Attitudes Underlying Reliance on Complementary and Alternative Medicine

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Abstract

Objective: We aimed to map attitudes underlying complementary and alternative medicine (CAM) use, especially those involved in "dysfunctional CAM reliance," that is, forgoing biomedical treatment in a life-threatening situation in favor of alternative treatment. Analyses of modifiable determinants of CAM use were conducted at a sufficiently specific level to inform intervention development. **Methods:** We collected usable data on CAM-related attitudinal beliefs from 151 participants in Budapest with varying degrees of CAM use, which we analyzed using confidence interval–based estimation of relevance plots. **Results:** Although there were beliefs that the entire sample shared, there was a marked difference between the biomedical and CAM groups. These differences were beliefs concerning trust in various medical systems, the level of importance assigned to emotions in falling ill, and vitalism or Eastern concepts. Regarding CAM users in general, the most successful intervention targets are beliefs in vitalism on the one hand, and distrust in biomedicine on the other. In addressing dysfunctional CAM use specifically, the most significant beliefs pertain to "natural" cures and reliance on biomedical testing. **Conclusions:** Albeit much research has been carried out on the motivations behind CAM use, rarely do studies treat CAM users separately in order to scrutinize patterns of nonconventional medicine use and underlying cognition. This is the first study to begin pinpointing specific attitudes involved in dysfunctional CAM use to inform future intervention development. Such interventions would be essential for the prevention of incidents and mortality.

Keywords

complementary and alternative medicine, attitudes, CIBER plot, intervention development, dysfunctional CAM use

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Introduction

In Western pluralistic health care systems, patients have the option of choosing "nonconventional treatments" to treat their ailment: services, products, and processes (together: "modalities") referred to as complementary and alternative medicine (CAM). The term "complementary" signifies treatments that are used in tandem with biomedicine, whereas the term "alternative" connotes treatments employed instead of biomedicine. Most studies agree that CAM use is increasing throughout the Western world,[1-3] and depending on the scrutinized illnesses and modalities, CAM use ranges between 40% and 86% in the United States and Europe.[4,5]

Although CAM use in many cases does not endanger the patient, there are instances when nonconventional therapy employed as alternative treatment does signify a hazard. CAM users are at a higher risk of forgoing recommended biomedical treatment either in an a priori (refusal to undergo treatment) or a posteriori (discontinuing the treatment) manner.[6] Refusal to undergo or electing to discontinue biomedical treatment when faced with life-threatening illness poses threats to patient safety, as do potentially dangerous interactions among biomedical and CAM therapies.[7-10] This is exacerbated by the fact that 40% to 77% of those employing CAM opt not to disclose their CAM use to their physician,[11-14] even in disease types such as cancer.[7,15,16] When

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CAM use occurs as an alternative to biomedicine in a life-threatening situation or if it interferes with the effectiveness of biomedicine, we refer to it as "dysfunctional." In such situations, intervention is warranted to prevent needless incidents and mortality, and such intervention requires a thorough understanding of the determinants of dysfunctional CAM use.[17-19]

The Cochrane Collaboration defines CAM as

[a] broad domain of healing resources that encompasses all health systems, modalities, and practices and their accompanying theories and beliefs, other than those intrinsic to the politically dominant health systems of a particular society or culture in a given historical period.[20]

This definition acknowledges that CAM is not restricted to a specific service or product but encompasses a set of beliefs concerning health and illness as well, which may vary considerably among modalities, yet represent important factors in their use.

Most studies treat CAM users as one group, but when scrutinized separately, patients employing nonconventional treatments in tandem with biomedicine (complementary medicine [CM]) and those employing them as an alternative to biomedicine (alternative medicine [AM]) exhibited different motivations and attitudes. In 1998, Astin found that dissatisfaction with and distrust in biomedicine was a significant predictor in alternative but not in complementary use.[21] In the latter group, patient characteristics such as "holistic thinking" and "spirituality"[21] were significant predictors, alongside psychosocial etiology as a naive theory of illness causation.[22] According to Hunt et al, employing CAM as an alternative to (as opposed to complementing) biomedicine reached 30% among all British CAM users in 2010.[23]

Many studies have explored sociodemographic variables in connection with CAM use such as age, education, place of residence, economic status, sexual orientation, and religion,[24,25] and have concluded that the average CAM user is a middle-aged, wealthy, well-educated, Caucasian female most likely suffering from cancer.[4,12,13,21,23,26] However, sociodemographic determinants of behavior cannot feasibly be targeted by interventions aiming to decrease dysfunctional CAM use: such prevention efforts are limited to targeting modifiable determinants, often the proximal determinants of behavior that mediate potential effects of more distal sociodemographic determinants.[18,27-29]

Studies that addressed more proximal determinants of CAM use explored patient motivations. For example, the market niche hypothesis asserts that CAM appeals to patients in areas where biomedicine is perceived to be lacking: patient-centered care and the attribution of meaning to suffering.[24,30-32] Another approach is the push and pull dichotomy, where motivations for CAM use are grouped into the categories of "push factors" repelling patients from biomedicine (eg, ineffective cure for their illness or severe side effects) and "pull factors" drawing patients toward CAM.[33-37] The most prominent pull factor is "philosophical congruence,"[38] which occurs when a patient presumes to discover their own cultural values in a CAM modality, that is, the patient identifies with (aspects of) the modality's cultural system. Such congruence may occur in a wide variety of ways with an assorted constellation of values and attitudes.

