

ATTITUDES, AWARENESS AND SELF-USE OF COMPLEMENTARY THERAPIES AMONG SPANISH HEALTH SCIENCES, JOURNALISM, AND PRIMARY TEACHER TRAINING STUDENTS

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ABSTRACT. In Spain, during the last decade, there has been an intense debate between advocates of complementary and alternative medicine (CAM) and a skeptical movement. Neither are these therapies integrated into the public health system nor have practitioner training courses been regulated. Notwithstanding this, their use is on the increase in Spain, as can be seen in the last public opinion survey (CIS, 2018). Thus, the objective of this work is to explore the attitudes towards and awareness and self-use of CAM among health sciences, journalism and primary teacher training students. These students were chosen since they will play a fundamental role as storytellers of evidence-based science for the foreseeable future. To perform the study, 234 students were asked to complete a Spanish version of the CAM Health Belief Questionnaire (CHBQ). The results show that, by and large, they had a positive attitude towards CAM, despite that fact that the journalism and health sciences students admitted to being wary of them to a certain extent. Four out of the five best known and most used CAM modalities among the respondents fell into the 'mental and corporal practices' category, i.e., yoga, massage, meditation and relaxation.

KEY WORDS. Complementary and alternative medicine (CAM), attitudes, awareness and self-use towards CAM, pseudotherapies, pseudoscience, university students, public health, health science education, debates on CAM in Spain.

1. INTRODUCTION

Complementary and alternative medicine (CAM) encompasses a broad range of techniques and treatments and, like the practice of conventional Western medicine, is associated not only with essential health benefits but also with serious risks (iatrogenic side effects), even more, in some cases,

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the worsening of the condition of patients (Han, Johnson, DelaMelena, Glismeyer, and Steinbock, 2011; Leggett, Koczwara, and Miller, 2015; Patel, Kemper, and Kitzmiller, 2017; Yun, et al., 2013). However, unlike traditional mainstream medicine, the harmonization of theoretical issues and the subsequent regulatory framework continue to be relevant challenges on a global scale (World Health Organization [WHO], 2013), in the European Union (EU) (European Parliament, 2017) and, above all, in Spain.

CAM use has rapidly increased in the West, especially in the USA (Honda and Jacobson, 2005) and Europe (Thomas and Coleman, 2004), where 100 million Europeans have resorted to these therapies (WHO, 2013). Different surveys have also demonstrated that the use has increased in Spain during the past decade. The National Health Survey carried out by the Spanish Ministry of Health showed that 4.8 per cent of the population had visited some or other CAM practitioner in the previous 12 months (Ministerio de Sanidad, 2013). A most recent survey conducted by the Spanish Sociological Research Centre revealed that between 20.4 per cent and 9.8 per cent of the Spanish population admitted to having consulted, at one time or another, a practitioner of one of the four most popular modalities—therapeutic massage, herbal medicines, meditation and homeopathy (Centro de Investigaciones Sociológicas [CIS], 2018). Moreover, according to the Spanish Association of Natural Therapy Practitioners, 81 per cent of the population has used at least one modality (Asociación Nacional de Profesionales y Autónomos de las Terapias Naturales [APTAN-COFENAT], 2018).

The literature has suggested that the reason why such a large number of people increasingly turn to CAM has to do with the prevalence of medical conditions not easily treated by modern medicine, including psychological states of anxiety and depression in patients with chronic diseases such as AIDS (Cauffield, 2000; Webb, Perry-Parrish, Ellen, and Sibinga, 2018). Further, they hold beliefs that are more congruent with these therapies than with conventional medicine (Bishop, Yardley, and Lewith, 2007). These beliefs are related to the patient's control of and participation in the healing process, the perception of illness, holism and natural treatments, and general philosophies of life (unconventional and spiritual). Decision-making on CAM use was also perceived as a means of regaining independence and maintaining hope in the case of patients with breast cancer (Truant and Bottorff, 1999). The view that their use mainly reflects dissatisfaction with conventional medicine has not been supported by empirical data (Eisenberg, et al., 2001). In addition, CAM providers themselves consider that they offer quality communication and personalized healthcare that patients often do not receive from conventional medicine professionals (Geist-Martin and Bell, 2009).

From a philosophical approach, the challenges raised by the ethical justification of CAM have also been addressed. In this respect, Mertz (2007) stated that beneficence and non-malefeasance are key issues for an ethical argument for the use, while freedom of thought and religion are central as a belief system. Moreover, the ethical models for explaining the relationship between mainstream and alternative medicines have also been explored (Kaptchuk and Miller, 2005; Lipman, 2002). These authors distinguished three ethical models—opposition, integration, and pluralism. While the opposition model is based on the belief that the medical profession should eradicate unconventional medicine for the good of the patient, the integration approach advocates for a combined use of conventional and CAM therapies to promote wellness and treating disease by addressing not only the physical signs and symptoms of illness but also its emotional and spiritual manifestations. Finally, Kaptchuk and Miller supported a pluralistic model implying ‘that mainstream medicine and CAM should relate to each other as separate but cooperative medical systems’ (2005, p. 286).

