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Changes during 11 years in characteristics of visitors to practitioners of complementary and alternative medicine in a large adult population in central Norway (HUNT 3 and 4)

Graduate thesis in Medicine
Supervisor: Aslak Steinsbekk
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Abstract

Aim

The aim was to study changes in prevalence and characteristics among visitors to practitioners of complementary and alternative medicine (CAM) from 2007 to 2018.

Method

Data were sampled from two consecutive cross-sectional population studies conducted in central Norway, HUNT 3 (2006-2008) and HUNT 4 (2017-2019). CAM visitors were compared to non-visitors on demographics, self-reported health, and health care utilization. The data within each year were analyzed using multivariable logistic regression analysis (adjusted odds ratio, adjOR), and Ratio Odds Ratio (ROR) were calculated to compare changes in adjOR from 2007 to 2018.

Results

The prevalence of CAM-visits decreased from 12.6% (95%CI 12.2-12.8%, N=50694) in 2007 (HUNT 3) to 10.7% (95%CI 10.4-10.9, N=52711) in 2018 (HUNT 4). The reduction was most prominent among the groups who in 2008 had the highest prevalence; females, those with poor global health and those with self-reported mental health issues. Being female was most strongly associated with visits to a CAM practitioner in both years (adjOR 1.7 in 2018 and 1.9 in 2007), followed by having muscle and joint pain, poor health, and conventional health care utilization. For most characteristics, there were no changes in which were associated with visiting a CAM practitioner during the 11-year period. The characteristics with the most prominent changes from 2007 to 2018 were: Increased odds of visiting for those 76 years and older (ROR of 2.2 for 76 to 85 years), as well having visited a chiropractor (ROR 1.2). There were decreased odds for visits among those with poor health (ROR 0.6) and daily smokers (ROR 0.9).

Conclusion

There has been a 2 percentage point decrease in the prevalence of visits to CAM practitioner during the 11-year period. Female gender continues to be a dominating characteristic of CAM-visit. The characteristics of CAM visitors were mainly the same in 2018 as in 2007, but fewer young people visited.

Introduction

Complementary and alternative medicine (CAM) are widespread practices in all parts of the world (1) and are on the rise in many western countries (2). These practices exist and in varying degrees coexist with ordinary medicine both among patients and the healthy population.

There are several ways to define CAM, which is one of the challenges in research on the prevalence of CAM use (3-5). According to Norway's National Research Centre in Complementary and Alternative Medicine, (NAFKAM - Nasjonalt forskningscenter innen komplementær og alternativ medisin) (6), the term complementary and alternative medicine (CAM) refers to health-related therapies practiced outside of established health services by non-authorized personnel or self-care remedies beyond the advice that would have been given by a health care provider. It also includes practices performed within established health care or by authorized personnel if the treatment is essentially used outside of established health care. This includes therapies like acupuncture, homeopathy, and reflexology.

Self-treatment with CAM is often distinguished from visit to a CAM practitioner. Self-treatment includes such things as over-the-counter remedies, often herbal or homeopathic, lifestyle changes, special diets, or meditation (7). A CAM practitioner is someone who provides CAM treatment or advice as a form of professional service. This study will focus on the latter.

Knowledge about who visits CAM practitioners can be clinically relevant to a health care provider if a patient's CAM treatment has implications for their conventional therapies, i.e. pharmaceutical interactions between CAM remedies and medicinal treatment (8). CAM treatment might not be evident in a patient's journal as it happens outside hospital walls. Knowing when to inquire about such practice is useful and, in some cases, a crucial part of patient communication. A systematic review of disclosure of CAM use in patient-provider communication found an average disclosure rate of 33% but there was a large variation and lack of inquiry being one of the main reasons for non-disclosure (3).

The characteristics of CAM users have been studied for some time. A study of CAM use in Europe published in 2020 showed greater use among female, middle-aged, and higher-income

populations (2). This has also been shown in earlier Norwegian population studies (9, 10). Chronic complaint is also associated with greater use of CAM (2). Reasons to use CAM range from expected benefits, dissatisfaction with conventional medicine, and a perceived safety with CAM, as well as internal locus of control regarding individual health (2, 11).

A significant number of patients in western countries seek CAM treatments as a way of dealing with health issues, as documented in various studies (2, 5, 12-14). A systematic review of studies performed on populations in the EU showed a lifetime prevalence of CAM use ranging from 0.3% to 86% (5). A systematic review of CAM-visit found a 12-month prevalence of CAM-visit ranging from 1.8-49% in 15 countries around the world (i.e. USA, UK, Australia, Sweden, Norway, Japan, Malaysia) (12). These studies show that there is a large variation in the prevalence of CAM use.

The CAMbrella project, funded by the European Commission recommends the use of cross-sectional studies of large populations to map prevalence and patterns among CAM users (5). Epidemiological patterns of which patients seek CAM-practitioners help us assess the patient's self-perceived needs, values, or lack of attention given to them by the public health care services (2, 11). Patients which feel the need to supplement their conventional health care with CAM treatments, might mirror areas where health care providers or conventional treatment falls short in providing a fulfilling patient experience, or fail to solve the patient's medical issue (2, 11). In a study conducted by Hansen et al, it was found an association between increased continuity of GP care with reduced visits to CAM practitioners (15). In a study by Fjær et al. patients who reported an unmet medical need were associated with greater use of CAM (2).

Studies on changes in CAM use over time are somewhat rare, but there have been some. A review conducted by Cooper et al. (16) studied the change in prevalence of visit to 5 common CAM modalities in studies from several countries and found little change during a 15-20 year period from 1986 to 2007. An American study found an increase in the prevalence of CAM-visit from 1990-1997 of 47% (17). A Canadian cohort study found an increase in CAM-visit from 4.8% in 1994 to 11.2% in 2011% (18).

Norway the most relevant research on changes in CAM-prevalence and characteristics might be an article by Steinsbekk et al. which describes changes in prevalence in central Norway

from 1997 to 2008 (10). It showed an increase in visits to CAM practitioners from 9.4% in 1997 to 12.6% in 2008, with approximately twice the number of female visitors as male visitors in both studies. The study contains further analysis of changes in visitor characteristics. It shows that in 2008, the variables strongly associated with CAM practitioner visits had changed from being predominantly psychiatric and chronic health issues as well as chiropractic use, to an increase among several other variables. The authors highlight an increase among young people and those practicing hard physical activity (10).