Similar to the dichotomic model of push and pull, many authors juxtapose "dissatisfaction with biomedicine" on the one hand, and general "values/beliefs" on the other, assigning the latter a more significant role in therapy choice.[21,39,40] A substantial amount of literature on the subject considers such beliefs significant predictors of CAM use, overshadowing the importance of a perceived lack in biomedicine[4,21,26,38,41,42] or clinical factors.[43,44] Such general beliefs that have been linked to increased CAM use include a need for more control and empowerment in the illness experience[4,45-48] and in the practitioner-patient relationship,[4,49-52] as well as a marked need for social support.[4,23,24,49]

Furthermore, illness usually induces a loss of control,[53,54] which may trigger an increased need for attributing meaning to the illness experience.[55] Meaning-making in such a context has been shown to aid disease management, as well as increase the level of perceived control[4,56] and resilience.[48] Some authors argue that CAM worldviews and etiologies provide possible avenues of interpretation, which may play an influential role in the utilization of CAM.[24,30,39,57]

CAM use has been predicted using Health Locus of Control (HLOC) as well, where most studies suggest Western CAM users are more likely to have an internal HLOC.[58,59] Furthermore, CAM use has been shown to positively correlate with constructs such as positive thinking,[4] optimism,[4,60-63] self-efficacy and agency,[4,48,64] as well as holistic thinking.[4,48,49,65,66] Yet such constructs differ in how they are defined and measured, suggesting that studies' use of identical construct labels does not necessarily imply that they are measuring the same phenomenon.[28,67]

There is an increasing number of studies exploring Modern Health Worries (MHW),[68] beliefs concerning the perceived detrimental effects on health posed by modern, technological advances and devices. The MHW scale is composed of 4 subscales: toxic interventions (TI), environmental pollution (EP), tainted food (TF), and radiation (RA). Items within the scale explore a wide range of attitudes that have been found to positively correlate with CAM use.[69] This wide range has the potential to provide useful leverage points for health promotion interventions aiming to decrease dysfunctional CAM reliance. However, these items are customarily aggregated, which precludes identification of viable intervention targets.

Concepts of health and illness comprise one system with other, non–health care concepts and notions present in the social network of the patient.[44] This conceptual framework and related attitudes are significant, as they influence the interpretation of symptoms, health and illness behavior, self-care, help-seeking, trusted sources of information, compliance, and coping.[44,70-73] Beliefs underlying behavior are shaped by the individual's sociocultural environment and may vary in populations. Thus, behavioral determinants may differ to some degree for different behaviors and populations in various cultural contexts.

International studies have found that CAM users tend to retain a preference for the "natural," often defined as "clean," "healthy," and "not man-made."[74] What is "natural" is often linked to dietary considerations as well, such as consuming "organic" and "unprocessed" food that is not "genetically manipulated" and does not contain "toxins" or additives. Natural therapies are conceptualized as harmless and drawing on the body's "self-healing" mechanisms; these therapies are usually equated with herbal and folk or traditional medicine.[75] Pharmaceuticals are frequently seen as "chemicals" to be avoided if possible or at all costs.[39,42,44,48,57,76]

Another prevalent attitude associated with CAM use in the West is psychosocial etiology manifesting in various concepts that elaborate a unidirectional causality between "soul" and "body." Psychosocial phenomena are believed to cause somatic illnesses, and in turn, healing is also conceptualized as originating in psychological changes.[39,77-80] Psychologization, as a "cultural mega-trend" in Western countries,[71,81] is regularly associated with CAM use, not just with regard to psychosocial etiology but also because CAM users may conceptualize health as the transformation of the Self through illness,[48,53,64] for which many CAM modalities offer frames of reference. Pharmaceuticals and biomedical procedures may be seen by the CAM user as inadequate treatment for somatic ailments that are "in reality" caused by psychosocial problems.[6]

Vitalism—beliefs in concepts of energy—is also reported as a significant attitude among CAM users,[6,40,49] and it may often constitute part of the "spirituality" dimension in quantitative surveys.[21,24,82] A belief in "universal energy" that courses through or gives rise to all living things may be accompanied by New Age concepts of man. In these interpretations, each individual is composed of an idealized "Self" (sacred, eternal) and an "Ego" (profane, temporary); one must "learn"—via hardships like somatic illness—to identify more with the former and minimize the latter through the process of "personal growth."[83] Vitalism may also include beliefs in elements of Eastern religions and philosophies, such as karma and reincarnation. Furthermore, these beliefs may be linked to teleological reasoning and illness or body symbolism (such as considering a hearing problem rooted in a reluctance to "hear" something undesirable). The association between CAM use and attitudes related to vitalism has been documented in qualitative studies in various countries, such as the United States,[64] Australia,[84] Denmark,[85] the United Kingdom,[86] Slovenia,[87] and Hungary.[88]

Thus, many potential reasons for relying on CAM in addition to or instead of biomedicine have been identified, and while these reasons exhibit some similarities across populations, they also differ in some aspects. Given that identification of attitudinal targets is a prerequisite of successfully discouraging dysfunctional CAM use, this is a lacuna that requires urgent resolution. Therefore, we compiled a large set of CAM-related attitudinal beliefs and report the analyses of modifiable determinants of CAM use at a sufficiently specific level to inform intervention development. Informing behavior change interventions that address dysfunctional CAM use requires mapping the beliefs held in the target population, in this case, Hungarian citizens.

