the search engine) to hand search the websites for the period between July 1 and December 31, 2021. After an em-

pirical testing of various search terms, we developed a comprehensive search string containing terms in Serbian such as *narodna medicina* [folk medicine], *alternativne metode* [alternative methods], and *kućni lekovi* [home remedies] (see Text S1). We opted for value-neutral terms and did not include pejorative terms such as *nadrilekar* [medicaster, quack].

While we did not preregister a stopping rule (i.e., the number of articles when we would stop data collection), we included all of the search results from all of the pages in [Google.rs](https://www.google.rs) obtained using the preregistered search string and the preregistered search period. Search results were split in half and screened by two authors against predetermined inclusion and exclusion criteria. We included only news reports, reportage, and lifestyle or how-to articles in Serbian. TM/CAM had to be mentioned in the section label of the website, headline, subheadline, lead or within the first third of the article. Articles were discarded if they dealt solely with politics, industry, business issues, ethics, laws/regulations, education, culinary issues or tourism with regard to TM/CAM or if they dealt solely with disease etiology. The last three criteria were added after the preregistration, which was the only deviation from it. We discarded paid promotional articles and any duplicates. Detailed instructions for searching and screening articles are available at <https://osf.io/6fwkm>.

Following these criteria, we identified 265 potentially relevant articles, which were then assessed for eligibility by all authors. After excluding a total of 83 articles, the final sample consisted of 182 articles. There were 125 (68.7%) articles coming from six online lifestyle magazines and 57 (31.3%) articles coming from six news websites. Searches for *Nova.rs* and *WannabeMagazine.com* articles returned zero results. The list of excluded articles (with rationale) and PDFs of all included articles are available at <https://osf.io/7jft>.

Data Coding and Analysis

We developed a coding scheme based on previous research studies and reports. It was further refined during the article identification, trial coding, and final coding phase. Progressive versions of the coding scheme in Serbian and English are available at <https://osf.io/ua62m>.

To ensure the credibility of the content analysis, we focused on consensus building and evaluated inter-coder agreement during the trial coding phase. Trial coding was essential because we used a deductive approach and because more than two researchers would be involved in the final coding (Elo et al., 2014). Using the initial version of the codebook, two authors independently evaluated 10.4% (19/182) of randomly selected articles. The majority of variables had strongly skewed distributions (e.g., 95% of all responses falling into a single nominal category). Standard measures of agreement such as Cohen’s kappa lead to biased values for skewed variables and would have been inappropriate (Xu & Lorber, 2014). We, therefore, interpreted only percent agreement estimates for all categories in the coding scheme. The percent agreement of coders was high (80-100%) for all categories except for the category that in-

volved identifying whether the article used (pseudo)scientific jargon (33%). Coding instructions for the jargon category were revised and we decided to discuss the answers on this category again during the final coding phase until a consensus of understanding of the data was reached. A detailed inter-coder agreement report is available at <https://osf.io/9qud2>. Following the inter-coder agreement test, each of the four authors manually coded one fourth of the remaining articles.

First, to describe the main topics in the articles, we mapped TM/CAM practices and their claimed health effects. We copied every practice (e.g., acupuncture), subcategory (e.g., energy medicine), and system (e.g., Ayurveda) of TM/CAM appearing anywhere in the article. We did not code practices that were claimed to treat non-medical problems, such as beauty treatments or personal hygiene care. We coded neither dietary supplement intake nor functional food consumption. Every coded practice was categorized using the National Center for Complementary and Alternative Medicine (2000) taxonomy. We coded whether the practice was framed as *narodna medicina* [traditional, folk medicine] and what its provenance was claimed to be (e.g., Serbian, Chinese). Finally, we coded whether the practice was presented as effective against COVID-19.

