

## ORIGINAL ARTICLE

## Use of complementary and alternative medicine in Europe: Health-related and sociodemographic determinants

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### Abstract

**Aims:** The aim of this research was to study health-related and sociodemographic determinants of the use of different complementary and alternative medicine (CAM) treatments in Europe and differences in CAM use in various European countries. **Methods:** The study was based on a design-based logistic regression analysis of the European Social Survey (ESS), Round 7. We distinguished four CAM modalities: manual therapies, alternative medicinal systems, traditional Asian medical systems and mind-body therapies. **Results:** In total, 25.9% of the general population had used CAM during the last 12 months. Typically, only one CAM treatment had been used, and it was used more often as complementary rather than alternative treatment. The use of CAM varied greatly by country, from 10% in Hungary to almost 40% in Germany. Compared to those in good health, the use of CAM was two to fourfold greater among those with health problems. The health profiles of users of different CAM modalities varied. For example, back or neck pain was associated with all types of CAM, whereas depression was associated only with the use of mind-body therapies. Individuals with difficult to diagnose health conditions were more inclined to utilize CAM, and CAM use was more common among women and those with a higher education. Lower income was associated with the use of mind-body therapies, whereas the other three CAM modalities were associated with higher income. **Conclusions: Help-seeking differed according to the health problem, something that should be acknowledged by clinical professionals to ensure safe care. The findings also point towards possible socioeconomic inequalities in health service use.**

**Key Words:** Complementary and alternative medicine (CAM), health conditions, health problems, health services, help-seeking, determinants of CAM use, European Social Survey, country-level differences

### Introduction

Complementary and alternative medicine (CAM) has become more popular and accepted in Europe [1–4], which reflects trends observed in other western countries [5]. Although this development has been acknowledged in European health policies, the knowledge base for informed policy actions is limited, and further evidence on the prevalence and determinants of CAM use in Europe is required [1,6–7]. Many existing CAM studies suffer from

methodological shortcomings, including inadequate operational definitions, recall bias related to long timeframes of the survey measures and insufficient coverage of European countries [6–10]. Moreover, most studies have reported only unadjusted associations, which neglect potential confounding variables [7]. Consequently, cross-country comparisons of CAM utilization are difficult, and prevalence estimates vary greatly, even in the case

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of single countries [7]. Moreover, although there is a considerable body of CAM research in some countries, such as the UK and Germany, there is a lack of evidence of CAM use in many others, especially Eastern European countries [6].

According to a review by Eardley et al. [7], the most frequently used CAM modalities in Europe are herbal medicine, homeopathy, chiropractic, acupuncture and reflexology. Massage was also found to be a widely used CAM treatment [9]. Typically, CAM is used to complement biomedical care [10–11]. With regard to sociodemographics, CAM users are more likely to be female, better educated and middle-aged [7,9,12]. In terms of health determinants, Eardley et al. [7] found that musculoskeletal problems were the most common condition treated with CAM. Reviewing the global CAM literature, Frass et al. [9] reported that back problems, depression, insomnia, severe headaches or migraines and stomach or intestinal illnesses were the most typical conditions associated with CAM.

Some previous studies investigated CAM use for specific health problems or illnesses, such as multiple sclerosis and cancer [13–14]. Menniti-Ippolito et al. [15] found that, in Italy, acupuncture and manipulative therapies were primarily used for alleviating pain, whereas herbal medicine was more often employed to improve quality of life. In contrast, the use of homeopathy was not associated with any specific health problems [15].

In addition to its use in medical conditions, some typical motivations for CAM use are relaxation, improvements in subjective wellbeing, preventive care, a preference for natural care instead of biomedical medicine, a desire for more personalized and holistic care, dissatisfaction with biomedicine and dissatisfaction with the doctor-patient relationship [6–7,16–18]. The heterogeneity of an individual's social network, resulting in exposure to a wide range of information and values, was also found to increase the probability of using CAM [17].

In this study, we examined health-related and sociodemographic determinants of CAM use in Europe and differences in CAM use in individual European countries. We used data from the 2014 European Social Survey (ESS), Round 7, which provides up-to-date and nationally representative information on 21 European countries [19]. This study contributes to the existing literature in several ways. It provides a systematic and comparative depiction of the use of different CAM modalities in Europe. Importantly, our multiple regression approach accounts for confounding variation. We also used a short timeframe (12 months), which helped to manage recall bias associated with longer periods. To the best of our knowledge,

this study is the first to focus simultaneously on a variety of CAM treatment modalities, different health-related problems and European country-level variations, thereby deepening our understanding of CAM use in Europe.