In this study, we map the attitudinal beliefs in Hungary, based on the results from a qualitative study conducted between January 2015 and June 2017.[75] In that study, participant observation was carried out at 4 sites of traditional Chinese medicine (TCM) involving 105 patients, and semi-structured interviews were conducted with patients and practitioners of TCM (N = 20). Items used in the present study were derived from this previous qualitative project. We will explore the predominant attitudinal differences between patients in a biomedical (BM) group, recruited at offices of general practitioners, compared with the 2 CAM groups (CM and AM). We will also investigate whether these beliefs differ between CM and AM users and establish which beliefs predict dysfunctional CAM use most strongly, thereby identifying the promising targets for interventions aiming to decrease dysfunctional CAM use.

Methods

Sample Size Planning

Sample size planning was based on 3 considerations: power in a standard null hypothesis significance testing power analysis, sufficient accuracy when estimating parameters, and pragmatic considerations. CAM users are a hard-to-reach population; therefore, the planned sample size had to remain realistic. In the ideal scenario, we would have recruited a sample size that would allow us to estimate the parameters of interest with sufficiently narrow confidence intervals (CIs; ie, the accuracy in parameter estimation approach).[89,90] For Cohen's d, to obtain a 95% CI with a maximum half-width of a 10th of a standard deviation requires between 1545 and 1660 participants,[91] which was not realistic. If we accepted a maximum half-width of one third of a standard deviation, between 142 and 146 participants are required, a more reasonable number. With 150 participants, equally distributed between the groups, one

obtains 86% power against an effect size of half a standard deviation ($d = 0.5$). This seemed acceptable both from research and practical perspectives, so we aimed to recruit 165 participants, allowing for 10% of corrupt data (due to missing values or participants who did not participate seriously).

Procedure

The paper-based, self-administered survey was conducted in Budapest, Hungary, between February 2017 and May 2017. One version was developed for CAM users and was administered at TCM clinics via the TCM practitioner. Patients were included who were aged 18 years and older and had been a patient at the clinic for more than 1 month. Another version of the questionnaire was developed for individuals who do not employ CAM and was administered at general practitioner offices. The patients were approached by a researcher, were included if they were 18 years or older, and passed the following 2 filter questions: "Have you employed a CAM modality to treat an illness?" (must answer: no) and "Have you been treated by a biomedical doctor for an illness?" (must answer: yes). The 2 versions of the survey were identical regarding the attitude scale; the CAM questionnaire contained extra questions concerning CAM use. Participants in the study provided informed consent to participate anonymously. Approval was obtained from the Semmelweis University Regional and Institutional Committee of Science and Research Ethics, Reference Number: SE TUKEB 6/2015.

Analyses

We used the following item to group respondents into CM and AM groups: "How are you presently treating your illness(es)?" with answer options "I only employ TCM"; "I employ TCM and other CAM"; "I employ TCM and biomedicine"; "I employ TCM, other CAM, and biomedicine." Participants who endorsed 1 of the first 2 answer options formed the AM group, and participants who endorsed 1 of the last 2 answer options formed the CM group. Diamond plots of the means were generated in order to compare participants who solely used biomedical treatment with those employing nonconventional medicine as either complementary or alternative treatment.[92] To establish determinant relevance, we generated confidence interval–based estimation of relevance (CIBER) plots.[93,94] Diamond plots (of which CIBER plots are a specific implementation) were generated because they enable visualizing the raw data as well as the accuracy of estimates. Consistent with this line of reasoning, we will base our conclusions on visual inspection of the results rather than on applying "bright-line" rules, which are discouraged by the American Statistical Association.[95] All data, materials, and scripts are available at the Open Science Framework at https://osf.io/djkyf/, enabling researchers to inspect the exact correlation coefficients and CIs, conduct alternative analyses, or include the data in individual patient data meta-analyses.

Results

Sample Characteristics

The sample comprised 151 participants after listwise deletion of missing values (157 before). There were more female participants than male (70%). The proportion of survey participants who reported to prefer biomedicine were slightly higher (38%) than the proportion who chose alternative or complimentary medicine (29% and 31%, respectively). Those who chose biomedical services were on average younger (mean $[M]_{age} = 43$ years old, 95% CI = 38 to 47) compared with those in the other 2 groups ($M_{age} = 49$ in the AM group, 95% CI = 45 to 53; and $M_{age} = 50$ in the CM group, 95% CI = 46 to 55). The proportion of females among those who reported to prefer CM and BM was slightly higher (75%, 95% CI = 60% to 86%; and 71%, 95% CI = 57% to 82%, respectively) compared with those who reported to prefer AM (67%, 95% CI = 51% to 80%). The majority of people in every group identified themselves as Christians (36% in the AM group, 95% CI = 22% to 51%; 59% in the CM group, 95% CI = 43% to 72%). It is worth noting that in the BM group, the second most frequently selected option of religious belonging was "not religious" (29%, 95% CI = 18% to 43%), whereas in the AM and the CM groups, it was "religious in my own way" (31%, 95% CI = 18% to 47%; and 27%, 95% CI = 15% to 42%, respectively, and 9%, 95% CI = 3% to 19% in the BM group). In all 3 groups, the most frequently reported educational status was master's degree (60%, 95% CI = 47% to 73% in the BM group; 78%, 95% CI = 63% to 89% in the AM group; and 77%, 95% CI = 63% to 88% in the CM group).