When it comes to TM/CAM's positive effects on health, we coded those that were claimed in the headline, subheadline or lead. We focused on the beginning of the article for practical reasons, as the number of effects mentioned in the entire text was high. We copied both the specific (e.g., "treats asthma", "reduces swelling") and broad effects, which could have referred to, for example, general health improvement or immunity boosters (e.g., "does wonders for your health", "cures all ills", "strengthens the immune system"). After coding was completed, all copied effects were classified into broader categories we identified in the data.

Second, to explore whether they followed recommended health reporting guidelines, we applied the following codes to all articles:

- Tone (positive/neutral/negative) (taken from Lopera-Pareja & Cano-Orón, 2021), which could be indicative of the attitude towards TM/CAM.
- Mention of potential or recorded harms to health from using TM/CAM, including contraindications and general recommendations of caution (yes/no).
- Mention of TM/CAM's safety or harmlessness (yes/no).
- Provision of a recommendation to speak with a healthcare provider before, during or after using TM/CAM (yes/no) (adapted from Weeks et al., 2007).
- Provision of a specific dosage recommendation, referring to the amount, frequency or duration of TM/CAM usage (yes/no).
- Sources of evidence used to support information about TM/CAM (yes/no), including: scientific journal and conference articles, researchers, conventional practitioners, TM/CAM practitioners, industry representatives, consumer groups, government representatives, religious authorities, personal testimonials,

and non-expert celebrities (adapted from Weeks et al., 2007).

Third, to identify dominant communication strategies, we coded the appeals or principles used to promote TM/CAM and the ways in which the media might have exploited scientific authority. We coded for the presence of the following appeals (yes/no), adapting them from Ernst (2019) and Peacock et al. (2019):

- "TM/CAM is natural", emphasizing that TM/CAM is good because it is natural or linking naturalness to the body's "natural" defenses.
- "TM/CAM is holistic", emphasizing the approach of treating the person as a whole human being.
- "TM/CAM tackles the root cause" (of a disease or of many diseases), sometimes suggesting that conventional medicine only treats the symptoms.
- "TM/CAM is traditional", emphasizing that TM/CAM is good because it has been traditionally used for a long time; it could include appeals to nostalgia or the wisdom of the ancestors.
- "TM/CAM is an innocent industry", emphasizing that TM/CAM is a small industry that operates without the intent to deceive the consumers.
- "TM/CAM is compassionate", emphasizing that TM/CAM is more humane than conventional medicine (e.g., that TM/CAM practitioners are more understanding) or that TM/CAM is pleasant or gentle.
- "Conventional medicine is disappointing", emphasizing that conventional medicine does not live up to its promises or generally favoring TM/CAM over it.
- "TM/CAM is empowering", emphasizing how TM/CAM helps consumers take a more proactive role and responsibility for their health.
- "TM/CAM is convenient", emphasizing that TM/CAM requires less resources (e.g., time, money, discomfort).

Appeals to naturalness, holism, and tradition could include one-word mentions, without further elaboration (e.g., "natural diuretic", "follows the principles of holism", "an effective folk remedy for colds").

Finally, we coded three ways in which the media might have exploited scientific authority to promote TM/CAM (yes/no), using categories adapted from Singh and Ernst (2008):

- Use of scientifically meaningless pseudoscientific jargon (e.g., "harmonizing the energetic body", "negative calories", "scalar waves", "adaptogens"), including both elaborate explanations and isolated terms, but also vague, unclear or complicated explanations containing terms that are well defined within science (e.g., "electromagnetic resonance", "detoxification").
- Mention of "gadgets" employed by TM/CAM practitioners described as scientific or impressive.
- Failure to cite sources for the claims that the effectiveness of TM/CAM is supported by scientific clinical trials or conventional practitioners.

POWER DIRECTLY FROM NATURE

HEALTH IS BLACK: It was used even by the Egyptian pharaohs, who claimed that this plant CURES EVERYTHING - EXCEPT DEATH!

This plant was used in ancient Egypt, as a spice, but also as a medicine for many diseases...