As mentioned before, there is limited research on changes in CAM-visit. The research available is also quick to go out of date, as most are over a decade old. In addition, they rarely provide changes in characteristics of CAM-visitors.

The aim of this project was to study changes in prevalence and characteristics among CAM visitors in a Norwegian population from 2007 to 2018.

Method

To answer the research question, data from two cross-sectional adult health surveys conducted approximately eleven years apart in central Norway, HUNT 3 (2006-2008) and HUNT 4 (2017-2019) was used.

Approval was granted by the Regional Committee for Medical and Health Research Ethics, Central Norway regional (reference ID 234009), and a Data Protection Impact Assessment for the project was performed. The HUNT data center provided data from both studies.

Setting

Norway is a country with an extensive public health care system and citizens are entitled to universal health care. Only 10% of the population has private health insurance, and this is mainly for quicker access to health care among private facilities, as well as a greater range of treatment options (19). The universal health care usually does not cover CAM treatment, meaning that visitors of CAM in Norway take the economic burden for such treatments themselves. Chiropractors are formally recognized as health care providers in Norway and are therefore not considered to be CAM practitioners in this study.

The HUNT studies

HUNT is a Norwegian acronym for The Nord-Trøndelag Health Study and is a comprehensive study of health that grants a wide collection of data for future analysis. There has been a total of 4 HUNT studies, the first of which was conducted in 1984-1986. It is recognized as the largest public health survey in the country. The study involves both physical, biochemical examination and several questionnaires, including a questionnaire focusing on CAM-practitioner visits. The participants are inhabitants of the county of Nord-Trøndelag and the population is considered in many regards to be representative of the Norwegian population (11).

For this study, data from HUNT 3 and 4 were used. HUNT 3 was conducted during 2006-2008 and had 50 800 participants, were as HUNT 4 was conducted during 2017-2019 and had 56 042 participants. In both studies, the participants were asked whether they had visited a CAM-practitioner in the last 12 months.

Each study was conducted in several steps of questionnaires and physical examinations. The data ordered for this study was gathered from the following parts of HUNT 3 and HUNT 4:

- Questionnaire 1, which was sent with the invitation to participate to all inhabitants of Nord-Trøndelag above the age of 20.
- Questionnaire 2, which was given to those who showed up at the health examination
- Interview at the health examination.

Participants

The inclusion criteria were participating in the HUNT 3 and HUNT 4 studies and having answered the question on CAM use.

Variables

Dependent variable

The dependent variable was whether the participant had answered yes on having visited a CAM practitioner in the last 12 months. In HUNT 3 this was asked as a single question: “During the last 12 months, have you visited homeopath, acupuncturist, reflexologist, layer on hands or another alternative treatment practitioner? (Yes/No)”. In HUNT 4 this was changed to three questions; “During the last 12 months, have you visited homeopath, reflexologist, laying on of hands or other alternative treatment practitioner” (Yes/No), “During the last 12

months, have you visited a naprapath (Yes/No) and “During the last 12 months, have you visited an acupuncturist (Yes/No)”. Those having answered yes to any of these three questions in HUNT 4 were considered a CAM-visitor.

Independent variables

The independent variables included demographics, lifestyle, health, and disease, as well as health care utilization. The variables were recoded in the same manner for HUNT 3 and 4.

Demographics

Demographic variables included sex, age, marital status, and cohabitation. Sex was taken from public records by HUNT. Age was calculated from birth date to respectively 2007 and 2018 (participations between autumn 2006 and spring 2008 for HUNT 3 and participation between autumn 2017 and spring 2019 for HUNT 4). The answering options for marital status were undisclosed, unmarried, married, widow(er), divorced, or separated, while cohabitation was measured by asking “Do you live with someone?”. Participants who answered “Yes, spouse/partner” were categorized as cohabiting. Those who answered “Married” to Marital status, or answered “Yes, spouse/partner” on “Do you live with someone?” were categorized as “Married or Cohabiting”.

Lifestyle

Employment was measured using the questions “Do you have a job” (HUNT 3) and “Are you employed” (HUNT 4).

Activity level was assessed using the question “How often do you exercise?” and was dichotomized into “Exercise 2 or more times a week”. Daily smoking was identified as answering yes to “I currently smoke daily” in HUNT 4. In HUNT 3 smoking was differentiated between cigarettes and cigars/cigarillos/pipe -daily. Yes to one or both of these questions in HUNT 3 was recoded into a “Yes” on daily smoking.

Health

Several variables connected to health were used. Some had answering options “Yes/No” to certain diseases or conditions, while others had response categories. The following lists the questions and their response categories. Variables recoded will be described later.

- Global health was self-reported by answering “How is your health at the moment?” (Poor, fair, good, very good). “Very good” was set as reference for the logistic regression analysis.
- Have you had, or do you have any of the following diseases (Yes/No):
 - Myocardial infarction (heart attack)
 - Angina pectoris (chest pain)
 - Stroke/brain hemorrhage
 - Asthma
 - Diabetes
 - Cancer
 - Arthritis (rheumatoid arthritis)
 - Bechterew's disease
 - Mental health problems you sought help for
- Do you suffer from longstanding (at least 1 year) illness or injury of a physical or psychological nature that impairs your functioning in your daily life? (Yes/no)
- Have you had headaches in the last year? (Yes/No)
- Do you have or have you had hay fever or nasal allergies? (Yes/No)
- In the last year, have you had pain or stiffness in muscles or joints that has lasted at least 3 consecutive months (Yes/No)
- To what degree have you had the following problems in the last 12 months? (Never, A little, Much)
 - Nausea
 - Heartburn/acid regurgitation
 - Diarrhea
 - Constipation

Questions on Myocardial infarction, Angina pectoris, and Stroke were recoded as “Yes” to “Cardiovascular disease” if the participant answered “Yes” to one or more of these questions. The answering options for Diarrhoea, Nausea, Heartburn, and Constipation were used for the bivariable analysis as asked. For the multivariable regression analysis, Never and A little was recoded into one category, and “Much” was kept as a separate category.

Hospital Anxiety and Depression scale, HADS-T, was used to assess the mental health of participants on a scale of 0 to 42. This was recoded into range groups “0-4”, “5-9”, “10-14”,

“15-19”, and “20 and higher”. The group “0-4” was set as reference in the logistic regression analysis.