Beliefs Held by the 3 Groups of Participants

Figure 1 shows the beliefs held in this sample. Points represent individual participant scores, and diamonds represent the 95% CIs for the means. Results are shown separately for the 3 groups of participants to facilitate comparison. Many beliefs were held similarly in all 3 groups, with no or trivial differences. Beliefs in which groups most overlapped included the determining role of the immune system, a healthy diet, and the low involvement of the social environment in the process of falling ill and healing. Also, all 3 groups agreed that one must suffer to attain health, and that chance and luck have little to do with falling ill or getting better.

However, many beliefs also differed, mostly exhibiting a pattern where the BM group stood in contrast to the other 2 groups. This was the case for beliefs related to various
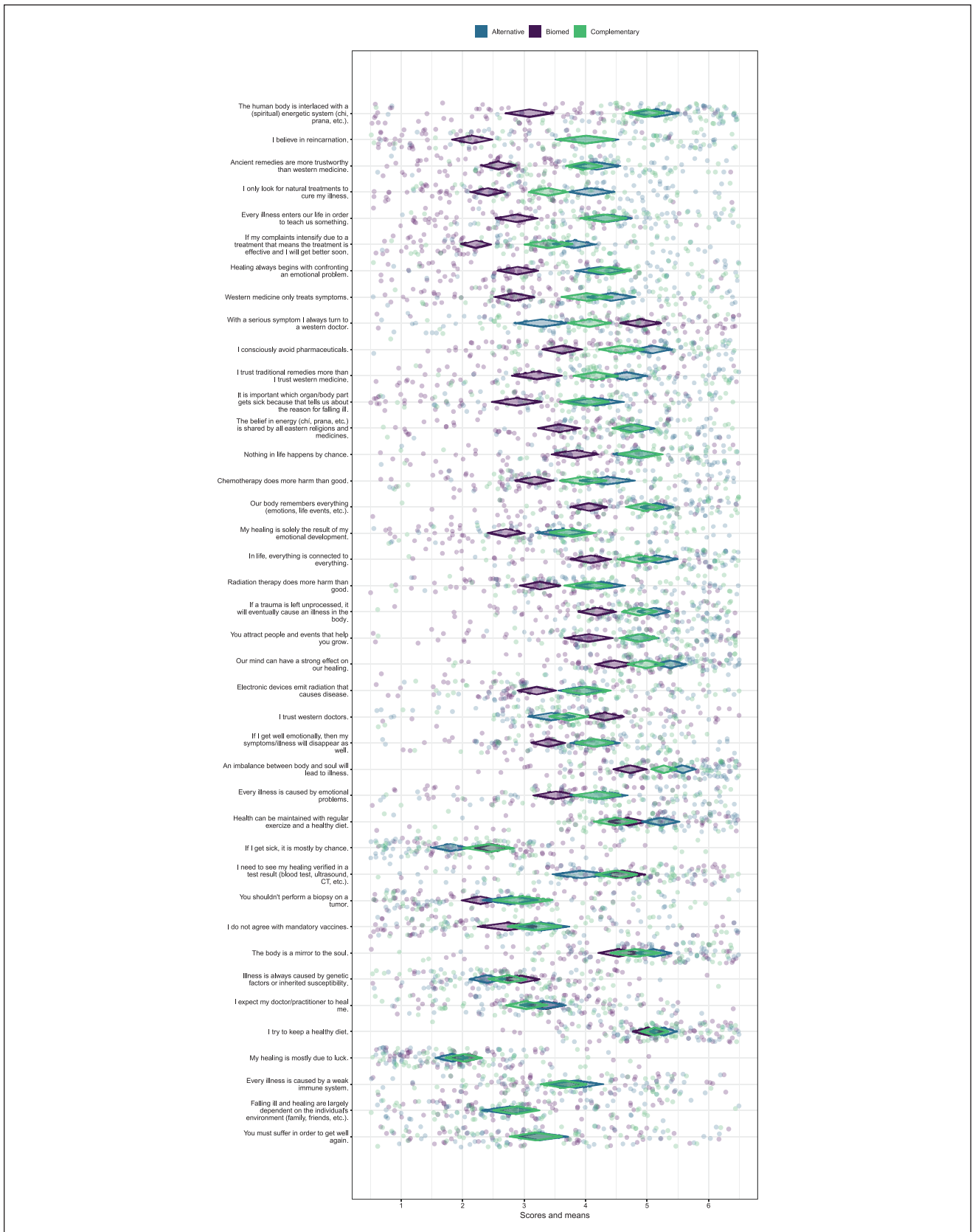
Figure 1. The means and scores for the 3 examined groups: patients solely using biomedicine (BM) and those using nonconventional medicine as either a complementary (CM) or an alternative (AM) treatment.

medicines and cures: the trustworthiness of traditional and ancient remedies compared with Western medicine; whether Western medicine only treats symptoms; whether pharmaceuticals are best avoided; whether serious symptoms call for visiting Western doctors; a preference for natural treatments; and the conviction that increased complaints indicate treatment effectiveness. Furthermore, the BM group differed in the level of importance assigned to emotions in falling ill. This was the case for beliefs such as that an imbalance between body and soul causes illness; that healing is solely determined by a patient's emotional development; that the symptomatic body part is indicative of an underlying psychosocial affliction that is interpreted symbolically; and that unprocessed trauma causes disease. Compared with the BM group, the CM and AM groups held stronger convictions in the validity of beliefs such as one attracts people and events that facilitate growth; one's body remembers everything (eg, emotions, life events); reincarnation is real; in life, everything is connected to everything; nothing in life happens by chance; a concept of energy is shared by all Eastern religions and medicines; and illness aims to teach the patient something.