DON'T THROW AWAY TANGERINE PEEL 7 problems it solves better than medicine, from indigestion to cancer

alo.rs/S.Ć. | WOMAN · 08.10.2021 · 14:35 · 0

Don't throw away tangerine peel, it can be used for health and beauty

THIS IS WHAT YOU WANT TO KNOW!

DID YOU KNOW THAT YOU HAVE 15 KILOGRAMS OF POISON AND PARASITES IN YOUR INTESTINES? Russian folk medicine, which will clean the whole body! (VIDEO)

Over time, a large amount of waste accumulates on the walls of our intestines, which poisons our body!

Figure 1. Examples of Included Article Headlines

Note. PDFs of the three articles translated into English are available at <https://osf.io/7jfhf>.

Results

We carried out a descriptive analysis of the collected data. Datasets, with code to reproduce the analysis done using {epiDisplay} (Chongsuvivatwong, 2022) in R 4.1.2 (R Core Team, 2020), are available at <https://osf.io/rvhzc>. The headlines and the subheadlines/leads of three articles included in the analysis, translated into English, are shown in [Figure 1](#).

TM/CAM Practices and Their Health Effects

We extracted a total of 289 TM/CAM practices from the articles (for a list of examples with frequencies and percentages, see [Table 1](#)). TM/CAM practices most commonly described were biologically based ones (70.9%, 205/289), predominantly various herbal medicine products. Articles sometimes also referred to whole medical systems. Less frequently, the articles mentioned mind-body interventions, manipulative and body-based methods, and energy therapies. Around half of the practices (52.2%, 151/289) were framed as *narodna medicina* [traditional, folk medicine]. For the majority of them, the article claimed they came from traditional Serbian (46.4%, 70/151) or Russian (22.5%, 34/

151) medicine. Six practices (2.1%, 6/289) were explicitly presented as effective COVID-19 treatments.

Since we were interested in claimed *positive* effects of TM/CAM, we analyzed only the effects extracted from articles with a positive tone. Out of 176 such articles, 166 claimed a total of 386 positive effects at the beginning of the text. While we extracted between one and seven effects already in the headline, subheadline or lead, most articles (83.7%, 139/166) mentioned between one and three effects. [Table 2](#) lists the effect categories we identified, along with examples, frequencies, and percentages. About a fifth of all effects could be categorized as general improvement of health or wellbeing, suggesting, for example, that TM/CAM can increase life expectancy or treat any disease. Other broader effects, including immunity boosts and detox, were also relatively frequent. Respiratory problems, such as the common cold, flu or cough, were the most frequently mentioned clinical outcome.

Adherence to Health Reporting Guidelines

Nearly all articles were positive in tone (96.7%, 176/182), recommending TM/CAM or expressing support for it. Five articles were judged to be neutral and one to be negative. To ease interpretation, we report all of the follow-

Table 1. Categorized Examples of TM/CAM Practices, With Frequencies and Percentages

TM/CAM category	Examples	Number of practices	%
Herbal medicine	apple cider vinegar; flower essences; syrups (thyme, marshmallow); balms and tinctures (calendula, garlic, hemp); teas (chamomile, horsetail, mint); oils (eucalyptus, pine, rosemary); other plants, fruits, and spices (aloe vera, ashwagandha, echinacea, figs, turmeric); various drinks (beet, ginger, oats)	164	56.7
Other biologically based treatments	chicken soup; diets (cabbage, Dukan, hibernation); golden milk; honey, regular or with additions (garlic, lemon, olive oil); lard; oxymel; whey	41	14.2
Whole medical systems	Ayurveda/traditional Indian medicine; acupuncture; aromatherapy; homeopathy; integrative medicine; quantum medicine; traditional Chinese/Russian/Tibetan medicine	33	11.4
Mind-body interventions	affirmations; breathing exercises; meditation; sound therapy; Tai chi; yoga	20	6.9
Manipulative and body-based methods	acupressure; massage; reflexology	8	2.8
Energy therapies	crystals; microresonance therapy; Rtanj Mountain energy; vibrational medicine	8	2.8
Other	baking soda; cold water immersion; detox; inhaling iodine/salt solutions; kerosene; <i>rakija</i> [Serbian brandy]	15	5.2
		289	100.0