This pluralistic model is aligned with the WHO Traditional Medicine Strategy 2014-2023 (WHO, 2013), which states that traditional medicine (TM), which integrates CAM, is an important and often underestimated part of healthcare. For this reason, many countries such as Chile—specifically, the Mapuche—have regulated TM. In 1996, the Ministry of Health of Chile launched a unique program to meet the needs of the nine ethnic groups recognized by the state and, in 2002, created an indigenous peoples’ health clinic which promoted initiatives in the country’s different medical services. In 2008, Mapuche health clinics were set up in public health centers and, a decade later, they are also now being used by the non-indigenous population (Arriagada, Celis, Mallea, Paul, and Vega, 2007; Estomba, Ladio, and Lozada, 2006). In this vein, the current strategy of the WHO aims to support all Member States in the development of proactive policies and the implementation of action plans that strengthen the role of TM in keeping populations healthy.

In countries like the USA and Canada, the increase in the demand for and use of these therapies has led to the development of national policies and regulations aimed at ensuring the quality, safety and effectiveness of these practices and treatments, as well as the required qualifications and accreditation of CAM practitioners. On the contrary, the current situation in Spain as regards CAM is, on the whole, characterized by a legal vacuum that should be filled as soon as possible, according to the recommendations of the WHO (2013) and the EU (European Parliament, 2017). For the most part, the only mention to these therapies in the current Spanish legislation is to be found in a Royal Decree of 2003, regulating the licensing procedure for opening care units in health centers. Under the name of

‘non-conventional therapies,’ some CAM modalities are mentioned in the healthcare service portfolio. Anyhow, only homeopathy products are currently governed by a specific legal framework, specifically a Royal Decree of 1994 and, more recently, a Ministerial Order of 2018 that transposes the 2001 European Directive to the Spanish legislation. Unlike in the USA, the European Parliament has not developed the resolution on non-conventional medicine adopted in 1997, except for the Commission Directive 2003/63/EC amending Directive 2001/83/EC on the Community code relating to medicinal products for human use.

In line with the aforementioned ethical models described by Kaptchuk and Miller (2005), the opposite approach, which encourages the medical profession to fight for the eradication of non-conventional medicine for the good of the patient, has lost ground. Nonetheless, in Spain, the increase in the use of CAM and the lacunae in the Spanish and EU legislation have outset a heated public debate revolving around two irreconcilable and simplistic viewpoints. On the one hand, it is claimed that whatever the patient perceives as being beneficial, no matter how it works or even if it works at all, must be by definition a good thing. On the other, it is held that any therapy that cannot be tested by modern scientific methods should be labeled as quackery and deemed unacceptable. Defending this last stance, Spanish newspapers usually refer to CAM as pseudotherapies based on pseudoscience (e.g., Ansede, 2018; Pinto, 2017).

Social agents basically shore up these polarized stances for or against CAM, whose ultimate objective is to influence the future development of public policies in one direction or the other. On one side, under the slogan ‘the natural thing is to be regulated,’ the National Association of Natural Therapies Practitioners (APTN-CONFENAT) advocates for the development of a legal framework governing the training, accreditation and working conditions of these practitioners while defending patients’ interests. On the other, the primary objective of the Association for the Protection of the Sick from Pseudoscientific Therapies (APETP) is precisely to safeguard them from the many pseudoscientific therapies that can harm them; either by encouraging them to abandon a conventional treatment, by causing them injury or by obliging them to pay substantial sums for false medicines that cannot offer them any real healing prospects.

The APETP, along with scientific and skeptical associations promoting critical thinking, fiercely opposes any attempt to normalize these kinds of practices and treatments. These collectives are against the inclusion of CAM instruction in mainstream undergraduate and postgraduate health sciences curricula, and refuse to integrate it into the healthcare system. Although the public debate on this issue has received media coverage in Spain over the past decade, national academic researches on attitudes

towards and awareness and use of these unconventional therapies have been scant (Ballesteros-Peña and Fernández-Aedo, 2015).

Although in other countries several studies have investigated attitudes towards and awareness and self-use of CAM within healthcare professionals and health sciences students (Jakovljevic, et al., 2013; Lipman, 2002; Pokladnikova and Lie, 2008; Riccard and Skelton, 2008; Samuels, et al., 2010; Walker, et al., 2017), as well as the general public (Islahudin, Shahdan, and Mohamad-Samuri, 2017; Van den Bulck and Custers, 2009), there is very little relevant academic research that has addressed this topic comprehensively.

Related to this issue, the WHO has admitted that there are still some challenges including: (i) the development and enforcement of policies and regulations; (ii) the education and training of practitioners, and (iii) information and communication. The findings of this study may allow us to gain a better understanding of how different social agents involved in science communication in Spain perceive CAM, which therapies are known and use, and how this knowledge and familiarity can influence their attitudes and, ultimately, affect the way they communicate about it. As the situation differs from one country to another, strategies have to be adapted to the context of each country (WHO, 2013). In this sense, this study may shed light on the approaches taken by the different actors who will be involved in science storytelling about this topic in their respective fields of work. This information may help health authorities to design strategies for managing and regulating CAM therapies, taking into account these differences in each sphere: education (school teaching), the healthcare system (nursing and medicine) and the media (journalism). In particular, these results may be relevant to the development of strategies in fields such as professional training and distribution of health information to society as a whole, as requested by the WHO.