In most of these cases, the mean of the CM group was in between the means of the 2 other groups. However, the CIs show that formal tests would not suggest that the CM group differed from the AM group. Nonetheless, the high consistency of these patterns suggests that participants in the CM group share characteristics with both of the other groups.

Confidence Interval–Based Estimation of Relevance of Potential Intervention Targets

The association patterns exhibited in Figure 1 are simultaneously consistent with the CM and AM groups being distinct groups in the population and with the CM and AM groups being indistinguishable. Therefore, we produced 2 CIBER plots. Figure 2 shows the differences in beliefs held by participants who did not use any nonconventional medicine and participants who used nonconventional medicine in some form (CM and AM). Figure 3 shows the differences in beliefs held by participants who engaged in complementary use of nonconventional medicine and participants who engaged in alternative use of nonconventional medicine. The first CIBER plot is useful when developing interventions to discourage CAM use in general. However, if in reality CM users do differ from AM users, the primary intervention targets should be the beliefs distinguishing those 2 groups, as shown in the second CIBER plot. In the latter scenario, discouraging CAM use in general may backfire, since that also includes harmless CAM use (ie, not dysfunctional CAM use), and may contribute to the stigmatization and alienation of the target population. Note that in these CIBER plots, all CIs have been set to 95%.

The patterns in Figure 2 suggest that, if need be, the CAM groups together are most effectively targeted with interventions addressing the beliefs that the body is interlaced with an energy system and that reincarnation is real. Similarly, significant beliefs include a distrust in biomedicine and not turning to a physician concerning a serious symptom. Additionally, important beliefs may include that natural and ancient remedies are more trustworthy than Western medicine, and that intensifying symptoms indicate treatment efficacy. Other slightly less relevant beliefs are the influential role of emotions in healing and the conviction that illness occurs in order to teach an individual something. Figure 3 shows the CIBER plot comparing participants in the CM group versus those in the AM group. These patterns suggest that in interventions for CAM users most at risk of dysfunctional CAM use (those in the AM group), it is important to target the belief that natural treatments should always be preferred. Furthermore, the AM group left less interpretive space for a genetic etiology and exhibited a decreased need for verifying their illness or healing with biomedical test results; thus, these beliefs seem to be important intervention targets as well. Finally, the AM group was less likely to turn to a biomedical doctor with a serious symptom, which, although is likely measured behavior rather than attitude, does capture dysfunctional CAM use accurately.

Discussion

Recommendations for Intervention Development

Our objective was to map attitudinal differences between patients using solely biomedicine and those using nonconventional medicine. We also explored whether any attitudinal differences can be pinpointed between the CM and AM groups, thus lending insight into the beliefs most responsible for dysfunctional CAM use and signify promising intervention targets. In order to achieve the latter, we generated CIBER plots to establish determinant relevance.

Comparative diamond plots of the means revealed that although there were beliefs shared by the entire sample, there was a marked difference between the BM and CAM groups. These differences were beliefs concerning various medical systems; the level of importance assigned to emotions in falling ill and healing; and vitalism or Eastern concepts.