ing analyses in the sample of positive articles only. While most articles (82.4%, 145/176) did not mention any potential harms of using TM/CAM, 11.4% (20/176) stated that TM/CAM was safe or harmless (e.g., “isn’t harmful to anyone”, “no side effects”, “safe to use”). Few articles (13.6%, 24/176) provided a recommendation to speak with a healthcare provider. More articles (59.7%, 105/176), however, described the recommended dosage of a TM/CAM product or treatment. TM/CAM practitioners and conventional medicine practitioners were the most common source used to support information about TM/CAM (15.9%, 28/176 and 12.5%, 22/176, respectively). Supporting information was less frequently provided by researchers (3.4%, 6/176), religious authorities (2.3%, 4/176), celebrities (1.1%, 2/176), consumer groups (1.1%, 2/176) or by using personal testimonials (1.1%, 2/176). Scientific articles, industry, and the government were never cited as the source.

Appeals and Scienceplotiation Techniques Used to Promote TM/CAM

To promote TM/CAM, almost two thirds of the articles appealed to tradition (65.3%, 115/176): “tested and approved by centuries of traditional use”; “an old folk remedy we all took as children”; “ancient remedy from Tibet”; “grandma’s secret to weight loss”; “a forgotten folk remedy”; “taking herbal and folk remedies used by our ancestors is sure to help”; “these recipes, proven in practice to be very effective, have been passed down for generations”; “Ayurveda is the oldest medicine in the world”; “even the Bible mentions black cumin”; “alternative forms of medicine have existed since time immemorial”; “this treatment is as old as the human race”; “has been used in Russia for centuries, which speaks to its effectiveness”; “can be linked to the medieval theory that plants look like the organ they heal”.

Appeals to naturalness (45.5%, 80/176) and convenience (40.9%, 72/176) were also common. Some naturalness appeals were: “an all-natural remedy”; “natural antibiotics”; “magical gifts of nature”; “if you are looking for a more natural way to treat headaches”; “there is a natural remedy for everything”; “nature is our best ally when it comes to health”; “works by ‘recruiting’ the body’s natural weight control mechanism”. Appeals to convenience emphasized the simplicity, affordability, availability, and the rapid effects of TM/CAM practices: “simple to make using just 4 ingredients”; “a beverage you can make at home”; “how to get rid of stress anywhere you are”; “try this free-of-cost cure”; “available without a prescription”; “can be found in any health food store”; “you will feel the effects after the first procedure”; “kilograms disappear overnight”.

Other appeals that were sometimes used emphasized the disappointment with the conventional medicine (13.6%, 24/176), that TM/CAM treats the root cause (9.1%, 16/176), and that it is holistic (8.0%, 14/176). Some disappointment appeals were: “there is so much medication, and yet we have essentially failed to help ourselves”; “if you’re tired of the life on medications”; “he went to the doctor, but there was no medicine for his condition that would cure him completely”. Cause appeals could be illustrated by the following examples: “allows us to see how our body works from the inside and reveals why headaches occur”; “helps him solve the problem that he has at the physical level at the root”. Holism appeals included statements such as: “views the man as a whole being - mentally, emotionally, spiritually and physically”; “while medicines and medications work in a targeted way, folk medicine helps return overall health to normal”. Other appeals we analyzed (i.e., emphasizing the compassion, self-empowerment, and innocence in relation to TM/CAM) were rarely or never used (Figure 2).