Health care utilization

The following questions measured visit to health care services:

- During the last 12 months, have you visited:
 - o Another specialist outside the hospital (Yes/No).
 - o Consultation with a doctor without being admitted to the psychiatric outpatient department (Yes/No).
 - o Consultation with a doctor without being admitted to a hospital outpatient department (other than psychiatric dept.) (Yes/No).
 - o Chiropractor (Yes/No)

Statistical analysis

The data were managed and analyzed using IBM SPSS Statistics version 27. Chi-square was used to compare the prevalence of CAM-visitors both overall and for each variable from 2007 to 2018. Multivariable logistic regression was used to calculate adjusted Odds Ratios (adjOR) with 95% confidence intervals (95%CI) for having visited a CAM practitioner in 2007 and 2018 respectively. The Odds ratio indicates the association between a variable and CAM-use. All variables were included in the multivariable analysis to calculate adjusted odds ratios. The Odds Ratios of each year were then used to compare changes from 2007 to 2018 using Ratio Odds Ratio (ROR) (20). $ROR < 1$ indicates that the association has become weaker, and $ROR > 1$ indicates an increase in association. Hosmer-Lemeshow Goodness of fit-test was applied to the multivariable regression analysis, but the large sample size made it difficult to interpret the p-value (21, 22).

Result

In 2007 (HUNT 3) there was a total number of 50800 participants, while in 2018 (HUNT 4) there were 56 042 participants. The total participant number who answered the question on CAM visit, was 50694 in 2007 and 52711 in 2018.

From 2007 to 2018 there was a decrease of 1.9 %-points in prevalence of persons having visited a CAM practitioner, going down from 12.6% (95%CI 12.2-12.8%) in 2007 to 10.7% (95%CI 10.4-10.9) in 2018 (p<0.001).

Bivariable

Table 1 shows the prevalence of CAM-visitors among each participant group, as well as the difference in prevalence from 2007 to 2018.

There was a general decrease in the proportion of CAM visitors for almost all the characteristics. The following characteristics had the most prominent changes: Those that responded “Much” on the question of constipation last 12 months had a decrease of -3.9 %-points, and response group “Much” for diarrhea had a decrease of -5.0 %-points. Responders with poor mental health in means of a HADS-T of 15-19 had a decrease of -5.2 %-points, while response group “Much” on Diarrhoea was down -7.1 %-points. The largest drop was found among those who responded “Poor” to global health, with a decline of -7.3 %-points.

Characteristics	2018		2007		2018 vs 2007	
	N	% CAM	N	% CAM	Diff.	P-value
Total	52711	10.7 %	50694	12.6 %	-1.9	<0.001
Sex - Male	24103	7.4 %	22992	8.3 %	-0.9	<0.001
- Female	28608	13.5 %	27702	16.2 %	-2.7	<0.001
Age group - Under 26	3481	7.5 %	2828	10.9 %	-3.4	<0.001
- 26-35	6219	11.0 %	5023	13.6 %	-2.6	<0.001
- 36-45	7287	12.4 %	9201	14.6 %	-2.2	<0.001
- 46-55	10196	13.3 %	10756	14.3 %	-1.0	0.031
- 56-65	10312	11.2 %	11302	12.2 %	-1.0	0.020
- 66-75	9621	8.5 %	7038	10.7 %	-2.2	<0.001
- 76-85	4337	8.7 %	3942	8.3 %	0.4	0.468
- >85	1258	5.9 %	604	7.6 %	-1.7	0.154
Marital status	39362	10.7 %	36870	12.8 %	0.0	<0.001
- Married/cohabiting						
Single	13349	10.7 %	13824	11.9 %	-1.2	0.001
Divorced/separated	5474	13.4 %	5056	14.5 %	-1.1	0.104

Widow(er)	3283	10.4 %	4164	11.9 %	-1.5	0.038
Currently working	31998	11.6 %	32396	13.2 %	-1.6	<0.001
Current lifestyle	4337	9.3 %	8539	12.5 %	0.0	<0.001
- Daily smoker						
- Exercise 2 or more times per week	33177	11.4 %	28122	13.2 %	-1.7	<0.001
Global Health	9048	8.2 %	7779	8.0 %	0.2	0.637
- Very good						
- Good	30909	9.9 %	28523	11.4 %	-1.5	<0.001
- Not so good	11307	14.4 %	12119	17.7 %	-3.4	<0.001
- Poor	800	15.9 %	711	23.2 %	-7.3	<0.001
Anxiety and depression (HADS-T score) - 0-4	13271	9.5 %	13912	11.1 %	-1.5	<0.001
- 5-9	13197	10.8 %	13570	12.6 %	-1.8	<0.001
- 10-14	7250	12.7 %	6998	14.7 %	-2.0	<0.001
- 15-19	3177	13.0 %	2842	18.2 %	-5.2	<0.001
- 20 and higher	1516	15.6 %	1264	18.5 %	-2.9	0.044
Recent complaint <12 months - Headaches	14674	14.7 %	14209	17.0 %	-2.3	<0.001
- Diarrhoea - Never	21114	9.8 %	20919	11.4 %	-1.6	<0.001
- A little	14589	12.0 %	13885	14.4 %	-2.4	<0.001
- Much	1834	14.5 %	1538	19.5 %	-5.0	<0.001
Nausea - Never	26278	9.7 %	25188	11.0 %	-1.3	<0.001
- A little	10537	13.7 %	10509	16.5 %	-2.8	<0.001
- Much	743	16.4 %	587	23.5 %	-7.1	0.001
Heartburn - Never	22921	10.5 %	21258	12.0 %	-1.6	<0.001
- A little	12764	11.4 %	13430	14.0 %	-2.6	<0.001
-Much	2319	13.2 %	2664	14.8 %	-1.6	0.116
Constipation - Never	20314	9.4 %	21714	10.7 %	-1.3	<0.001
-A little	14588	12.2 %	12586	15.5 %	-3.3	<0.001
-Much	2817	15.2 %	2321	19.1 %	-3.9	<0.001
Chronic complaint > 12 months	22112	12.6 %	20570	16.0 %	-3.4	<0.001