The following research questions were addressed:

1. What is the prevalence of different CAM modalities in Europe? How many CAM users utilize it exclusively, i.e. without biomedical care? (complementary or alternative use)
2. How are different health problems associated with the use of different CAM modalities?
3. What are the sociodemographic determinants for using different CAM therapies? Are there country differences in the prevalence of CAM use?

In practical terms, this study is of help to both medical professionals and CAM providers, as it provides information on the medical conditions for which CAM is most often used. A comprehensive medical history is paramount to quality care, but patients do not always inform healthcare professionals about CAM use [20], which can lead to harmful double treatment or medication. The study also offers information for CAM providers on the medical backgrounds of their clients. They can utilize this information to ensure safe care and assess the need for biomedical care [21]. CAM is an economic and societal issue related to money spent on treatments, the relationship between CAM and public healthcare and inequalities in health service use [6,16,22].

## Methods

### *Data*

This study utilized data from the European Social Survey, Round 7 (edition 2.0, 2014), which is a biennial cross-sectional survey project using face-to-face interviews. In the case of the Czech Republic, data on cancer were lacking, and data on other medical conditions in Estonia were missing. Consequently, these countries were excluded from the respective analyses. The data included post-stratification weights to account for the sampling design and address the implications of non-response.

### *Measures*

Using dichotomous survey items, the respondents were asked about their use of different healthcare modalities during the last 12 months. The CAM items were acupuncture, acupressure, Chinese medicine, chiropractic, osteopathy, homeopathy, herbal treatment, hypnotherapy, massage therapy, reflexology and

spiritual healing. The survey also recorded data on the respondents' use of physiotherapy and consultation with a general practitioner or medical specialist.

Our CAM classification draws on the widely accepted approach of the National Institutes of Health (NIH) and National Center for Complementary and Alternative Medicine (NCCAM) [23–24; cf. 25–26], with slight modifications following Fulder [27]. We distinguished four categories of CAM treatments. First, we used the category of **traditional Asian medical systems (TAMS)**, which can be described as 'complete system[s] of theory and practice', having evolved independently from biomedical medicine [25]. In the present study, this category included traditional Chinese medicine, acupuncture and acupressure. Second, drawing on Fulder [27], we constructed an **alternative medicinal systems (AMS)** category, which refers to the intake of substances thought to have healing potential. These systems included homeopathy and herbal treatment. The third category was **manual body-based therapies**, which involve body movements and focus on the structures and systems of the body. This category comprised massage therapy, chiropractic, osteopathy and reflexology. The final category was **mind-body therapies**, which emphasize the role of thought and emotion in healing. This category included hypnotherapy and spiritual healing. We created a dichotomous variable for each CAM category (i.e. used a treatment in a given category during the last 12 months vs not). Some other CAM therapies, such as energy therapies [23–24] and nature cure therapies [27], were not included in the survey data.

Health problems during the last 12 months were indicated with dichotomous items. The items included heart or circulatory problems, high blood pressure, breathing problems, allergies, back or neck pain, upper extremity pain, lower extremity pain, stomach or digestive system problems, skin conditions, severe headaches and diabetes. The item on cancer covered current disease and previous occurrences, and here they were combined in one category. Depression was measured using an eight-item version of the CES-D scale [28]. The items were feelings of depression, everything is an effort, loneliness, happiness, sadness, enjoyment in life, restless sleep and could not get 'going' during the past week. The items were marked on a four-point scale, ranging from 'none' or 'almost none of the time' to 'all' or 'almost all the time'. The sum was dichotomized between 8 and 9, corresponding to the cutoff point used commonly in longer scales [29–30]. Finally, standard sociodemographic control variables included gender, age (categorized), education (International Standard Classification of Education), household's total net income (decile) and country, with Hungary selected as the reference due to its low level of CAM use.

### *Statistical analysis*

Percentages and their confidence intervals as well as logistic regression models were estimated using the Complex Samples module of SPSS 22. In the text, 5% was used as the level of statistical significance. We controlled for the standard sociodemographic factors and country. Also, comorbidity was controlled for by including all the health variables in the models. To retain analytic power, the missing values of the household variable ( $n=8296$ ) were included in the logistic regression models as a separate category. The analyses were conducted using a survey weight variable that combines the post-stratification and country weights, except in those analyses that included country as an analytical variable. In these cases the country was already controlled for and the post-stratification weights were sufficient. The use of mind-body therapies was a relatively rare outcome, but comparing the maximum likelihood results with those from penalized estimation [31], run in R, suggests that the number of events was sufficient and, thus, the ordinary estimates could be relied on.