This study aims to examine attitudes towards and awareness and use of CAM among future healthcare professionals (nurses and doctors), journalists and school teachers, given that these groups will play a fundamental role in the communication and management of these therapies (Hall, Leach, Brosnan, Cant, and Collins, 2018). Thus, it focuses on the opinions of those whose job it will be to communicate science which, as will be seen below, differs according to age, sex, place of residence and type of studies. Besides this, as previous studies have shown that awareness and/or self-use of CAM are associated with positive attitudes towards these therapies (Pokladnikova and Lie, 2008; Walker, et al., 2017), the effects of these variables on Spanish students are examined here. This is especially important at a time when scientific and skeptical associations are promoting critical thinking and, therefore, opposing any attempt to normalize these types of practices and treatments.

2. JUSTIFICATION FOR THE RESEARCH

Depending on the context, CAM can be termed ‘traditional medicine and non-conventional or complementary medicine’ (WHO, 2013), ‘complementary and alternative therapies’ (European Parliament, 2017), ‘natural therapies’ (Ministerio de Sanidad, 2011), and most recently ‘pseudosciences’ or ‘pseudotherapies’ (Moreno-Tarín, 2019). The conceptual discussion on the different terms employed to refer to non-mainstream medicine is not a minor issue due to several reasons. Firstly, it could be a symptom of the difficulties in uniting the eclectic assortment of CAM practices and treatments under one name. Moreover, epistemological, semantic and ontological issues are highly relevant when defining a strategy aimed to develop a regulatory framework for these therapies (Mertz, 2007). Besides the semantic considerations, the lack of harmonization in the terminology may also represent the unresolved dispute between two sets of healthcare approaches: those exclusively based on scientific evidence resulting from clinical trials (biophysical medicine) and those based on other considerations above and beyond biophysical parameters and, therefore, difficult to measure employing modern scientific methods.

There is thus a need for both healthcare providers and patients to categorize CAM with a view to make meaningful comparisons and informed decisions about their use (Tataryn, 2002). In this respect, the National Centre for Complementary and Integrative Health (NCCIH) distinguishes between two broad subgroups of complementary health approaches—natural products and mind and body practices—plus a third area for those treatments or methods that do not fall into any one of these two subgroups. Natural products include herbs, food supplements, and probiotics, while mind and body practices encompass several procedures and techniques like yoga, chiropractic, osteopathy, meditation and massage. Traditional healers, Ayurvedic medicine, traditional Chinese medicine, homeopathy, and naturopathy are examples included in this third area (NCCIH, 2016).

Regardless of the conceptual categorization of CAM modalities, the greater attention now paid to the analysis of the variables of attitude, awareness, and self-use has resulted from the documented increase in adherence to these alternative therapies since the 1980s. The attitude of young Spanish science storytellers towards CAM is the crucial variable analyzed here, along with CAM awareness and self-use and the relationship between them.

2.1. ATTITUDES TOWARDS CAM

The first signs of interest in investigating attitudes towards these therapies emerged in the field of health sciences education research in the early

1980s (Reilly, 1983), though subsequent works also addressed CAM users' attitudes (Furnham and Smith, 1988; Moore, Phipps, Marcer, and Lewith, 1985). The general public's views on this topic have been analyzed in Belgium (Van den Bulck and Custers, 2009) and Malaysia (Islahudin, et al., 2017). Nevertheless, most of the research performed to date in this field has focused on healthcare professionals, mainly nursing and medical students and practitioners (Gyasi, Abass, Adu-Gyamfi, and Accam, 2017; Riccard and Skelton, 2008; Samuels, et al., 2010) as well as their pharmacy counterparts (James and Bah, 2014; Pokladnikova and Lie, 2008) and chiropracticers (Walker, et al., 2017).

Reilly's pioneering study already revealed that positive attitudes towards CAM among physician trainees were often based on awareness or personal experience within these therapies (1983). According to the conclusions of Visser and Peters (1990), the integration of alternative medicine in the medical system has gone hand in glove with its acceptance by general practitioners. Albeit skeptical about the scientific basis of CAM as a whole, most Israeli physicians believed that some therapies, if only because of the placebo effect, had been effective in several cases (Bernstein and Shuval, 1997). Other results from the USA suggested that physicians were, if not supportive, at least open-minded about the integration of complementary and alternative medicine (Boucher and Lenz, 1998). Taking things a step further and from a comparative approach, Dogas, et al. (2003) revealed that the curricula of medical schools, unlike those of others—e.g., economics and business and engineering—could influence attitudes towards science and CAM.