Table 2. Examples of Positive Effects of TM/CAM, With Frequencies and Percentages

Effect category	Examples	Number of effects	%
General health improvement	does wonders for your health; strengthens the whole organism; regenerates every cell in the body; affects our health, sleep and development; provides you with enough energy for the whole day; beneficial effect on the body, mind and spirit; restores the body to balance; your body will be reborn; a powerful fighter for your health; has the same effect like taking 14 medicines; for longevity; cure for the most devastating diseases; cures 100 diseases; there is nothing it doesn't cure; cure for all ills – except death	71	18.4
Respiratory	a cure for colds and flu; relieves cold symptoms; stops smoker's cough; cough remedy; sinus inflammation; expels mucus; bronchitis; laryngitis; sneezing; sore and scratchy throat; relieves asthma; lung pain	53	13.7
Immunity boosters	strengthens the immunity to the max; helps boost the immunity; fights off viruses; lowers body temperature; calms inflammation; prevents infections	35	9.1
Detox	cleanses the body inside and out; flushes all toxins from the body; gets rid of poisons from the body; cleanses the liver/blood/gut	34	8.8
Cardiovascular	protects the heart; reduces the risk of heart attack; prevents stroke; breaks blood clots; lowers blood pressure; reduces cholesterol	27	7.0
Digestive	cure for indigestion; protects the intestines; reduces bloating; helps with diarrhea; against constipation; gastritis; accelerates the excretion of bile acid; helps stomach ulcers	26	6.7
Mental health	improves mood; protects against negative emotions; positively affects our thoughts and emotions; depression; stress; insomnia; anxiety; for the nerves; concentration	22	5.7
Skin conditions	soothes all types of skin diseases; eczema; herpes; scar/burn care; rash; wound healing	15	3.9
Weight control	rapid weight loss; rids of appetite; rids of fat deposits	14	3.6
Bones, joints, and muscles	regenerates and heals the spine; bone and joint pain; relieves back pain; rheumatism; osteoporosis	14	3.6
Urologic	diuretic properties; urinary tract infections; dissolves kidney stones; soothes bladder inflammation	13	3.4
Menstrual/ Menopausal	relieves menopausal/(pre)menstrual symptoms; irregular menstrual cycles; restores sexual energy	10	2.6
Headache	headache relief	9	2.3
Malignant	prevention of oncological diseases; helps fight cancer; very effective in leukemia	6	1.6
Other categories	allergies; diabetes; hemorrhoids; hormone balance; liver problems	37	9.6
Total		386	100.0

We identified the reliance on pseudoscientific jargon and vague or long-winded explanations as the most frequent way in which the articles might have exploited scientific authority. Such jargon was used in over a half of the articles (59.7%, 105/176); for example: “the main ingredient of garlic is allicin, with miracle antibacterial, antiviral, antifungal, antiparasitic, and antioxidant properties”; “these waves can iron out the waves that cause illness within us”; “it helps our body to become alkaline”; “marjoram will set your body for a heightened absorption of positive energy”; “adaptogens are plants that . . . boost the function of organs and warn the body against imbalance”; “it contains phytoncides, flavonoids, and essential oils, which determine its bactericidal properties”; “affirmations help you program your body to lose weight at a subconscious level”; “as exceptional antioxidants, aronia berries prevent the formation of free radicals”; “the human cell nucleus emits light impulses . . . the electromagnetic resonance of the crystals affects those biophotons”.

While pseudoscientific “gadgets” were almost never mentioned (1.1%, 2/176), around a fifth of all articles (22.2%, 39/176) claimed that scientific studies or conventional practitioners support TM/CAM without citing sources for such claims: “laboratory studies show that ginger can prevent stomach ulcers”; “this combination of black tea and citrus peel, according to some research studies, reduces the risk of skin cancer by 70 percent”; “scientists claim that it is enough for a person to eat one fig every day”; “even some pediatricians recommend it for children”.

