Article:
Astin, F., Goyder, E., Cooper, R. orcid.org/0000-0001-5110-0384 et al. (2 more authors) (2025) An analysis of predictors of conventional and complementary healthcare use in Yorkshire. Advances in Integrative Medicine, 12 (4). 100566. ISSN: 2212-9588

https://doi.org/10.1016/j.aimed.2025.100566

Advances in Integrative Medicine 12 (2025) 100566

Contents lists available at ScienceDirect

Advances in Integrative Medicine

journal homepage: www.elsevier.com/locate/aimed

An analysis of predictors of conventional and complementary healthcare use in Yorkshire

Felicity Astin [a], Elizabeth Goyder [b], Richard Cooper [b,*,1], John Stephenson [c], Farideh A. Javid [d]

[a] School of Health, Wellbeing and Social Care, Faculty of Wellbeing, Education and Language Studies, The Open University, Milton Keynes, United Kingdom
[b] School of Medicine and Population Health, University of Sheffield, Sheffield, United Kingdom
[c] School of Human and Health Sciences, University of Huddersfield, Huddersfield, United Kingdom
[d] Department of Pharmacy, University of Huddersfield, Huddersfield, United Kingdom

ARTICLE INFO

Keywords:
Complementary and alternative medicine
Conventional medicine
Cohort study

ABSTRACT

Background: Well-recognised trends in types of services used by patients exist within health service utilisation. One increasing area is complementary and alternative medicine (CAM); considered distinct from the use of health professionals working in conventional medicine. Little is known about the contribution of CAM and whether people using CAM with multiple comorbidities make correspondingly less use of conventional health services.

Aims: 1) To describe self-reported visits to conventional health professionals and CAM practitioners, and to identify predictors of such visits; 2) To quantify the effect of demographic, health-related and CAM service take-up factors on contact with health services delivered by conventional health professionals.

Methods: Data from 70,836 participants in the Yorkshire Health Study, a large-scale population-based cohort study, was analysed descriptively and inferentially to test for associations between variables.

Results: 3.5 % of the cohort reported accessing CAM services in the previous three months. Level of contact with conventional health professionals was higher in those accessing practitioner-led CAM services (incidence rate ratio [IRR]=1.28; $p < 0.001$.) *Female gender, older age and increased incidence of mental and physical health conditions were also positively associated with the outcome.*

Conclusions: Self-reported utilisation of CAM services was low but there were several predictors of recent CAM use based on demographic and health conditions which may be of help in understanding conventional and CAM healthcare utilisation.

1. Background

A growing number of people in the general population live with long-term conditions and increasingly multi-morbidities. This disproportionately, but not exclusively, affects older populations: One in three people with four or more long-term conditions are 65 years of age or younger [1]. The management of these conditions is often complex and includes patient self-management of their own day-to-day care, support from carers, and the involvement also a variety of health care services. A major challenge exists in relation to how these services are co-ordinated and the achievement of integrated place-based healthcare [2]. All too often, people living with long-term conditions experience 'fragmented care': consultations with multiple health professionals, within different organisations, with a lack of central co-ordination [3] which is associated with poor care quality, preventable hospitalisations and higher healthcare costs [4]. People living with two or more long-term conditions use health services more than their healthier counterparts and account for almost half of all UK hospital admissions, outpatient visits and primary care consultations [1], representing a significant proportion of health service budgets.

Within health service utilisation, there are well recognised trends in terms of the types of services used by patients, and one increasing area is that of complementary and alternative medicine (CAM); this is considered distinct from the use of health professionals in the context of conventional medicine. CAM can be variously defined but is typically described as treatment delivered by practitioners who work 'outside'

* Correspondence to: School of Medicine and Population Health, University of Sheffield, Sheffield S14DA, United Kingdom.
E-mail address: richard.cooper@sheffield.ac.uk (R. Cooper).
[1] ORCID ID: https://orcid.org/0000-0001-5110-0384