To sum up, research has shown that attitudes towards CAM are a determining factor in how these therapies are managed in the healthcare system and, in a broader sense, within society, and, at the same time, are influenced by factors such as the type of university studies. Hence, this study rests on the assumption that the more detailed the information that we have on the attitudes of different social agents towards these therapies, the more likely it will be that the Spanish health authorities will successfully cope with the polarized debate and make informed decisions to regulate the issue. Therefore, hypothesis 1 is as follows:

H1. There are differences in attitudes towards CAM depending on age, gender, place of residence and type of university studies.

2.2. CAM AWARENESS AND SELF-USE

Based on extensive research that provides evidence for the relationship between attitudes towards and awareness and self-use, these additional variables were also included in this study. Aasland, Borchgrevink, and Fugelli (1997) concluded that the poor knowledge and limited experience of Norwegian physicians meant that they were at disadvantage when asked

by their patients to offer them their views on complementary methods of treatment. Maybe this is why respondents from a US Midwestern medical school expressed their willingness to learn more about CAM (Greiner, Murray, and Kallail, 2000). General practitioners and hospital doctors had similar levels of knowledge, while medical students were the least informed, yet the most enthusiastic respondents (Perkin, Percy, and Fraser, 1994).

Studies have shown that recommendations of CAM to patients were, more often than not, associated with the level of knowledge and self-use of these therapies among both physicians (Borkan, Neher, Anson, and Smoker, 1994) and their assistants (Houston, Bork, Price, Jordan, and Dake, 2001). Similarly, in the context of specialized medicine oncologists who had personally used these therapies recommended them to patients three times more frequently than others (Crocetti, Crotti, Montella, and Musso, 1996). In the case of general practitioners, personal experiences of such therapies or patients' endorsement of them were also associated with positive attitudes (Easthope, Tranter, and Gill, 2000).

The greater availability of information on CAM safety and effectiveness represents a significant challenge for patients, physicians, nurses, communicators, educators, and health authorities. Because patients often resort to these therapies behind their physicians' backs (Patel, et al., 2017), it is essential to keep open the flow of information between healthcare professionals and patients. This is quite relevant when studies have shown that even when general practitioners believe that acupuncture, chiropractic, and osteopathy are effective and even recommend that these therapies be made available in the UK National Health System, only a few of them feel confident enough to discuss about it with their patients (White, Resch, and Ernst, 1997). In light of the above, the following three hypotheses are postulated:

- H2. CAM awareness is positively associated with positive attitudes towards CAM.
- H3: CAM self-use is positively associated with positive attitudes towards CAM.
- H4. CAM awareness is positively associated with CAM self-use.

3. METHOD

3.1. DATA COLLECTION

Questionnaire responses were gathered from undergraduate students enrolled in health sciences, journalism and teacher training courses at two universities in Spain—namely, the University of Valencia and Florida Universit aria—from January to June 2017. The university lecturers forming part of the research team invited the students to participate anonymously,

before asking them to fill in the questionnaires in a lecture-hall environment. No reward was offered. The questionnaire was administered to 327 students, but after data cleaning and filtering out those respondents who had not completed the 10-item CHBQ, the survey yielded 234 valid questionnaires, equivalent to a response rate of 72 per cent.

Regarding their demographic profile, the average age of the respondents was 20.91 years, and most of them were female (70.9 per cent) living in urban areas (67.9 per cent). Respondents were studying mostly medicine (44.0 per cent) and nursing (36.3 per cent), followed by journalism (12.8 per cent) and teacher training (6.8 per cent).

3.2. MEASUREMENTS

The measurements of each construct in the study were adapted from previous research and subsequently translated into Spanish. To measure attitudes towards/beliefs on CAM, ten items measured on a seven-point Likert scale taken from the CHBQ, designed and validated by Lie and Bokker (2004) in the USA for English-speaking samples, were translated into Spanish (see Appendix 1). Responses yielded a total score with a possible maximum of 70 and a minimum of 10, higher scores indicating a more favorable attitude towards these therapies. A positive attitude was defined as an overall mean score exceeding the neutral midpoint score of 35. By items, scores higher than five indicated strong support for CAM.

The CHBQ has, by its repeated use, proven to be a useful tool for evaluating and gaining further insights into attitudes towards CAM in the healthcare education and practice sectors and cross-culturally (e.g., Jakovljevic, et al., 2013; Pokladnikova and Lie, 2008; Samuels, et al., 2010; Walker, et al., 2017). To a lesser extent, it has also been administered to explore the prevalence of positive attitudes among the general public in Belgium (Van den Bulck and Custers, 2009) and Malaysia (Islahudin, et al., 2017).

The internal reliability of the Spanish version of the CHBQ was verified using Cronbach's α to assess the extent to which the questionnaire's ten items measured the same construct (Kline, 2000). A minimum score of 0.7 had to be reached for a questionnaire to be considered reliable (Bland and Altman, 1997).

Next, CAM awareness and self-use variables were measured using a 23-modalities checklist (see Appendix 2) adapted and extended following the official report on this topic released by the Spanish Ministry of Health (Ministerio de Sanidad, 2011). This report registered 139 modalities divided into five categories: (1) integrative or comprehensive systems (e.g. acupuncture and homeopathy); (2) biological treatments (e.g. herbal and nutritional therapies); (3) body-based manipulation practices (e.g. chiropractic and osteopathy); (4) mind-body therapies (e.g. hypnoses and yoga), and (5) energy-based therapies (e.g. reiki and magnetism).