Discussion

Our findings show that biologically based treatments, predominantly herbal medicine, were the largest category of TM/CAM represented in Serbian media reports. One-half of the practices were framed as folk or traditional medicine, mostly Serbian or Russian. While the general pattern of TM/CAM categories is in line with previous studies (Bonevski et al., 2008; Dunne & Phillips, 2010; Milazzo

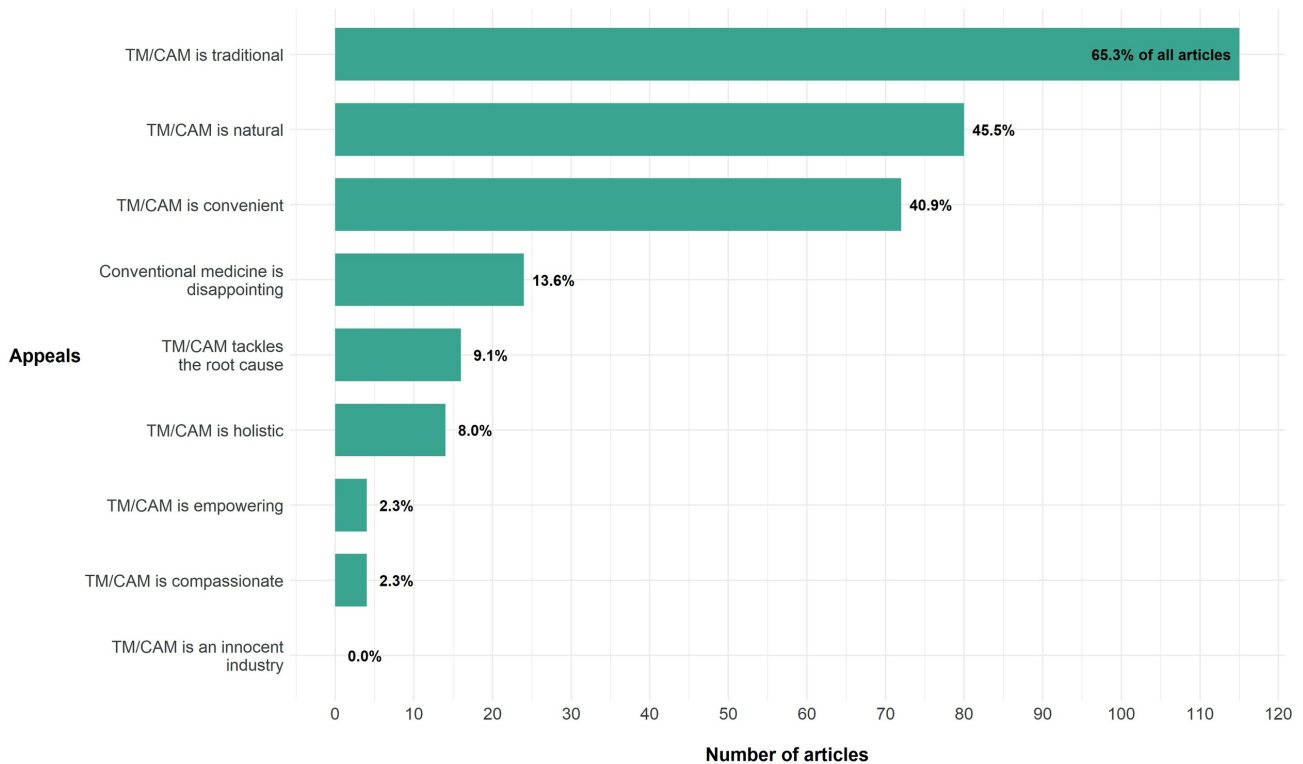


Figure 2. Appeals Used to Promote TM/CAM

Note. This figure shows how many articles with a positive tone ($N = 176$) used each of the listed appeals to promote TM/CAM. Created using [ggplot2] (Wickham, 2016) in R 4.1.2 (R Core Team, 2020).

& Ernst, 2006; Weeks et al., 2007), the predominance of herbal and traditional medicine is a novel finding. Since the previous studies did not explicitly investigate traditional medicine, the issue remains of whether this is a specificity of the cultural context.