## **Results**

### *Descriptive findings*

First, we estimated the use of different CAM modalities and compared their use with the use of biomedical treatments (General Practitioner [GP] and Medical Specialist [MS]) and physiotherapy. During the last 12 months, 25.9% (95% confidence interval: 25.1–26.6) of the study population had used CAM, which was around one-third of the proportion of those who had visited a general practitioner (76.3%). Almost half of the population had visited a medical specialist (44.6%), and 16.5% had used physiotherapy. Among those who had used CAM, 69.4% had used only one kind of CAM modality, and 19.9% had used two. Approximately 8% of CAM users had used CAM exclusively (alternative use), without any visits to biomedical professionals in the last 12 months. The rates of alternative use were highest for spiritual healing (14.9%) and acupressure (12.1%), and they were lowest for osteopathy (4.1%), homeopathy (5.6%) and acupuncture (6.3%).

Table I presents the unadjusted weighted estimates for the use of CAM in the surveyed countries, ranging from around 10% in Hungary to approximately 40% in Germany and Switzerland.

The most frequently used CAM treatment was massage therapy, used by 11.9% of the population, followed by homeopathy (5.7%), osteopathy (5.2%), herbal treatments (4.6%), acupuncture (3.6%), chiropractic (2.3%), reflexology (1.7%) and spiritual healing (1.3%). Other modalities (Chinese medicine,

Table I. Used at least one CAM therapy during the last 12 months.

Country	Weighted percentage	Standard error	Unweighted total count
Austria	35.5	1.2	1768
Belgium	24.6	1.1	1760
Czech Rep.	25.0	1.1	2045
Denmark	32.1	1.4	1493
Estonia	35.1	1.2	2030
Finland	35.3	1.2	2081
France	31.2	1.4	1907
Germany	39.5	1.1	3019
Hungary	9.5	0.8	1649
Ireland	19.2	1.0	2261
Israel	15.1	0.8	2491
Lithuania	32.9	1.3	2174
Netherlands	14.1	0.9	1917
Norway	28.8	1.3	1433
Poland	12.9	0.9	1588
Portugal	14.1	1.4	1030
Slovenia	22.7	1.4	1196
Spain	17.2	0.9	1894
Sweden	31.5	1.2	1763
Switzerland	39.4	1.3	1525
UK	20.6	1.0	2234
All countries	26.0	0.3	39258

acupressure and hypnotherapy) were used by around by 1% or less.

Next, we examined the association of CAM use with different health conditions. Of those with no health problems, around 9% had used at least one of the CAM modalities during the last 12 months. CAM was used most among those with skin conditions (38.1%), back or neck pain (38.0%), allergies (36.7%), stomach or digestive system-related problems (35.7%), upper extremity pain (34.7%) and severe headaches (34.1%). In contrast, of those with diabetes, only 23.6% had used CAM. With regard to other health conditions, including cancer and depression, the usage was around 30%.

Figure 1 shows the use of different CAM modalities in relation to various health problems. In the figure, medical conditions are ordered according to increasing use of biomedical care, ranging from 63% in the case of those with no health problems to 99% in diabetes.

Manual therapies were most commonly used, especially among those with back or neck pain. AMS was used most often by those with allergies, stomach and digestive system problems and skin conditions. TAMS and mind-body therapies were used fairly equally for a range of health problems. For problems strongly associated with the use of biomedicine (diabetes, heart or circulatory problems and high blood pressure), the use of CAM therapies was generally lower. However, the use of manual therapies and

AMS was slightly more common among those with heart or circulatory problems. People with no health problems used CAM treatments the least.

#### *CAM and health problems*

Comorbidities were also considered, as these could potentially blur the associations between treatment modalities and health problems. Around one-fifth of the population had no health problems, one-fourth had one, and one-fifth had two problems. The remaining one-third had three or more health problems. The following multiple regression results address comorbidity (see Methods section).

Table II reports the adjusted odds ratios (ORs) by health problem for the four CAM categories. With regard to TAMS, back or neck pain was the strongest health determinant of utilization, with an OR of 2.00. Pain in the upper or lower extremities, stomach or digestive system problems, allergies and cancer were other significant predictors of TAMS use. In terms of AMS, 10 health conditions were associated with its use. These were, most importantly, stomach or digestion problems, allergies, breathing problems, back or neck pain, skin conditions, cancer and heart or circulatory problems. Interestingly, individuals with diabetes were clearly not oriented towards AMS (OR: 0.76).

In the case of manual therapies, as expected, back or neck pain as well as pain in the upper and lower extremity were associated with this type of care. The presence of allergies, heart and circulatory problems and stomach and digestive system problems were also significant predictors of the use of manual therapies. Finally, mind-body therapies were commonly used by those with stomach or digestive system problems and those with cancer. It is noteworthy that mind-body care was the only CAM modality associated with depression. The presence of severe headaches, allergies, back or neck pain and upper extremity pain was also associated with the use of mind-body therapies.