https://doi.org/10.1016/j.aimed.2025.100566

Available online 26 August 2025

mainstream healthcare [5]. Common CAM treatments include the use of herbal medicines, acupuncture, homeopathy and massage. Estimates of the use of CAM vary but suggest use may be common: Harris et al. [6] found that between 2 % and 49 % of the general population surveyed had consulted a CAM practitioner within previous 12 months; and within the UK, a systematic review of 89 studies suggested prevalence of CAM use within the previous 12 months of between 41.1 % and 51.8 % [7]. Similar usage has been reported in the US, where around a third of adults had used at least one form of CAM in the previous year [8]. Predictors of CAM use also vary, but there are recognised associations, such as among people who are dissatisfied with conventional medicine [9], and among UK individuals, being female and having an above-average income [10]. Another key predictor of CAM use is having one or more long-term conditions. The most commonly reported in the US is chronic pain [11], but conditions such as diabetes, cancer and cardiovascular disease [12] and a variety of other mental health conditions [13] have all been reported. Less is known about the predictors and patterns of CAM use in people living with long-term conditions and multi-morbidities in particular; studies suggest that the combination of CAM alongside conventional medicine is more common in people with coexisting mental and physical long-term conditions (31.2 % of US adults) rather than physical conditions alone (20.1 %) [14]. Other US data suggests that multiple-morbidities were present in 62.4 % of those reporting use of CAM [12].

These utilisation data are not necessarily reflected in wider trends of the integration of CAM into conventional medicine and in the UK for example, CAM use in the NHS is still variable and not integrated. Official guidance notes that '*The availability of CAM on the NHS is limited, and in most cases the NHS will not offer such treatments.*' [5] and case study research has suggested there are examples of good practice but barriers relating to lack of funding and negative perceptions of CAM and a lack of CAM understanding [15].

The World Health Organisation reports that the average person spends over 8000 h managing their own health and one hour with a healthcare worker each year [16]. This figure is likely to be much greater in people living with multimorbidity. Large-scale studies are important to help us to understand who accesses CAM, and whether people who manage their health by seeing CAM providers make less use of services delivered by conventional health professionals working in medically focused services.

In this analysis of the data from a large population-based cohort study, the Yorkshire Health

Study, we aimed to:

1. Describe the self-reported visits to conventional health professionals and CAM practitioners.
2. Identify factors that are associated with self-reported visits to conventional health professionals and CAM practitioners.
3. Quantify the effect of individual factors, including demographic, health-related and CAM service take-up, on contact with conventional health professionals working in health services.

2. Methods

2.1. Study setting and participants

The Yorkshire Health Study, originally known as the South Yorkshire Cohort, is an observational study of health and lifestyle in Yorkshire and the Humber, designed to facilitate health research in a demographically and geographically diverse regional UK population. Data were initially collected between 2010 and 2012 and then between 2013 and 2015, from adult patients registered at general practice surgeries in South Yorkshire with recruitment subsequently widened to cover the Yorkshire and Humberside (Y&H) Government Office Region, including boroughs in North Yorkshire, West Yorkshire, East Riding of Yorkshire and North Lincolnshire. This second wave of data collection used online recruitment to increase coverage and sample size, and to generate a sample that was more representative of the underlying population. Details of recruitment and survey methods have been reported previously [17].

2.2. Variables

Respondents to Wave 1 (general practitioner [GP] recruitment) and Wave 2 (online recruitment) of the Yorkshire Health Study were asked about their level of contact with health professionals working in conventional medical settings, including GPs, nurses, physiotherapists, dieticians, mental health (MH) workers, psychotherapists or counsellors in the preceding 3 months. Level of contact with conventional health professionals was defined as the number of different professions utilised during this time period. This was considered to be the variable that was the most appropriate proxy measure for overall level of interaction with health services, given difficulty interpreting the significance of number of contacts and lack of any other information on nature of contacts. Yorkshire Health Study respondents were also classified as to whether or not they had utilised complementary or alternative medication (CAM) services within the preceding 3 months. Practitioner-led CAM services were considered to be represented by use by respondents of any of the following professions: acupuncturist, chiropractor, herbalist, homeopath or osteopath. Due to generally low take-up in the use of CAM services, no distinction was made between individuals who had made use of one and multiple CAM practitioners. Participants were not asked about whether their use of CAM was self-directed or suggested by an existing health care practitioner.

Self-reported demographic and health information collected on respondents in both waves of the Yorkshire Health Survey were included in the analysis to act as controlling variables to the key predictor of CAM service take-up. These variables included age, sex, socio-economic status (as measured by the Index of Multiple Deprivation), and number of long-term mental health and physical health conditions; considering six mental health conditions (tiredness/fatigue, pain, insomnia, anxiety/nerves, depression, memory problems) and seven physical health conditions (diabetes, breathing problems, high blood pressure, heart disease, osteoarthritis, cancer, stroke).