The analyzed articles claimed almost 400 positive effects of TM/CAM practices already in the headline, subheadline or lead. Most frequent claims were made about general health improvement, alongside non-specific outcomes such as immunity-boosting, detox or cure-all relief. In addition, the media reports tended to eliminate the mediators (e.g., TM/CAM practitioners), constructing themselves as direct providers of cures to health-related problems. The universality of the promised effects breaches the guidelines for health reporting (Goldacre, 2014). Such effects are, however, supposedly relevant for the majority of the consumers and thus more likely to be clicked on, while their vagueness could be perceived as an attempt to shift the responsibility away from the recommenders.

Table 3 outlines the health reporting guidelines that were of interest in this study and indicates whether the Serbian online media outlets we analyzed adhered to them. Although the guidelines in health reporting explicitly ask for a balanced approach (Schwitzer, 2005; Vercellesi et al., 2010; World Health Organization, 2004), we observed a trend of univocal positivity: TM/CAM practices were in a vast majority of cases presented as beneficial, and the authors of the news pieces uncritically advocated their use. In the rare cases in which sources were cited, it was practitioners or official medical representatives supportive of

TM/CAM. The particularly sensitive issue of safety was almost never addressed; potential harmfulness or interactions of these practices with conventional treatments were not mentioned. What is more, a significant portion of articles argued that these practices are harmless and safe to use. In contrast to numerous stances of non-adhering to journalistic standards, the majority of articles did have a detailed posology section containing the dosage, timing and methods of administering a particular treatment (WHO, 2004). Although it is definitely positive that reporting follows this guideline, especially having in mind that they typically recommend self-medication, it is our impression that this section adds to the overall persuasiveness of the treatment in question or even to its magical allure (St. James et al., 2011).

Our analysis of appeals for TM/CAM is largely in line with previous findings, indicating that the media might be relying on a limited pool of tactics in promoting TM/CAM, reminiscent of the finite arguments of the anti-vaccination movement (e.g., Kata, 2012). The most dominant appeals we identified were the appeals to tradition, naturalness, and convenience, also found in previous studies (Dunne & Phillips, 2010; Lopera-Pareja & Cano-Orón, 2021; Peacock et al., 2019). In contrast, appeals such as self-empowerment or holism (Doel & Segrott, 2003; Peacock et al., 2019) were less present. The articles we examined rarely featured TM/CAM practitioners, and instead directly provided the consumers with tools needed to single-handedly administer these practices, emphasizing the convenience of traditional and natural remedies.

Table 3. Relevant Health Reporting Guidelines and Whether the Analyzed Serbian Online Media Outlets Adhered to Them

Relevant reporting guidelines	Did the media adhere to this guideline?
Present an accurate, balanced and complete report. Distinguish between advocacy and reporting. <i>Schwizer, 2004; Vercellesi et al., 2010; WHO, 2004</i>	No
Be skeptical about all emphatic claims, particularly about claims that an intervention has few or no adverse side effects. Do not give unrealistic recommendations. <i>Schwizer, 2004; Vercellesi et al., 2010; WHO, 2004</i>	No
Report the complete risks and benefits of any treatment, along with the possible outcomes of alternative approaches. Include both positive and negative outcomes of the treatment. Inform consumers about known adverse events and their causality. <i>Schwizer, 2004; Vercellesi et al., 2010; WHO, 2004</i>	No
Consult reliable sources (link to the sources). Seek out independent experts to evaluate the quality of evidence presented by sources. <i>Schwizer, 2004; Vercellesi et al., 2010</i>	No
Write in a language that is easy to understand. <i>WHO, 2004</i>	No
Be aware of the possibility of interactions that may result from the concurrent use of several TCAM practices and/or conventional drugs. Refer to a clinician. <i>WHO, 2004</i>	No
Provide posology information: dosage, time, length of taking. Provide information about the method of taking. <i>WHO, 2004</i>	Yes

In line with previous studies (Dunne & Phillips, 2010; Fogarty & Chalmers, 2021; Peacock et al., 2019), we also identified frequent exploitation of scientific language in appealing to consumers. While there is evidence that scientific jargon causes people to disengage in the case of official medical advice (Links et al., 2019; Shulman et al., 2020), it might have no such effect in the case of TM/CAM, or it could even cause more positive evaluation of these practices.