Back and neck pain, stomach and digestive system problems, upper extremity pain and allergies were strong predictors of CAM use in all categories. High blood pressure had no independent predictive power in any of the models.

#### *CAM and sociodemographic factors*

Table III presents the results of sociodemographic determinants of CAM use and CAM usage in different countries. Women were more likely to use CAM than men. Higher education was related to higher odds of CAM usage in all the CAM categories. In terms of other sociodemographic factors, the results varied

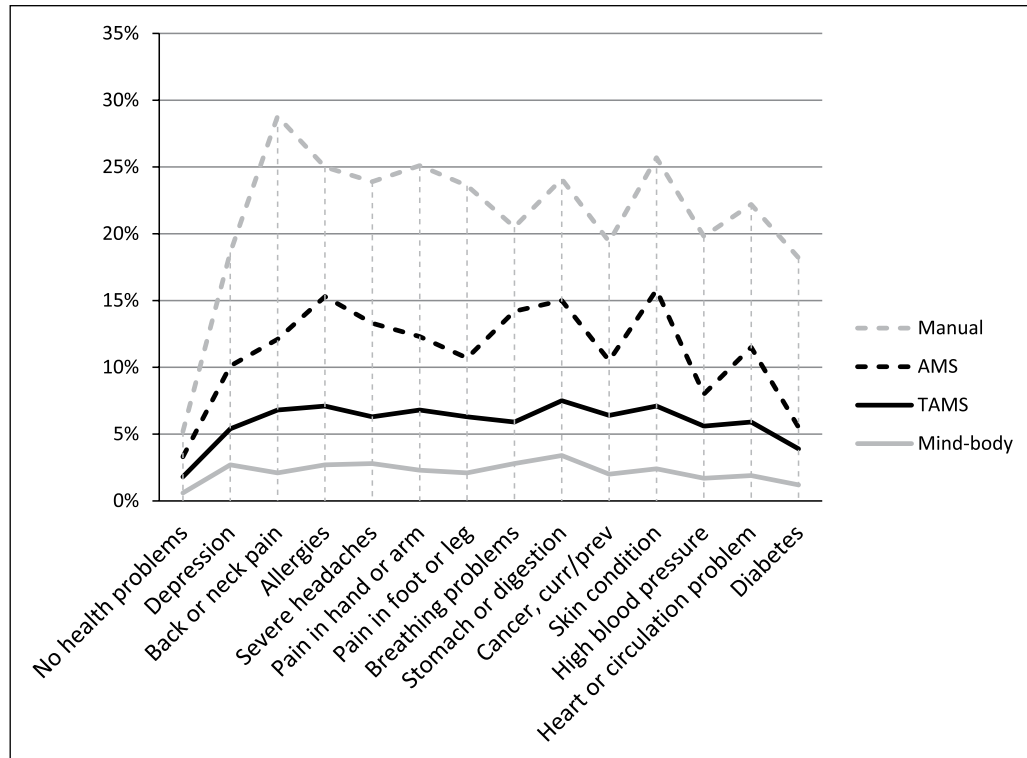


Figure 1. Use of CAM in different health problems (%).

Table II. Health problems and the use of CAM. Design-based logistic regression models.

	TAMS		AMS		Manual		Mind-body					
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI		
Depression	1.04	0.89	1.22	1.05	0.93	1.20	0.97	0.88	1.07	<b>1.37</b>	1.08	1.75
Back or neck pain	<b>2.00</b>	1.76	2.27	<b>1.40</b>	1.26	1.56	<b>3.08</b>	2.86	3.32	<b>1.33</b>	1.07	1.65
Allergies	<b>1.33</b>	1.14	1.56	<b>1.53</b>	1.34	1.75	<b>1.24</b>	1.12	1.37	<b>1.42</b>	1.09	1.84
Severe headaches	1.12	0.96	1.30	<b>1.17</b>	1.03	1.33	1.05	0.95	1.16	<b>1.49</b>	1.19	1.87
Pain in arm or hand	<b>1.38</b>	1.19	1.59	<b>1.24</b>	1.10	1.41	<b>1.28</b>	1.18	1.40	<b>1.33</b>	1.05	1.68
Pain in foot or leg	<b>1.33</b>	1.15	1.54	1.09	0.96	1.24	<b>1.26</b>	1.16	1.38	1.07	0.86	1.34
Cancer	<b>1.24</b>	1.03	1.48	<b>1.31</b>	1.13	1.52	1.09	0.97	1.22	<b>1.62</b>	1.24	2.11
Breathing problems	1.00	0.83	1.22	<b>1.42</b>	1.20	1.67	0.96	0.85	1.09	1.08	0.80	1.47
Stomach or digestion	<b>1.37</b>	1.19	1.57	<b>1.62</b>	1.44	1.83	<b>1.13</b>	1.03	1.23	<b>1.86</b>	1.49	2.32
Skin condition	1.10	0.92	1.31	<b>1.38</b>	1.19	1.60	1.05	0.94	1.18	1.02	0.76	1.35
High blood pressure	1.07	0.91	1.27	0.99	0.86	1.14	1.02	0.92	1.13	1.13	0.85	1.50
Heart or circulation	0.98	0.79	1.22	<b>1.29</b>	1.10	1.51	<b>1.15</b>	1.01	1.30	1.32	0.95	1.83
Diabetes	0.83	0.62	1.10	<b>0.76</b>	0.60	0.98	1.03	0.88	1.21	0.89	0.57	1.40