2.3. Statistical analysis

The sample was summarised descriptively. The nature of missing data was investigated for variables with missing values using separate variance t-testing. The distribution of the outcome variable was inspected to assess the need for zero-inflated and/or negative binomial regression models. A Poisson regression model for level of NHS contact was derived including CAM service take-up and all controlling variables as predictors. P-values, incidence rate ratios (IRR) and associated 95 % confidence intervals were derived for each predictor included in the model. The model was checked for extra-Poisson variation (over-dispersion) after fitting to the data.

3. Results

Data was collected from 70,836 respondents. 42,379 respondents (59.8 %) reported contact with one or more National Health Service (NHS) health professionals working in conventional medicine in the preceding 3 months. 15,588 respondents (22.0 %) reported contact with 2 or more health professionals working in different disciplines. The numbers of respondents reporting contact with health professionals included for the purposes of the current analysis in the category of conventional medicine is summarised in Table 1.

The mean level of contact with conventional health professionals in the preceding 3 months (i.e. number of distinct conventional health professionals contacted) reported by respondents was 0.86. No evidence for zero-inflation was revealed, and a Poisson model was hence judged

Table 1
Number of respondents reporting contact with *conventional* health professionals within previous 3 months.

Health Care Professional	Number (valid %) reporting 1 or more instances of contact within preceding 3 months
GP	35,459 (49.5 %)
Nurse	17,115 (24.2 %)
Physiotherapist	4420 (6.2 %)
Dietician	969 (1.4 %)
Midwife	1768 (2.5 %)
Mental health worker	1152 (1.6 %)
Psychotherapist	735 (1.0 %)
Counsellor	1470 (2.1 %)

to be an appropriate fit to the data.

Most participants (68,392; 96.5 %) did not self-report accessing practitioner-led CAM services in the preceding three months. A small minority (2444; 3.5 %) reported accessing CAM practitioners in the previous 3 months, including acupuncturists, chiropractors, herbalists, homeopaths and osteopaths. Very few (177; 0.25 %) reported using CAM services on 2 or more occasions; of which 21 respondents (0.03 %) reported using CAM services on 3 or more occasions. Due to the low numbers of respondents who reported using practitioner-led CAM services on multiple occasions, no distinction was made between respondents using CAM services on 1 or multiple occasions.

Some missing data was recorded on various controlling variables. 1828 cases (2.58 %) were missing on the *Age* variable, 548 cases (0.74 %) were missing on the *Sex* variable and 19,191 cases (27.1 %) were missing on the *Index of Multiple Deprivation (IMD)* variable. Most missing cases on this variable appeared to be a result of missing or invalid postcodes. Separate variance t-tests conducted on the data revealed no evidence that missing data was not missing at random. Inferential analysis hence proceeded on a complete cases basis, without imputation.

The sample is summarised descriptively in Table 2.

The demographic characteristics of those who reported, and did not report, utilising CAM within the 3 months were summarised to assess the effect of any baseline imbalance across groups defined by CAM status (Table 3).

From Table 2, the proportion of practitioner-led CAM service users who did not have any contact with conventional health professionals was about two thirds of the corresponding proportion of non-CAM service users. The mean level of contact with conventional health professionals reported by CAM service users was 1.17 (SD 0.955); the mean level of contact with conventional health professionals reported by non-CAM service users was 0.850 (SD 0.859). Hence respondents who utilise practitioner-led CAM services had levels of contact with conventional health professionals about 38 % higher than levels seen in those who did not utilise CAM services.

CAM service users were also slightly older than non-CAM service users, included a higher proportion of females and had IMD scores about 20 % lower than non-CAM service users. Few substantive differences between CAM service users, and non-CAM service users, with respect to long-term physical health conditions were observed: with a mean of 0.60 conditions (SD 0.92) in CAM service users and a mean of 0.53 conditions (SD 0.89) in non-CAM service users. However, a substantially larger proportion of non-CAM service users than CAM service users reported having no long-term mental health conditions: with a mean of 1.03 conditions (SD 1.37) in CAM service users and a mean of 0.71 conditions (SD 1.21) in non-CAM service users.