The CIBER plots for BM versus CAM revealed that the most successful intervention targets seem to be regarding beliefs in vitalism on the one hand, and distrust in biomedicine on the other. If CM and AM groups are taken as separate intervention targets, as would be indicated for addressing dysfunctional CAM use, then the most promising beliefs appear to be not preferring a natural cure and relying more on biomedical testing, which would, in turn, possibly affect
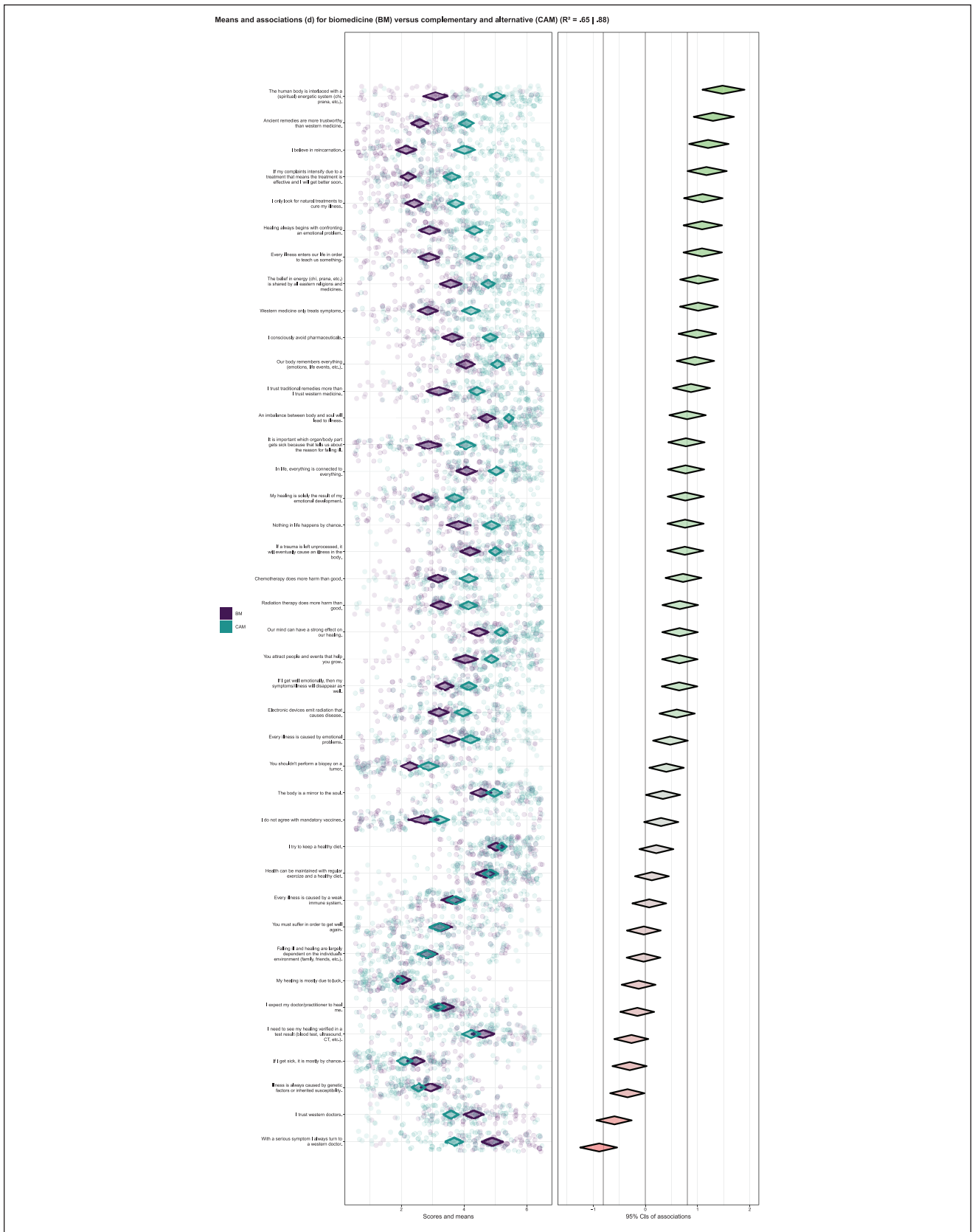
Figure 2. The confidence interval–based estimation of relevance (CIBER) plot comparing patients using biomedicine (BM) with those using nonconventional medicine in some form (complementary and alternative medicine [CAM]).
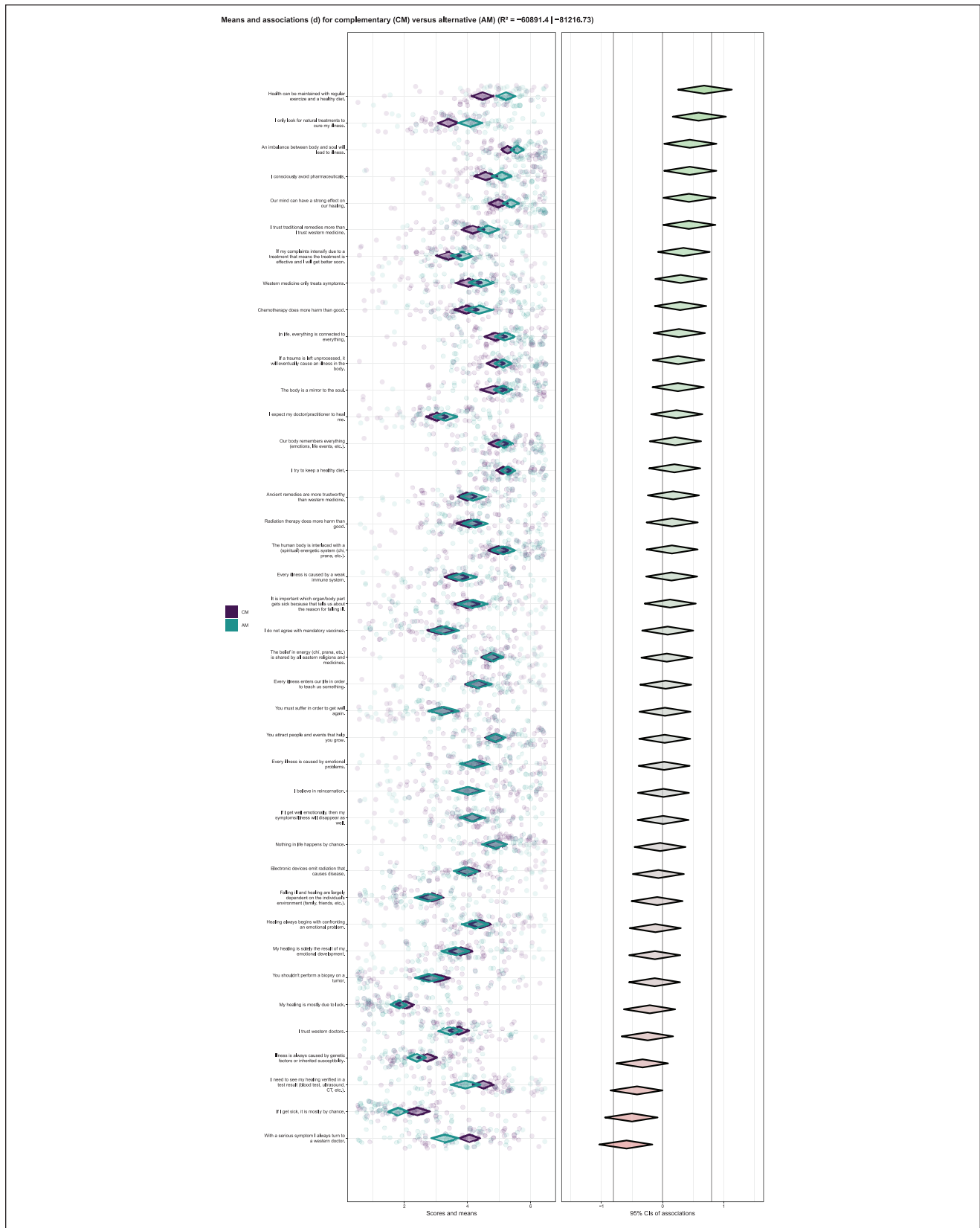
Figure 3. The confidence interval–based estimation of relevance (CIBER) plot comparing patients using complementary medicine (CM) with those using alternative medicine (AM).