Diseases - Asthma	6170	12.4 %	5943	14.7 %	-2.3	<0.001
- Hay fever or nasal allergies	10407	13.1 %	11769	15.3 %	-2.2	<0.001
- Cardiovascular disease (MI. Angina. Stroke)	4124	8.6 %	4147	9.3 %	-0.7	0.248
- Cancer	3912	9.7 %	2790	12.4 %	-2.7	<0.001
- Diabetes	2998	10.1 %	2259	11.3 %	-1.2	0.177
- Muscle or joint pain	20851	14.9 %	21038	18.0 %	-3.1	<0.001
- Rheumatoid arthritis	2646	12.9 %	1860	15.6 %	-2.7	0.011
- Bechterew's disease	747	12.9 %	757	16.4 %	-3.5	0.053
- Mental health problems sought help for	8870	15.1 %	7883	18.4 %	-3.3	<0.001
Seen health care practitioner last year	42738	11.8 %	40338	14.1 %	-2.3	<0.001
- Physician						
- Chiropractor	5623	22.3 %	4019	24.3 %	-1.9	0.025
- Specialist outside a hospital	6443	15.6 %	7057	18.6 %	-3.0	<0.001
- Psychiatric outpatient consultation without admittance	1332	18.0 %	1250	19.1 %	-1.1	0.472
- Somatic outpatient consultation without admittance	13205	13.0 %	12773	15.2 %	-2.1	<0.001

Table 1. Abbreviations: CAM- Complementary and alternative medicine. MI – Myocardial infarction/heart attack. HADS-T – Hospital anxiety and depression scale total.

In both 2007 and 2018, there was a large difference between the genders, with the proportion of women with CAM-visits being twice as high compared to men. In 2018, 13.5% of female responders had visited a CAM practitioner, whereas the prevalence was 7.4% among males did.

Regarding age, the age groups that stand out the most are the youngest and oldest. Among those aged <26 years old, the prevalence in 2018 was 7.5 %, and in the age groups above 65 years old, the prevalence ranged from 8.7% down to 5.9% among the oldest (<85years). This pattern of higher prevalence among the middle-aged and lower prevalence among the youngest and eldest was also found in 2007.

On global health, the prevalence in 2018 ranged from 8.2% among the healthiest to 15.9% among those with “Poor” global health. The gradient with an increase in CAM-visit among those with poorer health was also found in 2007 where the responders with “Poor” global health had a 23.2% prevalence. This was also the variable with the largest change in prevalence. From 2007 to 2018 the response category “Poor” on global health dropped -7.3 %-points.

Another variable with a gradient from low to high prevalence was HADS, which measures anxiety and depression. Responders scoring a HADS-T of “0-4” had a prevalence of 9.5% in 2018, whereas the highest-scoring participants with a HADS-T of “20 or higher” had a prevalence of 15.6%. The same gradient was found in 2007. Similar to the changes seen for the global health variable, the ones with poor mental health have also had a more drastic decrease in CAM visits.

Recent health complaints were also associated with CAM visit. Participants were asked how often they experienced diarrhea, nausea, heartburn, and constipation on a scale of “Never”, “A little” or “Much”. The numbers show increasing CAM-prevalence according to response category. For instance, in 2007 those who answered that they were “Never” bothered by Nausea had a prevalence of 11.0%, while “A little” had 16.5% and “Much” 23.5%.

Those who reported having chronic health complaints had in both years a higher-than-average prevalence of CAM-visits, especially those with muscle or joint pain, mental health issues, and rheumatic patients, however, these have also had a moderate decline and are now closer to normal. Cancer and cardiovascular disease separate from the others by having less frequent CAM use.

Those who had been to a health care provider, i.e. physician, somatic and psychiatric outpatient consult, and specialist outside a hospital, all had a higher prevalence of CAM visit

in both 2018 and 2007. In addition, among chiropractor-visitors, there continues to be a large proportion with CAM-visits, 24.3% in 2007 and 22.3% in 2018.

Multivariable logistic regression analysis

Table 2 shows the result of the multivariable regression analysis, with adjusted Odds Ratio for each year, as well as the Ratio Odds Ratio comparing the years.

Characteristics	2018 AdjOR (95%CI)	P-value	2007 AdjOR (95%CI)	P-value	RatioOR (95%CI)	P-value
Gender - Male	Reference	Reference	Reference	Reference	Reference	Reference
Female	1.7 (1.6 to 1.9)	<0.001	1.9 (1.8 to 2.0)	<0.001	0.9 (0.8 to 1.0)	0.139
Age group -<26 ref	Reference	Reference	Reference	Reference	Reference	Reference
- 26-35	1.4 (1.2 to 1.7)	0.001	1.1 (0.9 to 1.3)	0.298	1.3 (1.0 to 1.7)	0.074
- 36-45	1.6 (1.3 to 1.9)	<0.001	1.1 (0.9 to 1.3)	0.445	1.5 (1.1 to 1.9)	0.004
- 46-55	1.7 (1.4 to 2.1)	<0.001	1.0 (0.8 to 1.2)	0.769	1.8 (1.4 to 2.3)	<0.001
- 56-65	1.4 (1.2 to 1.7)	<0.001	0.8 (0.7 to 0.9)	0.008	1.8 (1.4 to 2.4)	<0.001
- 66-75	1.3 (1.0 to 1.5)	0.029	0.8 (0.7 to 1.0)	0.017	1.6 (1.2 to 2.1)	0.001
- 76-85	1.3 (1.0 to 1.6)	0.037	0.6 (0.5 to 0.7)	<0.001	2.2 (1.6 to 3.0)	<0.001
- >85	1.2 (0.8 to 1.7)	0.461	0.5 (0.3 to 0.8)	0.001	2.4 (1.3 to 4.3)	0.004
Married/cohabiting	0.9 (0.8 to 1.0)	0.035	1.0 (0.9 to 1.1)	0.780	0.9 (0.8 to 1.0)	0.090
Currently working	1.2 (1.1 to 1.3)	0.002	1.2 (1.1 to 1.3)	<0.001	1.0 (0.9 to 1.1)	0.907