Note 1: Reference category: no health problems. The *n* in all models: 34,101. Significant at 0.05 in bold.

Note 2: The models account also for gender, age, education, income and country (see Table III).

depending on the type of CAM. Most notably, the oldest and youngest age groups were the least likely to use TAMS and manual therapies, and the oldest group was also less likely to use mind-body therapies.

With regard to income, those with a lower income were more likely to be users of mind-body therapies. In contrast, those with a higher income were more inclined to be users of the other three

CAM modalities (i.e. TAMS, AMS or manual body-based therapies).

In terms of country-level differences, the highest ORs for the use of TAMS were found in Denmark, Switzerland and Israel, followed by Austria, Norway and Sweden. The highest OR for the use of AMS was found in Lithuania, while manual therapies were most commonly used in Finland, Austria, Switzerland,

Table III. Sociodemographic determinants of CAM. Design-based logistic regression models (*n* in all models 34,101). Significant at 0.05 in bold.

	TAMS			AMS			Manual			Mind-body		
	OR	95%	CI	OR	95%	CI	OR	95%	CI	OR	95%	CI
Woman	<b>1.57</b>	1.39	1.77	<b>1.88</b>	1.70	2.09	<b>1.36</b>	1.27	1.45	<b>1.55</b>	1.26	1.91
15–24 years	1.18	0.83	1.67	1.18	0.92	1.52	0.94	0.78	1.14	<b>2.12</b>	1.12	4.00
25–34	<b>1.92</b>	1.40	2.64	<b>1.33</b>	1.04	1.68	<b>1.27</b>	1.07	1.50	<b>2.60</b>	1.42	4.78
35–44	<b>1.95</b>	1.43	2.64	1.25	0.99	1.58	<b>1.31</b>	1.11	1.55	<b>3.62</b>	2.00	6.55
45–54	<b>1.94</b>	1.44	2.62	1.23	0.98	1.55	<b>1.29</b>	1.10	1.53	<b>2.55</b>	1.41	4.60
55–64	<b>1.86</b>	1.39	2.49	<b>1.28</b>	1.03	1.59	<b>1.28</b>	1.09	1.51	<b>2.31</b>	1.33	4.04
65–74	<b>1.83</b>	1.35	2.48	1.16	0.92	1.46	1.07	0.91	1.27	1.37	0.77	2.44
over 75	1.00	.	.	1.00	.	.	1.00	.	.	1.00	.	.
Less than lower secondary (ISCED I)	<b>.49</b>	.36	.66	<b>0.40</b>	0.32	0.52	<b>0.46</b>	0.38	0.55	<b>0.42</b>	0.25	0.71
Lower secondary (II)	<b>.71</b>	.56	.89	<b>0.49</b>	0.41	0.60	<b>0.66</b>	0.58	0.76	<b>0.60</b>	0.40	0.89
Lower tier upper secondary (IIIb)	<b>.76</b>	.62	.92	<b>0.62</b>	0.53	0.74	0.92	0.81	1.03	0.75	0.52	1.08
Upper tier upper secondary (IIIa)	<b>.80</b>	.64	.98	<b>0.68</b>	0.56	0.81	<b>0.79</b>	0.70	0.91	0.72	0.50	1.05
Advanced vocational (IV)	.94	.77	1.14	<b>0.76</b>	0.64	0.90	1.09	0.96	1.23	0.87	0.61	1.23
Lower tertiary, BA (V1)	.93	.76	1.13	<b>0.86</b>	0.72	1.03	1.05	0.92	1.19	1.13	0.81	1.60
Higher tertiary, MA (V2)	1.00	.	.	1.00	.	.	1.00	.	.	1.00	.	.
Income, missing	<b>0.75</b>	0.60	0.95	<b>0.82</b>	0.68	0.99	<b>0.63</b>	0.55	0.72	1.16	0.75	1.82