Finally, a third section collected demographic data (age, gender, place of residence—rural or urban) and type of university studies (health studies, journalism or teacher training) that were used as classification variables.

3.3. DATA ANALYSIS

Descriptive statistics were used (proportions, mean, standard deviation) to analyze the respondents' scores in relation to dependent variables (attitudes towards and awareness and self-use of CAM). All the scores were analyzed in aggregate and also compared. Attitudes were gauged by tallying the responses to the 10-item CHBQ, while awareness and self-use were determined by tallying all the selected modalities from the 23-CAM checklist.

A one-way analysis of variance (ANOVA) was employed to determine the relationship between categorical (age, gender, place of residence and type of studies) and quantitative variables (attitudes/beliefs towards and awareness and self-use). The analysis of variance involves comparing the mean distribution of the quantitative variables (dependent) between groups of the qualitative variables (independent), known as 'between-group variance,' which describes the mean difference between groups, i.e., the effect on the categorical variables of interest. Dogas, et al. (2003) used ANOVA to determine the differences in attitudes towards CAM among three types of Croatian undergraduate students. When normal distribution or/and equality of variances were not met, the non-parametric Kruskal-Wallis test was performed to contrast the null hypothesis of equality of means ($p < 0.05$).

Additionally, the Pearson correlation coefficient test was run to assess the relationship between attitudes towards and awareness and self-use of CAM. Pearson's r can take a range of values from +1 to -1. A value close to 0 indicates that there is no association between the variables, while one close to +1 or -1 indicates a positive and negative association, respectively. This statistic was used by Gyasi, et al. (2017, p. 1) to assess 'nurse' knowledge, personal and professional practices and attitude towards complementary and alternative medical therapies in urban Ghana.

4. RESULTS

First of all, Cronbach's α for the results of the Spanish version of the CHBQ was 0.84, indicating an adequate internal consistency of the measured construct (Bland and Altman, 1997; Lie and Boker, 2004). The CHBQ's overall mean score was 41.75 (SD= 11.04), ranging from 40.33 to 43.17 at a confidence interval of 95 per cent and with a margin of error of 0.7. These data for the whole sample were, therefore, above the neutral score of 35 points, which is indicative of slightly positive attitudes towards CAM among tomorrow's science storytellers in Spain (see Table 1).

Table 1. Respondent characteristics and attitudes towards CAM.

		Frequency	%	Mean	SD
Overall n				41.75	11.04
= 234					
Gender					
	Male	64	27	40.34	11.67
	Female	166	71	42.46	10.84
Age					
	<21	160	68	42.16	10.21
	21-25	61	26	39.74	12.29
	26-35	7	3	42.43	11.74
	>35	5	2	54.60	13.41
Place of residence					
	Urban	159	68	42.37	11.00
	Rural	70	30	40.27	11.13
Type of university studies					
	Teacher training	16	7	48.75	12.64
	Journalism	30	13	34.23	11.17
	Medicine	103	44	37.91	9.85
	Nursing	85	36	47.74	8.04

^aAn analysis of variances (ANOVA) or Kruskal-Wallis test was used -depending on normal distribution- at a level of significance $p < 0.05$. Standard error= 0.7; confidence interval= 95%.

According to the results, H1 was partially demonstrated: unlike the gender, age and place of residence variables, attitudes towards CAM differed significantly depending on what the respondents were studying ($p < 0.05$). While journalism and medical students displayed a certain degree of caution, with lower mean scores (34.23 and 37.91, respectively), teacher training and nursing students were more willing to endorse CAM, with higher mean scores (48.75 and 47.74, respectively).

By items (see Table 2), significant differences were found in all the seven-point scale items in relation to the type of studies ($p < 0.005$). Item 5, 'A patients' expectations, health beliefs, and values should be integrated into the patient care process', was the statement that achieved the greatest consensus, with mean scores ranging from 4.13 (journalism students) to 6.53 (nursing students) on the seven-point scale. Teacher training students concurred more with 50 per cent of the items, with mean scores ≥ 5.00 , followed by nursing students with 40 per cent of the items, with mean scores > 5.00 .

Table 2. Attitudes towards CAM by type of university studies and by items.

		Mean score ^a				
CHBQ items		Teacher training n= 16	Journalism n= 30	Medicine n= 103	Nursing n= 85	Overall n= 234
1.	The physical and mental health are maintained by underlying energy or vital force.	5.00	3.40	3.19	3.73	3.54
2.	Health and disease are a reflection of the balance between positive life-enhancing forces and negative destructive forces.	4.88	2.77	2.58	4.01	3.28
3.	The body is essentially self-healing and the task of a health care provider is to assist in the healing process.	4.81	2.93	3.01	3.98	3.47
4.	A patient's symptoms should be regarded as a manifestation of general imbalance or dysfunction affecting the whole body.	4.69	3.17	3.93	5.09	4.31
5.	A patient's expectations, health beliefs and values should be integrated into the patient care process.	5.13	4.13	5.24	6.53	5.56
6.	Complementary therapies are a threat to public health. ^b	5.44	4.87	5.01	5.88	5.34
7.	Treatments not tested in a scientifically recognized manner should be discouraged. ^b	4.25	2.73	3.44	4.08	3.64
8.	Effects of complementary therapies are usually the results of a placebo effect. ^b	4.38	2.93	3.13	4.31	3.62
9.	Effects of complementary therapies include ideas and methods from which conventional medicine could benefit.	5.13	4.13	4.65	5.47	4.91
10.	Most complementary therapies stimulate the body's natural therapeutic powers.	5.06	3.17	3.73	4.66	4.09
Total mean score		48.75	34.23	37.91	47.74	41.75
(SD)		(12.64)	(11.17)	(9.85)	(8.04)	(11.04)