Current lifestyle - Daily smoker	0.7 (0.6 to 0.8)	<0.001	0.8 (0.7 to 0.9)	<0.001	0.9 (0.7 to 1.0)	0.066
- Exercise 2 or more times per week	1.2 (1.1 to 1.3)	<0.001	1.0 (1.0 to 1.1)	0.198	1.1 (1.0 to 1.2)	0.015
Global Health - Very Good reference	Reference	Reference	Reference	Reference	Reference	Reference
- Good	1.0 (0.9 to 1.1)	0.599	1.2 (1.1 to 1.4)	<0.001	0.8 (0.7 to 1.0)	0.025
- Not so good	1.3 (1.1 to 1.5)	<0.001	1.6 (1.4 to 1.8)	<0.001	0.8 (0.7 to 1.0)	0.060
- Poor	1.3 (1.0 to 1.7)	0.082	2.2 (1.7 to 2.8)	<0.001	0.6 (0.4 to 0.9)	0.008
Anxiety and depression (HADS-T score) - 0-4 ref	Reference	Reference	Reference	Reference	Reference	Reference
-14	1.0 (0.9 to 1.1)	0.512	1.0 (1.0 to 1.1)	0.313	1.0 (0.9 to 1.1)	0.841
-24	1.1 (1.0 to 1.2)	0.082	1.1 (1.0 to 1.2)	0.090	1.0 (0.9 to 1.2)	0.912
-34	1.0 (0.9 to 1.1)	0.957	1.2 (1.0 to 1.3)	0.022	0.9 (0.7 to 1.0)	0.130
- 20 and higher	1.0 (0.8 to 1.1)	0.615	1.0 (0.8 to 1.1)	0.592	1.0 (0.8 to 1.3)	0.979
Recent complaint <12 months - Headaches	1.2 (1.1 to 1.3)	<0.001	1.1 (1.0 to 1.2)	0.001	1.1 (1.0 to 1.2)	0.292
Diarrhea - much	1.0 (0.9 to 1.2)	0.830	1.1 (1.0 to 1.3)	0.104	0.9 (0.7 to 1.1)	0.323
Nausea - much	1.0 (0.8 to 1.2)	0.770	1.2 (1.0 to 1.5)	0.060	0.8 (0.6 to 1.1)	0.123

Heartburn - much	1.0 (0.9 to 1.1)	0.744	0.9 (0.8 to 1.0)	0.064	1.1 (0.9 to 1.3)	0.313
Constipation - much	1.0 (0.9 to 1.2)	0.715	1.0 (0.9 to 1.2)	0.464	1.0 (0.8 to 1.2)	0.789
Chronic complaint > 12 months	1.0 (0.9 to 1.1)	0.773	1.2 (1.1 to 1.3)	<0.001	0.9 (0.8 to 1.0)	0.006
Diseases - Asthma	1.1 (1.0 to 1.2)	0.281	0.9 (0.9 to 1.0)	0.293	1.1 (1.0 to 1.3)	0.132
- Hay fever or nasal allergies	1.1 (1.0 to 1.2)	0.011	1.1 (1.0 to 1.1)	0.077	1.0 (0.9 to 1.1)	0.501
- Cardiovascular disease (MI. Angina. Stroke)	0.9 (0.8 to 1.0)	0.131	0.8 (0.7 to 0.9)	<0.001	1.2 (1.0 to 1.4)	0.138
- Cancer	0.9 (0.8 to 1.0)	0.143	1.0 (0.9 to 1.2)	0.841	0.9 (0.7 to 1.1)	0.242
- Diabetes	1.0 (0.8 to 1.1)	0.527	1.0 (0.8 to 1.1)	0.590	1.0 (0.8 to 1.2)	0.953
- Muscle or joint pain	1.9 (1.7 to 2.0)	<0.001	2.0 (1.8 to 2.1)	<0.001	0.9 (0.8 to 1.0)	0.230
- Rheumatoid arthritis	1.0 (0.9 to 1.2)	0.852	0.8 (0.7 to 1.0)	0.013	1.2 (1.0 to 1.5)	0.050
- Bechterew	0.9 (0.7 to 1.2)	0.380	0.9 (0.7 to 1.1)	0.328	1.0 (0.7 to 1.4)	0.990
- Mental health problems sought help for	1.2 (1.1 to 1.3)	0.002	1.2 (1.1 to 1.3)	<0.001	0.9 (0.8 to 1.1)	0.401
Seen health care practitioner last year - Physician	1.6 (1.4 to 1.7)	<0.001	1.6 (1.5 to 1.8)	<0.001	1.0 (0.8 to 1.1)	0.605
- Chiropractor	2.3 (2.1 to 2.5)	<0.001	1.9 (1.7 to 2.1)	<0.001	1.2 (1.1 to 1.4)	0.004
- Specialist outside hospital	1.3 (1.2 to 1.4)	<0.001	1.3 (1.2 to 1.4)	<0.001	1.0 (0.9 to 1.1)	0.680

- Psychiatric outpatient consultation without admittance	1.2 (1.0 to 1.5)	0.040	1.0 (0.8 to 1.2)	0.746	1.3 (1.0 to 1.7)	0.088
- Somatic outpatient consultation without admittance	1.0 (0.9 to 1.1)	0.792	1.0 (0.9 to 1.1)	0.994	1.0 (0.9 to 1.1)	0.852

Table 2. Abbreviations: CAM- Complementary and alternative medicine. MI – Myocardial infarction/heart attack. HADS-T – Hospital anxiety and depression scale total.

Characteristics of CAM-visitors in 2018

The characteristics with the highest association to CAM visit in 2018 were female gender, muscle and joint pain, age 46-55, having seen a physician and chiropractor visit.

- In 2018 female gender was highly associated with CAM visit and had an adjusted Odds Ratio of 1.7 (95%CI 1.6-1.9, p<0.001).
- Middle age was also associated with increased odds for CAM visits; Age of 36-45 years had an odds ratio of 1.6, while age 46-55 years had an odds ratio of 1.7.
- Muscle and joint pain were also highly associated with higher use of CAM with an odds ratio of 1.9 (95%CI 1.7-2.0 p<0.001).
- Reduced global health indicated a higher odds of CAM-visit, with the response group “Not so good” and “Poor” having an Odds ratio of 1.3 compared to very good health.
- Visit to physician last 12 months had an odds ratio of 1.6 and having seen a specialist outside a hospital had an odds ratio of 1.3.

Other characteristics associated with CAM were Currently working (adjOR 1.2), “Exercise two or more times per week” (adjOR 1.2), and mental health problems that had been sought help for (adjOR 1.2).