Income, quintile 1, lowest	<b>0.66</b>	0.53	0.83	0.86	0.71	1.04	<b>0.54</b>	0.47	0.62	<b>1.79</b>	1.22	2.61
Income, quintile 2	<b>0.80</b>	0.65	0.98	<b>0.84</b>	0.70	1.00	<b>0.67</b>	0.59	0.76	<b>1.83</b>	1.27	2.64
Income, quintile 3	.84	.69	1.01	1.05	0.89	1.24	<b>0.76</b>	0.68	0.86	<b>1.51</b>	1.06	2.15
Income, quintile 4	.91	.76	1.10	1.08	0.92	1.27	<b>0.84</b>	0.75	0.94	1.14	0.80	1.64
Income, quintile 5, highest	1.00	.	.	1.00	.	.	1.00	.	.	1.00	.	.
Austria	<b>5.20</b>	3.00	9.00	<b>2.53</b>	1.92	3.35	<b>5.63</b>	4.30	7.38	2.64	0.86	8.11
Belgium	1.56	.86	2.85	1.10	0.81	1.48	<b>2.58</b>	1.96	3.42	<b>6.83</b>	2.47	18.92
Denmark	<b>6.90</b>	3.98	11.94	<b>0.39</b>	0.25	0.59	<b>4.24</b>	3.21	5.61	<b>15.58</b>	5.69	42.64
Finland	<b>3.53</b>	2.03	6.15	<b>0.46</b>	0.32	0.66	<b>5.72</b>	4.37	7.49	<b>5.02</b>	1.79	14.12
France	<b>2.54</b>	1.41	4.59	<b>2.45</b>	1.83	3.27	<b>3.23</b>	2.43	4.30	<b>5.65</b>	1.98	16.14
Germany	<b>3.99</b>	2.31	6.88	<b>1.78</b>	1.35	2.33	<b>4.67</b>	3.60	6.06	<b>5.20</b>	1.89	14.32
Hungary	1.00	.	.	1.00	.	.	1.00	.	.	1.00	.	.
Ireland	<b>4.27</b>	2.45	7.43	<b>0.60</b>	0.42	0.84	<b>3.01</b>	2.26	3.99	<b>16.27</b>	6.01	44.03
Israel	<b>6.13</b>	3.58	10.50	<b>0.55</b>	0.39	0.78	<b>1.94</b>	1.45	2.59	<b>4.56</b>	1.59	13.09
Lithuania	.90	.44	1.81	<b>5.56</b>	4.24	7.28	<b>2.60</b>	1.94	3.50	<b>12.72</b>	4.67	34.67
Netherlands	<b>2.12</b>	1.18	3.82	<b>0.57</b>	0.41	0.79	1.22	0.90	1.65	<b>9.50</b>	3.36	26.90
Norway	<b>5.21</b>	3.00	9.03	<b>0.27</b>	0.17	0.43	<b>3.82</b>	2.88	5.06	<b>11.83</b>	4.33	32.34
Poland	.71	.35	1.47	<b>0.72</b>	0.51	1.01	1.27	0.94	1.72	<b>4.64</b>	1.60	13.47
Portugal	<b>2.31</b>	1.18	4.52	<b>0.62</b>	0.38	1.00	1.18	0.80	1.74	<b>3.89</b>	1.15	13.10
Slovenia	<b>2.34</b>	1.26	4.34	<b>1.85</b>	1.35	2.53	<b>2.31</b>	1.70	3.15	<b>14.72</b>	5.30	40.86
Spain	<b>2.11</b>	1.17	3.79	1.04	0.76	1.43	<b>1.69</b>	1.26	2.28	<b>5.64</b>	1.99	16.04
Sweden	<b>4.49</b>	2.60	7.74	<b>0.30</b>	0.20	0.44	<b>4.12</b>	3.15	5.40	<b>8.83</b>	3.13	24.88
Switzerland	<b>6.37</b>	3.72	10.92	<b>2.08</b>	1.57	2.75	<b>5.14</b>	3.93	6.73	<b>8.11</b>	2.92	22.54
UK	<b>3.22</b>	1.83	5.67	<b>0.71</b>	0.51	1.00	<b>2.19</b>	1.66	2.91	<b>8.56</b>	3.14	23.37

ISCED: International Standard Classification of Education.

Note: The models also account for health problems (see Table II).

Germany and Denmark. Moreover, Denmark, Ireland, Slovenia and Lithuania had the highest ORs for using mind-body therapies. France, Spain and Germany presented a common pattern, with relatively similar use of the different modalities. Poland and Hungary had low ORs for use of the different CAM modalities.