^aAll items responses were based on a Likert-type scale ranging from 1= "Absolutely Disagree" and 7= "Absolutely Agree".

^bItem response was reverse-scored (to minimize the acquiescence response set), so a higher value indicated greater endorsement to CAM.

Scores above 5 indicating strong support to CAM are highlighted in bold.

The results also reveal that CAM awareness was fairly widespread across the sample: 99 per cent of the respondents knew at least four modalities, 90 per cent at least eight and 50 per cent at least 13. Significant differences in CAM awareness were detected concerning the respondents' age and type of university studies ($p < 0.05$). Students under 21 and, especially, over 35 proved to have a greater knowledge of modalities. As to the type of stud-

ies, medical students registered the highest score on CAM awareness (see Table 3). Acupuncture (99 per cent), yoga (97 per cent), massage (96 per cent) and meditation (94 per cent) were the most well-known therapies, followed by relaxation (89 per cent), music therapy (86 per cent), tai chi (84 per cent) and homeopathy (82 per cent), while biofeedback (11 per cent), therapeutic touch (12 per cent) and acupressure (14 per cent) were the least well-known.

Table 3. Responses to CAM awareness from a 23-CAM checklist.

		Frequency	%	Mean	SD	p^a
Overall n = 234				13.61	3.61	
Gender						NS
	Male	64	27	13.20	3.98	
	Female	166	71	13.69	3.45	
Age						0.003
	<21	160	68	14.05	3.27	
	21-25	61	26	12.61	4.00	
	26-35	7	3	10.71	3.30	
	>35	5	2	15.60	5.98	
Place of residence						NS
	Urban	159	68	13.58	3.79	
	Rural	70	30	13.60	3.28	
Type of university studies						0.010
	Teacher training	16	7	11.38	4.44	
	Journalism	30	13	13.07	4.33	
	Medicine	103	44	14.29	3.30	
	Nursing	85	36	13.19	3.36	

^aAn analysis of variances (ANOVA) or Kruskal-Wallis test was used depending on normal distribution at a level of significance $p < 0.05$.

As was to be expected, CAM self-use was much more limited. First of all, 15 per cent of the respondents had never used it, 85 per cent admitted to having used at least one modality, 50 per cent at least two and only 11 per cent more than five. Significant differences in self-use were observed in relation to age and type of university studies ($p < 0.05$). Again, students under the age of 21 and, above all, over 35 showed greater use of these therapies. By type of studies, teacher training and nursing students reg-

istered the highest scores on self-use (see Table 4). Massage (63 per cent), relaxation (40 per cent), yoga (26 per cent) and meditation (24 per cent) were the most popular ones, followed by dance therapy (19 per cent) and homeopathy (18 per cent). In contrast, naturopathy (0 per cent) therapeutic touch (1 per cent) and acupressure (1 per cent) were the least used.

Table 4. Responses to CAM self-use from a 23-CAM checklist.

		Frequency	%	Mean	SD	p^a
Overall n = 234				2.84	2.60	
Gender						NS
	Male	64	27	2.50	2.94	
	Female	166	71	2.97	2.48	
Age						0.002
	<21	160	68	3.00	2.52	
	21-25	61	26	2.16	2.56	
	26-35	7	3	2.14	1.68	
	>35	5	2	6.60	3.78	
Place of residence						NS
	Urban	159	68	2.98	2.75	
	Rural	70	30	2.53	2.33	
Type of university studies						0.001
	Teacher training	16	7	4.13	4.94	
	Journalism	30	13	1.83	1.62	
	Medicine	103	44	2.38	2.21	
	Nursing	85	36	3.51	2.51	

^aAn analysis of variances (ANOVA) or Kruskal-Wallis test was used depending on normal distribution at a level of significance <0.05.

Concerning the relationship between attitudes towards and awareness and self-use of CAM, Table 5 shows the overall results of Pearson's r . It was found that attitudes were not associated with awareness, indicating that H2 has not been substantiated. As for self-use, a positive association with attitudes was detected ($r = 0.43$, $p < 0.001$), which confirms H3. CAM awareness was also positively related to self-use ($r = 0.23$, $p < 0.001$), thus supporting H4.

Table 5. Association between attitude towards CAM, awareness and self-use.