The characteristic least associated with CAM visit was smoking, with an odds ratio of 0.7 (95%CI 0.6-0.8) of visiting if you were a daily smoker.

Changes among CAM visitors from 2007 to 2018

To investigate changes, a ratio of the adjusted odds ratios was used (ROR). ROR >1 indicates increased odds of CAM-visit in 2018 while ROR <1 indicates decreased odds. For the most part, there was little change in the characteristics of CAM visitors from 2007 to 2018. In summary, the most prominent changes were increased odds for visits among the age group “46-55” (ROR 1.8) and the age group “76-85” (ROR 2.2). A decrease in odds was seen among those with poor self-reported health (ROR 0.6) and daily smokers (ROR 0.9).

In 2018 there was a stronger association between CAM visit for all age groups above the “<26 years” group and there was a gradient with higher ROR for each age group. The middle-aged, who have had the highest prevalence, showed an increased ROR (1.8 for age group 46-55). The age group 76-85 was the age group that had the most prominent change, with a ROR of 2.2. In 2007 the odds ratio of this group was 0.6 but increased to 1.3 in 2018.

Those who smoked tended to have visited a CAM practitioner to a lesser degree in 2018 compared to 2007 (ROR 0.9), with a decrease in the adjusted odds ratio from 0.8 in 2007 to 0.7 in 2018.

Poor self-reported health had a significant decrease in association from 2007 to 2018 with a ROR of 0.6 (p=0.008). The odds ratio in 2007 was 2.2 (p<0.001) and in 2018 the odds ratio was 1.3(95% CI 1.0-1.7. (p<0.08)) but was not found to be significant.

As mentioned before, chiropractor use is highly associated with CAM visit. The association has increased, with a ROR of 1.2 with an increased odds ratio from 1.9 in 2007 to 2.3 in 2018.

Discussion

The prevalence of CAM-visit decreased from 12.6% in 2008 to 10.7% in 2018. The decrease was similar across most characteristics, but most prominent among the youngest age group, those with poor global or mental health, and those who had recent complaints. Female gender had almost twice as high a prevalence compared to male gender both years. Female gender, middle age, muscle and joint pain, chiropractor visits, and poor health are characteristics that continued to have strong associations with CAM-visit during the period. For most characteristics, there were no changes during the 11-year period, but higher age and

chiropractor visits were associated with increased odds of visiting a CAM practitioner in 2018, while smoking and poorer self-reported health were associated with decreased odds.

Strengths and limitations

The material used in this study stems from large cross-sectional studies and provides a large sample size from a population representative to the Norwegian population (23). The sample thus fits with the recommendation of the EU's CAMbrella project about the use of cross-sectional studies of large populations to map prevalence and patterns among CAM users (5), as described in the introduction. Thus, it should be well suited for a study of CAM prevalence and changes over time.

The lack of a larger city is however a weakness as urban trends might differ from rural trends of CAM-visits. A previous study of CAM prevalence in Norway found that living close to the capital was positively associated with CAM use (24). It is also reasonable to assume that there is a higher availability of CAM providers in larger cities which could mean that the prevalence in the HUNT studies is on the lower side as the national prevalence numbers are higher (25).

As mentioned in the introduction, the comparison of CAM use is complicated by the fact that definitions of CAM might vary. For instance, naprapathy is one of the most common CAM-modalities in Norway according to a rapport done by NAFKAM (25), however, the question in HUNT 3 was worded "During the last 12 months have you visited homeopath, acupuncturist, reflexologist, laying on of hands or other alternative treatment practitioner". This means that the participants themselves must recognize naprapathy as CAM. Naprapathy was however listed in the HUNT 4-questionnaire. The fact that the question on CAM was different in HUNT 3 and HUNT 4 could potentially affect results. Because the question in the 2018-questionnaire listed more CAM-practices than the questionnaire in 2007 did, it is reasonable to assume that it could cause an increase in participant reporting CAM-visits by making it easier for the participant to recognize a practice as CAM. The consequence would then likely be a higher prevalence in 2018, and thus the reduction in the proportion visiting a CAM practitioner could be larger than the one reported.

Another issue with CAM definitions regarding this study is the recognition of chiropractors as health care personnel in Norway. This might reduce this study's comparison value to

international studies of CAM prevalence, as chiropractors are considered as CAM practitioners in many countries. However, the general definition of CAM as “practices outside the established health care system” (6) of a country validates the idea that chiropractors are not treated as CAM in a Norwegian study.

The study suffers from the lack of an education variable which was not included as a question in HUNT 3. Education was meant to be included as it is available from the Central Bureau of Statistics in Norway for a cost, but due to lack of funding, this was omitted. Education has been relevant in the findings of several other studies which have shown increased CAM visit and/or use among those with shorter higher education (2, 10, 24). It is reasonable to assume that education might have played a part in the adjustment of other variables. Other variables that one can assume would have played a part if included are income and social status. The closest variable to this was “Employment”, but this is far from a fulfilling demographic profile.

Another issue when researching use of CAM, is the difference between visiting a CAM practitioner and CAM use in general which includes the use of CAM products and self-use of CAM practices. There might be considerable differences among those who say, practice yoga, and a visitor to a reflexologist. Thus, the results of this study, like the prevalence, has limited comparability to studies on CAM use in general.

Discussion of findings

Changes in prevalence

There was a drop in prevalence from 12.6% to 10.7% during the last decade. However, in a previous comparison of HUNT 2 (1997) and HUNT 3 (2008) by Steinsbekk et al. (10) the prevalence increased from 9.4% to 12.6%. International studies have also shown an increase in CAM-visit during the period 1990-2011 (17, 18). In other words, it might be that the trend of increased CAM visit has turned to a decrease from 2007 to 2018. A decrease has also been shown in national Norwegian surveys conducted by NAFKAM (26).

The decrease in CAM-visit prevalence is visible in most of the variables included in this study. This could be expected when the study shows a total decrease in the prevalence of CAM-visit. However, some groups have a more prominent decrease than others. Further details regarding changes in prevalence are discussed below.

Characteristics associated with CAM-visit

The characteristics most associated with CAM-visit found in this study, was female gender, middle age, having chronic health issues and self-reported poor global health and mental health, as well as visit to chiropractor, resonates with findings of earlier studies (2, 9, 10).