## Discussion

The more prevalent CAM use in pain- and allergy-related conditions may reflect their ambiguous and

uncertain character, which may leave patients without a clear understanding of causes and remedies. In these cases, CAM use may function as a coping strategy against this kind of uncertainty [cf. 10]. In contrast with the findings of a previous study [9], people with depression were not the most active CAM users. This may be because finding information and making an informed decision on treatment can be difficult due to hampered agency [cf. 18].

In the present study, the use of CAM varied greatly by country. The variation can be partly explained by

regulations governing the use of CAM and the inclusion of CAM in biomedical practice and health insurance. For example, in Germany and Switzerland, some forms of CAM are covered by insurance [32–33]. In Austria, where CAM use is high, general practitioners receive training in CAM methods [13]. Some country-level differences may also be cultural [10]. For example, in large multicultural countries, such as France and Germany, the use of different CAM modalities is widespread, whereas this is not the case in the more homogeneous Nordic countries. Furthermore, the diffusion of ideas in German-speaking countries may partly explain the higher usage of AMS, including homeopathy, which originated in Germany.

In relation to previous CAM studies, the key strengths of this study stem from the comparable findings on the surveyed European countries, its focus on different CAM modalities and the association of these modalities with different health problems, in addition to the multiple regression approach used to control for confounding variation [6–10]. On the other hand, it is well known that cross-sectional data do not allow for optimal estimation of causal impacts. In addition, the study did not include all known CAM treatment modalities, which may lead to underestimation of CAM usage rates. Furthermore, data were not available on the frequency of CAM use. Thus, it was not possible to distinguish the single use of CAM therapy versus more frequent usage. Finally, country-level differences may exist in what is considered complementary or alternative care.

In conclusion, our study demonstrated that CAM was commonly used for health-related problems in Europe. Hence, CAM should not be viewed as a form of relaxation or preventive care used only by those in good health [cf. 6–7]. CAM was not used as a sole alternative to biomedical care. Instead, it was typically used in a complementary manner. The patterns of help-seeking behaviour differed according to the health-related problem. For example, those suffering from pain conditions turned to a wide range of CAM treatment modalities. On the other hand, AMS especially attracts help-seekers with various medical conditions, which should be taken into account by the providers of these treatments in order to provide safe care. In addition, individuals in a higher socioeconomic position were more likely to turn to a wider range of CAM options than individuals in a lower socioeconomic position. Therefore, those with a higher socioeconomic status were more likely than those with a lower socioeconomic status to find a satisfactory combination of biomedical and complementary therapies. This

finding points towards a possible socioeconomic inequality in health service use.

### Author contributions

LMK and TTK have joint first authorship.

### Declaration of conflicting interests

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### References

- [1] Fischer FH, Lewith G, Witt CM, et al. B. High prevalence but limited evidence in complementary and alternative medicine: Guidelines for future research. *BMC Complement Altern Med* 2014; 6: 14–46.
- [2] Ernst E and White A. The BBC survey of complementary medicine use in the UK. *Complement Ther Med* 2000; 1: 32–36.
- [3] Härtel U and Volger E. Inanspruchnahme und Akzeptanz klassischer Naturheilverfahren und alternativer Heilmethoden in Deutschland—Ergebnisse einer repräsentativen Bevölkerungsstudie. *Forsch Komplementarmed Klass Naturheilkd* 2004; 6: 327–334.
- [4] Ekholm O and Kjoller M. Brugen af alternativ behandling i Danmark. Resultater fra den nationalt repræsentative Sundheds-og sygelighedsundersøgelse 2005. *Tidsskrift for Forskning i Sygdom og Samfund* 2007; 6: 15–24.
- [5] Clarke T, Black LI, Stussman BJ, et al. Trends in the use of complementary health approaches among adults: United States, 2002–2012. *Natl Health Stat Report* 2015; 79: 1–16.
- [6] Nissen N, Schunder-Tatzber S, Weidenhammer W, et al. What attitudes and needs do citizens in Europe have in relation to complementary and alternative medicine? *Forsch Komplementmed* 2012; 19 Suppl 2: 9–17.
- [7] Eardley S, Bishop FL, Prescott P, et al. A systematic literature review of complementary and alternative medicine prevalence in EU. *Forsch Komplementmed* 2012; 19 Suppl 2: 18–28.
- [8] Linde K, Alscher A, Friedrichs C, et al. Die Verwendung von Naturheilverfahren, komplementären und alternativen Therapien in Deutschland—eine systematische Übersicht bundesweiter Erhebungen. *Forsch Komplementmed* 2014; 2: 111–118.
- [9] Frass M, Strassl RP, Friehs H, et al. Use and acceptance of complementary and alternative medicine among the general population and medical personnel: A systematic review. *Ochsner J* 2012; 1: 45–56.