trusting a physician with a serious symptom. Targeting the need for biomedical testing would be essential for patients in receiving adequate care for their ailment in time, as dysfunctional CAM use may be coupled with health care avoidance or a delay in presentation.[96-99]

The similarity between CM and AM beliefs may denote that there is no major difference between the 2 types of nonconventional medicine users. However, the consistency in the patterns of the 3 means, where the CM group mean almost always fell in between the other 2 group means, suggests that those using both biomedicine and nonconventional medicine may share beliefs with both other groups. Future research with larger sample sizes will yield more accurate estimates (as manifest in more tight confidence intervals) and will allow determining whether these patterns represent sampling and measurement error or patterns present in the population.

It is vital to note that belonging to these groups is not static—every symptom, illness, or change in condition may induce a new therapy choice on the part of the patient. Dysfunctional CAM use can only occur among patients who use nonconventional treatments as an alternative to biomedicine concerning a condition that is life-threatening. Thus, alternative CAM use is not always dysfunctional: for example, a patient may use homeopathy or herbs to treat a common cold. It is also important to note that attitudes and intentions do not perfectly predict behavior,[100,101] for example, a patient may exhibit a strong conviction to avoid pharmaceuticals, yet because of their condition, may be forced to regularly take them.

Fit With Existing Findings and Theory

All groups in our sample believed that chance and luck have little to do with falling ill and healing, which may suggest that attributing meaning is important to all participants regardless of therapy choice. This may also suggest that, contrary to some studies' findings,[31,102] biomedicine does in fact provide an adequate interpretive framework to patients concerning their ailment, albeit not for every individual, due to personal preferences and circumstances.

The attitudes in which the BM group in our study exhibited the most differences compared with the CM and AM groups involved trust toward various medical systems. As expounded in previous studies involving so-called "push factors" in CAM use,[38] CAM users may exhibit a decreased trust in biomedicine. This loss of trust can be observed in attitudes within our study where CAM users were more likely to trust "ancient" and "traditional" remedies and were less likely to turn to a physician with a symptom deemed serious.

Two pivotal points where the biomedical and CAM groups differed was the latter's preference for "natural" cures and the avoidance of pharmaceuticals. These 2 attitudes are often co-present in individuals; a prevalent etiology among CAM users is illness caused by the accumulation of "toxins" (food additives, "chemicals", etc) in the body, which is conceptualized as an inevitable part of modern, urbanized life.[44] A congruent practice is "detoxification" via various diets and cleansing processes to regain health. CAM use may be associated with a "clean" and "natural" way of achieving health, while also resisting modern dangers.[42] In such a worldview, pharmaceuticals are frequently perceived as toxic chemicals.[39,103] Siahpush argues that these attitudes may have a metaphoric element as well: if the body is seen as "part of nature," it can be "polluted" similarly to environmental pollution.[39] The idea of pollution is central to MHW as well, which have previously been linked to CAM use.[69]

Another set of attitudes where biomedicine and CAM groups differed greatly concern the role of psychosocial factors in illness and healing. CAM groups credited emotions with a crucial role in causing illness, namely, through the imbalance of body and soul, or trauma that goes unprocessed by the individual. Several studies have found that psychosocial etiology predicts CAM use.[49,56,66] Other scholars have argued that interpreting somatic illness in a psychosocial frame is a characteristic of many cultures and posited that separating the biological domain from emotional and social aspects of the illness experience was only made possible with the relatively recent emergence of biomedicine, biotechnology, and modern diagnostics.[77-80] Tangentially, our results also show that the CAM groups gave credence to the role of "emotional development" or "personal growth" in healing, which may correspond to the conviction that illness is trying to teach the patient how to grow; thus, somatic ailments receive a symbolic interpretation (eg, a throat infection means one is reluctant to "say" something). According to many authors, the rise of popular psychology and therapy culture[81] in the West has led to an increasing psychologization[48,71] in the interpretation of somatic disease. In the present study, this may relate to the conviction among CAM users that biomedicine only treats the symptoms of an illness; if a psychosocial interpretation of a somatic ailment is seen as a causative factor, then the biomedical cure may be perceived as mere symptomatic treatment.