The gender difference in CAM-visit is striking. Female sex was found to have almost twice the odds of CAM-visit compared to men. Higher prevalence and association among women have been found in several previous studies. (2, 9, 10, 24). It is a well-known fact that women's health issues are given inadequate attention or resolution in conventional health care (27), something that might make women more prone to visit a CAM practitioner. As mentioned in the introduction, dissatisfaction with conventional medicine is a motivator for CAM use (2, 11), and there is research to show that women in Europe have a higher experience of unmet needs (28). In addition, social constructs around gender and traditional culture might be different between the genders, with women devoting more attention to their health in general, while men are known to have less care-seeking behavior (9, 29, 30).

In 2018, almost all age groups had a higher odds ratio of CAM-visit when compared to the youngest age group (<26). This reflects a decreased prevalence among the youngest, as the bivariable showed a larger decrease for this group than the other groups. In fact, the decrease among the youngest is a prominent finding of this study. There might be several reasons as to why there are fewer CAM visitors among younger people. Younger age usually means better health, and therefore implies a lower consumption of health care services. One would think this also applies to CAM-visit.

Poor global health and mental health issues are associated with higher odds of CAM-visit in both 2007 and 2018. The same goes for chronic complaint and muscle and joint pain. Poor health has been associated with CAM-visit/use in several prior studies (2, 9, 10, 31), and it is not surprising to find this as a result in this study as well. These are groups where one can assume there is an increased need and consumption of health care services in general. In addition, patients with chronic illness might have unsatisfactory results from conventional therapy which is something that is associated with CAM-use (11, 32). Poor global health and chronic illness could also correlate with increased treatment and burden of side effects. The desire to reduce the negative effects of conventional therapy has also been reported as a

reason for CAM use (32). These patients might also feel the need for an internal locus of control, which is another reason for CAM use (11).

Changes in characteristics

The characteristics of CAM-visitors were found to be mainly the same in 2007 as in 2018 in this study. There are however some changes worth mentioning, mainly regarding age and global health.

The results show an increased association between higher age and CAM-visits. An explanation for this would be that the earlier generations of CAM visitors have shifted to higher age groups, meaning that trends of increased CAM visit among younger seniors in 2007 appear among seniors in 2018. At the other end of the scale, the youngest age group (<26 years) had a decreased association.

As seen in the bivariable analysis, there is a more prominent decrease in prevalence among the age groups “<26”, “26-35”, and “36-45” and most prominently so among those under 26 years. Interestingly, in the previously mentioned study conducted by Steinsbekk et al. (10) with data from the same region, there was an *increase* in CAM visit among younger groups from 1997 to 2007, contrary to the findings of this study ten years later.

The low prevalence and odds among younger age groups in 2018 will probably affect the age characteristics some decades from now, pushing low CAM prevalence into higher age groups. As of now, middle-age has been a recurring characteristic of CAM-visit (2, 9, 10, 17), however, this could change if current younger generations keep to a lower prevalence of CAM visit as they grow older. Generational trends of CAM-visit/use have been studied previously (18), and it is interesting to think that such birth cohort differences over time could indicate future use in certain age groups. As shown in this study, and several others (2, 9, 10), age turns out to be an important characteristic among CAM-visitors and should be monitored further.

Those with poor health still have a higher chance of visiting a CAM practitioner in 2018, however, the association is not as strong as it was in 2007. Poor health is assumingly connected to several reasons to visit a CAM-practitioner, among them expected benefits, dissatisfaction with conventional medicine, perceived safety with CAM, or association

internal locus of control (2, 11). The decrease in this group could therefore indicate that those with poor health either have a changed perception of CAM, have found other ways of improving their health, or maybe conventional methods and health care have improved to meet the needs of those who were earlier without satisfactory treatment. Another explanation is the relative increase in those with good global health where the bivariable analysis showed that there were no or only little reduction in the prevalence.

The general decrease in CAM-prevalence is of course also an interesting topic. As mentioned earlier there has previously been an increase in CAM-visit/use. The decrease found in this study, as well as the national NAFKAM-study (26), might indicate that the prevalence of CAM-visit has stabilized, after several decades of increase. The reasons for this could be many, and this study does not provide any data on this. Therefore only speculations can be offered as suggestions. The faith in conventional medicine might have improved among those who were previously unsatisfied. It could also be that improvements in medicine have left fewer patients without sufficient health care options. Or maybe public health communication has improved, and it is easier for members of the public to find information on public health care services and their treatment options. It might also be that the general interest for or faith in CAM has decreased. That the concept of natural and traditional meaning “safe” has been challenged in popular media to a point where people are less inclined to assume CAM-treatments as a safer and better option to conventional medicine.

Conclusion

There has been a general decrease in CAM-visitors across several characteristics including sex, demographics, health status, disease, and health care utilization. Female gender continues to be a dominating characteristic of CAM-visit, as does muscle and joint pain, chiropractor visit, poor health, and health care utilization. For most of the characteristics studied, the associations to CAM visit have not changed too much in the last ten years. Characteristics such as middle age and old age have increased odds of CAM-visit compared to younger age groups which have decreased prevalence and odds. Poor self-reported health has also decreased in odds.