- [10] MacArtney JI and Wahlberg A. The problem of complementary and alternative medicine use today: Eyes half closed? *Qual Health Res* 2014; 1: 114–123.
- [11] Shmueli A, Igudin I and Shuval J. Change and stability: Use of complementary and alternative medicine in Israel: 1993, 2000 and 2007. *Eur J Public Health* 2011; 2: 254–259.
- [12] Harris PE, Cooper KL, Relton C, et al. Prevalence of complementary and alternative medicine (CAM) use by the general population: A systematic review and update. *Int J Clin Pract* 2012; 10: 924–939.
- [13] Horneber M, Bueschel G, Dennert G, et al. How many cancer patients use complementary and alternative medicine: A systematic review and metaanalysis. *Integr Cancer Ther* 2012; 3: 187–203.
- [14] Skovgaard L, Nicolajsen PH, Pedersen E, et al. Differences between users and non-users of complementary and alternative medicine among people with multiple sclerosis in Denmark: A comparison of descriptive characteristics. *Scand J Public Health* 2013; 5: 492–499.
- [15] Menniti-Ippolito F, Gargiulo L, Bologna E, et al. Use of unconventional medicine in Italy: A nation-wide survey. *Eur J Clin Pharmacol* 2002; 1: 61–64.
- [16] Sointu E. Detraditionalisation, gender and alternative and complementary medicines. *Sociol Health Illn* 2011; 3: 356–71.
- [17] Gale N. The sociology of traditional, complementary and alternative medicine. *Sociol Compass* 2014; 6: 805–822.
- [18] Salamonsen A. Use of complementary and alternative medicine in patients with cancer or multiple sclerosis: Possible public health implications. *Eur J Public Health* 2016; 2: 225–229.
- [19] European Social Survey. Round 7, edition 2.1. NSD – Norwegian Centre for Research Data, Norway – Data Archive and distributor of ESS data for ESS ERIC 2014. [www.europeansocialsurvey.org](http://www.europeansocialsurvey.org)
- [20] Robinson A and McGrail MR. Disclosure of CAM use to medical practitioners: A review of qualitative and quantitative studies. *Complement Ther Med* 2004; 2–3: 90–98.
- [21] Ayers SL and Kronenfeld JJ. Delays in seeking conventional medical care and complementary and alternative medicine utilization. *Health Serv Res* 2012; 5: 2081–2096.
- [22] Nissen N. Challenging perspectives: Women, complementary and alternative medicine, and social change. *Interface: a journal for and about social movements* 2011; 2: 187–212.
- [23] Wieland LS, Manheimer E and Berman BM. Development and classification of an operational definition of complementary and alternative medicine for the Cochrane collaboration. *Altern Ther Health Med* 2011; 2: 50–59.
- [24] Koithan M. Introducing complementary and alternative therapies. *J Nurse Pract* 2009; 1: 18–20.
- [25] Tataryn DJ. Paradigms of health and disease: A framework for classifying and understanding complementary and alternative medicine. *J Altern Complement Med* 2002; 6: 877–892.
- [26] Ayers SL and Kronenfeld JJ. Using factor analysis to create complementary and alternative medicine domains: An examination of patterns of use. *Health* 2010; 3: 234–252.
- [27] Fulder S. The basic concepts of alternative medicine and their impact on our views of health. *J Altern Complement Med* 1998; 2: 147–158.
- [28] Radloff LS. The CES-D scale: A self-report depression scale for research in the general population. *Appl Psychol Meas* 1977; 1(3): 385–401.
- [29] APA. Center for Epidemiological Studies – Depression. [www.apa.org/pi/about/publications/caregivers/practice-settings/assessment/tools/depression-scale.aspx](http://www.apa.org/pi/about/publications/caregivers/practice-settings/assessment/tools/depression-scale.aspx) (accessed 6 January 2017).
- [30] Björgvinsson T, Kertz SJ, Bigda-Peyton JS, et al. Psychometric properties of the CES-D-10 in a psychiatric sample. *Assessment* 2013; 4: 429–436.
- [31] Firth D. Bias reduction of maximum likelihood estimates. *Biometrika* 1993; 1: 27–38.
- [32] Marstedt G and Moebus S. *Inanspruchnahme alternativer Methoden in der Medizin. Gesundheitsberichterstattung des Bundes*. Berlin: Robert Koch Institut, 2002, pp. 7.
- [33] Klein SD, Torchetti L, Frei-Erb M, et al. Usage of complementary medicine in Switzerland: Results of the Swiss Health Survey 2012 and development since 2007. *PLoS One* 2015; 10: e0141985.