A strong conviction in psychosocial etiology may also result in a decreased reliance on biomedical test results when monitoring one's condition. Due to the belief that physical illness is caused by an underlying emotional problem, test results may either not be important to the patient or the individual may be convinced that psychosocial growth will eventually be manifested in physical healing as well. Needing to see one's illness or remission verified in biomedical testing was equally important for the BM and CM groups, but the CIBER plot results show that this attitude connotes a significant difference between the CM and AM groups.

The last analytical domain where the biomedical and CAM groups differed in terms of attitude can be interpreted along the lines of vitalism and teleology. Vitalism entails a belief in concepts of "universal energy"; this energy courses through the human body and, more broadly, gives rise to all things within the universe. Such a "vital force" is often linked to concepts of energy in various medical systems (eg, "qi" in TCM, "prana" in ayurvedic or Tibetan medicine); this energy is then assumed to connect all living things and enable reincarnation as well. Teleological reasoning, that is, explaining events by assigning a grander purpose to them,[104] can be associated with attitudes that exclude chance in life events, viewing illness as having a didactic quality, and the idea that one attracts people and events that serve some kind of greater purpose of growth. All of these attitudes were more espoused by the CAM groups in our study, compared with the BM group. The emphatic presence of vitalism and teleology in the worldview of CAM users is in accordance with the previous findings.[40,49]

The preference for natural treatments, beliefs in psychosocial etiology, and vitalism coincide with values of a subculture Ray and Anderson called "cultural creatives," claiming 24% of the American population can be characterized as belonging to this group[105]; Stratton et al estimated a further 80 to 90 million cultural creatives in Europe.[24] Cultural creatives share values such as ecological sustainability, a preference for the exotic and foreign, social optimism, spirituality, and mind-body unity.[21,24,105] According to Stratton et al, adherents exhibiting any constellation of said attitudes represent "the core market" for CAM.[24] Our results reflect these values, as CAM users had a more marked preference for concepts linked to Eastern philosophy, religion, and medicine, while the "religious in my own way" category in our sample (31% in the alternative group, 27% in the complementary, and significantly lower in the biomedicine group at 9%) may be interpreted as "spirituality."

Limitations and Strengths

Our study had several limitations. First, the hard-to-reach nature of the target population means that although we achieved our sample size planning goals, we had to adjust those to what seemed feasible a priori. Had we been able to recruit more participants, we would have had more certainty as to whether the CM and AM groups are ultimately different or hardly distinguishable. In future research, it may be necessary (and in any case, beneficial) to collect data in multiple locales (perhaps countries).

Second, our research was based in the urban capital of Hungary. This may threaten generalizability of the findings, as some studies have concluded that CAM use motivations may differ between urban and rural settings, not only because of differences in education levels but also in access to conventional health care and differing CAM-related beliefs.[24,106,107] Future research, therefore, should try to recruit participants from both urban and rural settings.

Third, the predominance of a belief in vitalism (eg, qi) could be a result of surveying CAM patients at TCM clinics. If one would survey patients attending massage therapy, mindfulness classes, or naturopaths, one might find different results in this regard. As mentioned, CAM modalities retain unique worldviews, values, and norms, which may affect measured attitudes as well.

Last, strategies for dealing with illness, thus choice of therapy, are not only contingent on attitudes but on clinical factors as well. These clinical factors may change over time, influencing employed therapies also. Furthermore, exhibited behavior may differ from illness to illness; consequently, group belonging of patients is not static. Moreover, although there is evidence that the examined attitudes are shared among CAM users in Western countries,[5] the level of transferability of our results is unclear. Additionally, due to the fact that CAM patients were recruited in clinics of TCM by their practitioners, there may have been a potential selection bias.

This study also had a number of strengths. First, CAM users are regularly examined as a unified group and set in contrast to users of solely conventional medicine, without separating patterns of use into complementary and alternative forms. Treating CAM patients as a homogeneous group leads to oversimplification: for example, not all CAM use has detrimental effects on conventional therapy; not all CAM use is medically unwarranted, as in the case of many chronic diseases; and there are instances when nonconventional medicine is the only feasible alternative because biomedicine does not offer a cure. In order to avoid oversimplification and to bolster intervention effectiveness by allowing personalization, we have introduced the distinction of "dysfunctional CAM use." Second, although there are studies scrutinizing motivations for CAM use, there are few analyzing specific attitudes involved. CAM use is frequently examined relative to psychological constructs with identical label names not denoting the same phenomenon (eg, positive thinking, holism, spirituality). This is particularly problematic because, albeit interesting from a theoretical perspective, results from such studies leave intervention developers seeking to discourage dysfunctional use of nonconventional medicine empty-handed, as no behavior change principles have (as yet) been identified that successfully target positive thinking or holism.[108] This study did address specific attitudinal beliefs as collected in earlier qualitative research and produced CIBER plots that can guide intervention development.

Conclusions

Albeit much research has been carried out on the motivations behind CAM use, rarely do studies treat CAM users separately in order to scrutinize patterns of nonconventional

medicine use and underlying cognition. Furthermore, insufficient attention is given to a subset of alternative CAM users, patients employing nonconventional therapies for a life-threatening condition. This study has made preliminary steps in pinpointing attitudes that may signify or predict dysfunctional CAM use so as to inform future intervention development. Such interventions would be essential for the prevention of incidents and mortality. Further research is needed to confirm our results and to continue mapping attitudes specifically focused on a population of dysfunctional CAM users.

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