1. WHO global report on traditional and complementary medicine 2019. Geneva: World Health Organization; 2019. Contract No.: ISBN 978-92-4-151543-6.
2. Fjær EL, Landet ER, McNamara CL, Eikemo TA. The use of complementary and alternative medicine (CAM) in Europe. *BMC Complementary Medicine and Therapies*. 2020;20(1):108.
3. Foley H, Steel A, Cramer H, Wardle J, Adams J. Disclosure of complementary medicine use to medical providers: a systematic review and meta-analysis. *Scientific Reports*. 2019;9(1):1573.
4. Quandt SA, Verhoef MJ, Arcury TA, Lewith GT, Steinsbekk A, Kristoffersen AE, et al. Development of an international questionnaire to measure use of complementary and alternative medicine (I-CAM-Q). *J Altern Complement Med*. 2009;15(4):331-9.
5. Fischer FH, Lewith G, Witt CM, Linde K, von Ammon K, Cardini F, et al. High prevalence but limited evidence in complementary and alternative medicine: guidelines for future research. *BMC Complement Altern Med*. 2014;14:46.
6. Bergli TL. About CAM in Norway [web page]. Tromsø: National Research Center in Complementary and Alternative Medicine (NAFKAM); 2019 [cited 2021 09.01]. Available from: <https://nafkam.no/en/complementary-and-alternative-medicine-cam/about-cam-norway>.
7. NAFKAM. Hva er alternativ behandling? Tromsø: Nasjonalt forskningscenter innen komplementær og alternativ medisin; 2018 [cited 2021 23.12]. Available from: <https://nafkam.no/complementary-and-alternative-medicine-cam/hva-er-alternativ-behandling>.
8. Parvez MK, Rishi V. Herb-Drug Interactions and Hepatotoxicity. *Curr Drug Metab*. 2019;20(4):275-82.
9. Kristoffersen AE, Stub T, Salamonsen A, Musial F, Hamberg K. Gender differences in prevalence and associations for use of CAM in a large population study. *BMC Complement Altern Med*. 2014;14:463.
10. Steinsbekk A, Rise MB, Johnsen R. Changes among male and female visitors to practitioners of complementary and alternative medicine in a large adult Norwegian population from 1997 to 2008 (The HUNT studies). *BMC Complementary and Alternative Medicine*. 2011;11(1):61.
11. Tangkiatkumjai M, Boardman H, Walker D-M. Potential factors that influence usage of complementary and alternative medicine worldwide: a systematic review. *BMC Complementary Medicine and Therapies*. 2020;20(1):363.
12. Harris PE, Cooper KL, Relton C, Thomas KJ. Prevalence of complementary and alternative medicine (CAM) use by the general population: a systematic review and update. *Int J Clin Pract*. 2012;66(10):924-39.
13. Posadzki P, Watson LK, Alotaibi A, Ernst E. Prevalence of use of complementary and alternative medicine (CAM) by patients/consumers in the UK: systematic review of surveys. *Clin Med (Lond)*. 2013;13(2):126-31.
14. Zuzak TJ, Boňková J, Careddu D, Garami M, Hadjipanayis A, Jazbec J, et al. Use of complementary and alternative medicine by children in Europe: published data and expert perspectives. *Complement Ther Med*. 2013;21 Suppl 1:S34-47.
15. Hansen AH, Kristoffersen AE, Lian OS, Halvorsen PA. Continuity of GP care is associated with lower use of complementary and alternative medical providers: a population-based cross-sectional survey. *BMC Health Services Research*. 2014;14(1):629.
16. Cooper KL, Harris PE, Relton C, Thomas KJ. Prevalence of visits to five types of complementary and alternative medicine practitioners by the general population: a systematic review. *Complement Ther Clin Pract*. 2013;19(4):214-20.
17. Eisenberg DM, Davis RB, Ettner SL, Appel S, Wilkey S, Van Rompay M, et al. Trends in alternative medicine use in the United States, 1990-1997: results of a follow-up national survey. *Jama*. 1998;280(18):1569-75.
18. Canizares M, Hogg-Johnson S, Gignac MAM, Glazier RH, Badley EM. Changes in the use practitioner-based complementary and alternative medicine over time in Canada: Cohort and period effects. *PLoS One*. 2017;12(5):e0177307.
19. Roosa Tikkanen RO, Elias Mossialos, Ana Djordjevic, George A. Wharton. International Health Care System Profiles - Norway New York: The Commonwealth Fund; 2020 [cited 2021 14.12]. Available from: <https://www.commonwealthfund.org/international-health-policy-center/countries/norway>.

20. Altman DG, Bland JM. Interaction revisited: the difference between two estimates. *Bmj*. 2003;326(7382):219.
21. Nattino G, Pennell ML, Lemeshow S. Assessing the goodness of fit of logistic regression models in large samples: A modification of the Hosmer-Lemeshow test. *Biometrics*. 2020;76(2):549-60.
22. Yu W, Xu W, Zhu L. A modified Hosmer–Lemeshow test for large data sets. *Communications in Statistics - Theory and Methods*. 2017;46(23):11813-25.
23. Centre HR. HUNT Databank [Internet]. Levanger: NTNU; Unknown year [cited 2021 18.01]. Available from: <https://www.ntnu.edu/hunt/databank>.
24. Kristoffersen AE, Quandt SA, Stub T. Use of complementary and alternative medicine in Norway: a cross-sectional survey with a modified Norwegian version of the international questionnaire to measure use of complementary and alternative medicine (I-CAM-QN). *BMC Complementary Medicine and Therapies*. 2021;21(1):93.
25. Fonnebø V. Bruk av alternativ behandling i Norge 2018 [Internet]. Tromsø: NAFKAM; 2019 [updated 25.06.2019; cited 2021 02.12]. Available from: <https://nafkam.no/nafkam-undersokelsen-2018>.
26. Bergli TL. NAFKAM-survey 2012-2018 (infographics) [Internet]. Tromsø: Norways National Research Center in Complementary and Alternative Medicine; 2020 [cited 2021 23.12]. Available from: <https://nafkam.no/en/nafkam-survey-2012-2018-infographics>.
27. Hamberg K. Gender Bias in Medicine. *Women's Health*. 2008;4(3):237-43.
28. Fjær EL, Stornes P, Borisova LV, McNamara CL, Eikemo TA. Subjective perceptions of unmet need for health care in Europe among social groups: Findings from the European social survey (2014) special module on the social determinants of health. *European Journal of Public Health*. 2017;27(suppl_1):82-9.
29. Krizek C, Roberts C, Ragan R, Ferrara JJ, Lord B. Gender and Cancer Support Group Participation. *Cancer Practice*. 1999;7(2):86-92.
30. Courtenay WH. Constructions of masculinity and their influence on men's well-being: a theory of gender and health. *Soc Sci Med*. 2000;50(10):1385-401.
31. Kempainen LM, Kempainen TT, Reippainen JA, Salmenniemi ST, Vuolanto PH. Use of complementary and alternative medicine in Europe: Health-related and sociodemographic determinants. *Scandinavian Journal of Public Health*. 2018;46(4):448-55.
32. Reid R, Steel A, Wardle J, Trubody A, Adams J. Complementary medicine use by the Australian population: a critical mixed studies systematic review of utilisation, perceptions and factors associated with use. *BMC Complementary and Alternative Medicine*. 2016;16(1):176.