Strengths, Limitations, and Recommendations for Future Studies

While this study is, to the best of our knowledge, the first analysis of TM/CAM reporting in Serbian media, we did not uncover any cultural specificities in the way this topic is communicated to the audience, with the exception of the predominance of traditional Serbian and Russian medicine, uncommon in the Western media. In addition to focusing on a non-English speaking country, this study contributes to the field by developing a comprehensive coding scheme, able to reliably assess a range of categories related to the representation of TM/CAM content in the online mass media (e.g., appeals, tone, discussions of risks and safety, journalistic sources). As such, our work can be useful in helping to design policies aimed at improving media reporting on TM/CAM in the region.

The decision to exclude paid promotional content in online news and magazines may have limited the study findings. Future research can, therefore, investigate whether there are any differences between overtly promotional and non-promotional TM/CAM-related messages in the media.

To gain more precise insight into the plausibility and accuracy of information used to recommend TM/CAM, social scientists would benefit from collaborating with medical experts equipped to examine the quality of evidence presented in online news or magazine articles. Future research in the area may focus specifically on how journalists and editorial teams decide to cover the topic of TM/CAM; interviews could, for example, explore whether they use certain communication strategies (e.g., tradition, naturalness or convenience appeals) because they were explicitly instructed to do so or whether they developed these strategies based on audience engagement feedback. Our results do not offer insight into whether media coverage of TM/CAM is more or less responsible than that of conventional medicine; future studies could tackle this by including a conventional medicine coverage control group. In the most comparable study to ours that focused on a conventional medicine issue (vaccination), most of the analyzed news articles were neutral in tone (61%), while a third (33%) were overtly positive (Lazić & Žeželj, 2022a, 2022b).

Conclusion

We explored how Serbian online media cover the topic of TM/CAM by conducting a content analysis of articles published on popular news and lifestyle magazine websites in 2021. The TM/CAM practices most commonly described were herbal medicine products, often framed as Serbian or Russian folk medicine, and TM/CAM use was most often described as beneficial for general health or wellbeing improvement. The media's adherence to health reporting guidelines was low – potential harms of TM/CAM use were

rarely addressed, recommendations to speak with a health-care provider were almost never provided, and sources for the claims were either not cited or were not diverse. Media reports tended to draw on a limited number of appeals to promote TM/CAM (tradition, naturalness, convenience) and often used pseudoscientific jargon that was difficult to comprehend. Given that TM/CAM use may lead to harmful outcomes (such as adverse events, avoidance or neglect of official treatment or interaction with it), the information provided in media articles appears to be inadequate to assist consumers with informed decision-making, with a potential to even mislead them. The findings offer insight into how online media promote TM/CAM use, highlighting the issues that need to be addressed towards ensuring more critical health reporting.

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Contributions

Contributed to conception and design: AL, MBP, MB, IZ
Contributed to acquisition of data: AL, MBP, MB, IZ
Contributed to analysis and interpretation of data: AL, MBP, MB, IZ
Drafted and/or revised the article: AL, MBP, MB, IZ

Approved the submitted version for publication: AL, MBP, MB, IZ

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Competing Interests

The authors report no competing interests.

Data Accessibility Statement

Datasets and analytic code: <https://osf.io/rvhzc>
Trial coding data and the intercoder agreement report: <https://osf.io/9qud2>
Sampling strategy and media articles: <https://osf.io/7jfht>
Codebook development: <https://osf.io/ua62m>

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