		Awareness	Self-use	Attitudes
Awareness	Pearson's r	1	.226**	.005
	Sig. (bilateral)		.000	.936
	N	234	234	234
Self-use	Pearson's r		1	.426**
	Sig. (bilateral)			.000
	N		234	234
Attitudes	Pearson's r			1
	Sig. (bilateral)			
	N			234

**Correlation is significant at a level of significance $p < 0.01$ (two-tailed).

5. DISCUSSION

In this study, although the attitudes of young Spanish science storytellers towards CAM were above the neutral score, they showed little enthusiasm in this regard, except in the case of teacher training and nursing students who were more willing to endorse these therapies. This result is in line with the findings of prior research revealing that nursing students and faculty members had a greater interest in CAM, versus their medicine and pharmacy counterparts (Kreitzer, Mitten, Harris, and Shandeling, 2002). Regarding the enthusiasm of Spanish teacher training students, previous research has also indicated that outside health sciences curricula—e.g., economics and business, and engineering—attitudes towards CAM were more positive (Dogas, et al., 2003). Unlike their teacher training and nursing peers, Spanish medical students showed a less positive attitude, in line with the results of studies performed in Croatia and Norway (Dogas, et al., 2003; Risberg, Kolstad, Johansen, and Vingerhagen, 1999). By the same token, Canadian medical students viewed these therapies as less useful than their health profession peers—physiotherapy, occupational therapy, nursing and pharmacy—(Baugniet, Boon, and Ostbye, 2000). The results of this study and those of previous works suggest that the more cautious attitude among journalism and medical students may be due to their role as future gatekeepers of bias-free information and evidence-based knowledge, respectively. Risberg, et al. (1999) identified a perceived lack

of evidence as to the most significant barrier to the integration of CAM in conventional medicine. Concerning nursing students, since in Spain nurses are not allowed to prescribe conventional medications, they could be more likely to be willing to consider and even prescribe these therapies.

However, contrary to our findings, prior research focusing on oncology nurses in Finland revealed that they did not regard CAM as a safe option for the treatment of cancer (Salmenpera, Suominen and Lauri, 1998). On the contrary, many of them associated these practices with quackery and financial gain, although they believed that it was essential that cancer patients had the opportunity to discuss their use with nurses and physicians alike. For their part, Israeli nurses tended to be wary of CAM, although their middle-aged colleagues were more likely to use it (DeKeyser, Bar Cohen, and Wagner, 2001).

Additionally, two CHBQ statements on CAM yielded the highest overall score and achieved the greatest consensus among the respondents. Firstly, Item 5, 'A patient's expectation, health beliefs, and values should be integrated into the patient care process' and, secondly, Item number 6, 'Complementary therapies are [not] a threat to public health.' These findings are consistent with those of previous studies in which the CHBQ was administered to medical students (Lie and Boker, 2004), nurse-midwives (Samuels, et al., 2010) and chiropractic and nursing students (Walker, et al., 2017). Results obtained with different methods also showed that most medical students did not believe CAM was a public health hazard (Chez, Jonas, and Crawford, 2001) and that patients and primary care physicians did not view these therapies as a threat, but rather as complementary to conventional medicine (Bernstein and Shuval, 1997). Hence, the low-risk perception of CAM is linked to a common belief that these therapies are natural and therefore safe, notwithstanding the evidence of complications (White, et al., 1997).

With regards to awareness and self-use, therapies providing well-being and comfort were found to be the most popular—e.g., yoga, massage, and meditation—although acupuncture was the most well-known. Similarly, Hopper and Cohen (1998) revealed that Australian medical students also scored meditation, massage and acupuncture the highest regarding knowledge, perceived usefulness, intended referral and desire for education in medical schools.

Moreover, CAM self-use among young Spanish science storytellers was found to be closely associated with their attitudes and awareness. In contrast, no association between attitudes towards and awareness of CAM was observed. These results are consistent with those of prior studies demonstrating that attitudes and training were the best predictors of the use among primary care physicians (Berman, Singh, Hartnoll, Singh, and

Reilly, 1998). DeKeyser, et al. (2001) also found evidence of the relationship between nurses' attitudes towards or self-use and knowledge.

As for the relationship between use and kind of information sources, a study focusing on the Spanish context also revealed that there was no correlation between the frequency of news coverage on CAM therapies in online newspapers and that of the use by the general public (Autor/a, 2016). Additional findings also stressed that there was no evidence of a link between online searches for these therapies and their use in Spain (Cano-Orón, 2016). However, according to the surveys' results and literature, recommendations by friends and family seem to be the strongest determinant of first-time CAM use (CIS, 2018; Koentopp and Ebersberger, 2008). Hence, in the absence of a clear legal framework and guidelines, as is the case in Spain, Eisenberg (1997) proposed a step-by-step strategy to allow conventional physicians and their patients to discuss the use or avoidance of these therapies proactively to complement the always well intended—but not always accurate—advice from relatives, friends or acquaintances.

Generally, this research could also suggest that the main reasons why people endorse CAMs are their health-related value and belief systems, as Siahpush (1999) concluded earlier. As has happened in other countries, future health policies should assess these systems and cultural change.

6. CONCLUSIONS

This paper provides new insights into research on attitudes towards complementary and alternative therapies among young science storytellers and on how awareness and self-use can influence them in a context in which this issue lacks regulation and is currently at the center of a highly polarized social debate, as is the case in Spain. Specifically, it has made several theoretical contributions to this research field. Firstly, as a pioneering study of CAM at a crossroads from a science communication perspective; namely, it has helped to gain a better understanding of the current situation of the object of study, focusing on how curricula factors—health sciences, journalism, and teacher training—shape young storytellers' views on these therapies. Secondly, it has gone a step further than traditional research on attitudes towards CAM in health sciences curricula to include the perspectives of teacher training and journalism students. Thirdly, the Spanish version of the CHBQ for measuring attitudes towards CAM has been successfully validated.

Overall, and despite the hot debate in the Spanish public arena, the respondents showed a more or less positive attitude towards CAM, above the neutral score. Teacher training and nursing students were more inclined to accept these therapies, which is a factor that may be taken into account when developing public policies. On the contrary, sociodemo-

graphic factors such as age, gender, and place of residence did not seem to influence attitudes. Generally, the respondents proved to have extensive knowledge of CAM modalities, but used them to a much lesser extent, the comprehension and self-use of those aged under 21 and, especially, over 35 is greater than the rest. The most popular therapies were those providing wellbeing and comfort—e.g., massage, relaxation, yoga, and meditation—along with homeopathy, but the most well-known was acupuncture. While medical students had a higher level of awareness of CAM, their teacher training and nursing peers were more likely to resort to therapies of this type. Furthermore, the results obtained here suggest that a possible predictor of positive attitudes towards CAM does not seem to be related to knowledge levels but solely to self-use, in line with the axiom, ‘the more you use it, the more you like it.’

As for this study’s practical contributions, its findings are especially useful to Spain’s national and regional governments and its health organizations for understanding how factors such as curricula and CAM self-use can encourage or discourage support for it in the healthcare, education and news media sectors. In particular, these insights may help health authorities to tailor effective CAM communication strategies for the different professionals involved in science storytelling while strengthening communication channels as a parallel measure for developing a regulatory framework on this issue.

Instead of opposing all CAM modalities as a whole under the labels of “pseudoscience” or “pseudotherapies”, we recommend that the Spanish health authorities follow the WHO’s strategy on CAM by establishing a new research organization focusing on gathering data on the efficacy and safety of its different modalities. An information clearinghouse and clear guidelines for users and practitioners are also needed. The US National Center for Complementary and Integrative Health within the National Institute of Health, founded in 1999, could be an excellent model.

However, this study has limitations that should be addressed in future research. Firstly, using a non-representative student sample from universities in Valencia means that the results cannot be extrapolated to other Spanish universities. Thus, it would be interesting to analyze a sample from universities in different Spanish regions and professionals involved in science storytelling.

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Neither do the authors have a financial interest in the direct applications of this study nor have they profited from them.

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Appendix 1.

CHBQ questionnaire

Attitudes towards CAM (1 = absolutely disagree", 7 = absolutely agree)

1. The physical and mental health is maintained by underlying energy or vital force.
 2. Health and disease are a reflection of the balance between positive life-enhancing forces and negative destructive forces.
 3. The body is essentially self-healing, and the task of a health care provider is to assist in the healing process.
 4. A patient's symptoms should be regarded as a manifestation of general imbalance or dysfunction affecting the whole body.
 5. A patient's expectations, health beliefs and values should be integrated into the patient care process.
 6. Complementary therapies are a threat to public health.^a
 7. Treatments not tested in a scientifically recognized manner should be discouraged.^a
 8. Effects of complementary therapies are usually the results of a placebo effect.^a
 9. Effects of complementary therapies include ideas and methods from which conventional medicine could benefit.
 10. Most complementary therapies stimulate the body's natural therapeutic powers.
-

^aItem response were reverse scored (to minimize the acquiescence response set), so a higher value indicated greater endorsement to CAM.

Source: Lie and Boker (2004).

Appendix 2.

23-CAM checklist

Knowledge and self-use of non-conventional therapies: For each of the following 23 CAM modalities, please indicate (a) if you do know this modality, and (b) have you ever used it? If your answer is YES, check the box. An unchecked box indicates an answer of NO. Please check all that apply.

Modality	Do you know it?	Have you ever used it?
Acupressure	☐	☐
Acupuncture	☐	☐
Aromatherapy	☐	☐
Art therapy	☐	☐
Biofeedback	☐	☐
Chiropractic	☐	☐
Dance therapy	☐	☐
Herbal therapy	☐	☐
Homeopathy	☐	☐
Hypnosis	☐	☐
Magnet therapy	☐	☐
Massage	☐	☐
Meditation	☐	☐
Music therapy	☐	☐
Naturopathy	☐	☐
No herbal supplements	☐	☐
Osteopathy	☐	☐
Prayer/Spirituality	☐	☐
Reiki	☐	☐
Relaxation	☐	☐
Tai Chi	☐	☐
Therapeutic touch	☐	☐
Yoga	☐	☐