A multiple Poisson regression model for contact with conventional health professionals revealed CAM service take-up and all controlling variables except IMD score to be significantly associated with the outcome measure ($p = 0.193$ for IMD score; $p < 0.001$ for all other variables). Poisson regression parameters are summarised in Table 4. In this context the incidence rate ratio (IRR) represents the ratio of the expected count of conventional health professionals contacted in the preceding 3 months, comparing a baseline value with that associated with a unit change in a predictor.

Table 2
Descriptive summary of sample.

Variable	**Frequency (valid %)**
Practitioner-led CAM utilisation within preceding 3 months	
No utilisation	68,392 (96.5 %)
Utilisation	2444 (3.5 %)
Level of contact (number of conventional health professions) within preceding 3 months	
0 (no contact)	28,457 (40.2 %)
1	26,791 (37.8 %)
2	13,108 (18.5 %)
3	2085 (2.94 %)
4	301 (0.425 %)
5	74 (0.105 %)
6	16 (0.223 %)
7	4 (0.0056 %)
Sex	
Male	25,286 (36.0 %)
Female	45,002 (64.0 %)
Number of long-term mental health conditions	
0 (no conditions)	45,658 (64.5 %)
1	11,301 (16.0 %)
2	6958 (9.82 %)
3	3512 (4.96 %)
4	1939 (2.72 %)
5	1090 (1.54 %)
6	378 (0.54 %)
Number of long-term physical health conditions	
0 (no conditions)	46,140 (65.1 %)
1	15,631 (22.1 %)
2	5980 (8.44 %)
3	2153 (3.04 %)
4	709 (1.00 %)
5	181 (0.26 %)
6	31 (0.04 %)
7	11 (0.02 %)
Variable	**Mean (SD)**
Age (years)	50.0 (17.9)
Index of Multiple Deprivation score	22.7 (17.3)

The model was checked for extra-Poisson variation. The ratio of the likelihood ratio statistic to the model degrees of freedom was revealed to be 2.31, indicating possible evidence for over-dispersion.

Hence controlling for other variables in the model, at best estimate, those participants who utilise CAM services have had 24 % higher level of contact with conventional health professionals, than those who do not utilise practitioner-led CAM services, within the preceding 3 months. Females had 10 % higher level of contact with conventional health professionals than males within the preceding 3 months. Each year of advancing age was associated with an increase of 0.25 % in the level of contact with conventional health professionals, within the preceding 3 months. Participants with multiple long-term conditions had reported a higher number of consultations than those with fewer conditions. Each additional mental health condition reported was associated with an increase of 17 % in level of contact with conventional health professionals within the preceding 3 months. Similarly, for each additional physical health condition reported, an associated increase of 16 % in level of contact with conventional health professionals was observed within the preceding 3 months

4. Discussion

In an analysis of Yorkshire Health Study data from 70,836 participants 3.5 % of the cohort reported accessing practitioner-led CAM services in the previous 3 months. The level of contact with conventional health professionals working in conventional medicine was higher in those accessing CAM services (incidence rate ratio [IRR]=1.28;

Table 3
Descriptive summary of sample (by CAM utilisation).

Variable	Mean (SD)		
	CAM utilisation	No CAM utilisation	All respondents
Age (years)	52.8 (15.9)	49.9 (17.9)	50.0 (17.9)
Index of Multiple Deprivation score	19.0 (15.4)	22.9 (17.3)	22.7 (17.3)
Variable	**Frequency (valid %)**		
Sex			
Male	682	24,604	25,286
Female	(28.0 %)	(36.3 %)	(36.0 %)
	1751	43,251	45,002
	(72.0 %)	(63.7 %)	(64.0 %)
Number of long-term mental health conditions			
0 (no conditions)	1237	44,421	45,658
1	(50.6 %)	(65.0 %)	(64.5 %)
2	525	10,776	11,301
3	(21.5 %)	(15.8 %)	(16.0 %)
4	315	6643	6958
5	(12.9 %)	(9.71 %)	(9.82 %)
6	196	3316	3512
	(8.02 %)	(4.85 %)	(4.96 %)
	96 (3.93 %)	1843	1939
	56 (2.29 %)	(2.69 %)	(2.72 %)
	19 (0.77 %)	1034	1090
		(1.51 %)	(1.54 %)
		359 (0.53 %)	378 (0.54 %)
Number of long-term physical health conditions			
0 (no conditions)	1496	44,644	46,140
1	(61.2 %)	(65.3 %)	(65.1 %)
2	592	15,039	15,631
3	(24.2 %)	(22.0 %)	(22.1 %)
4	238	5742	5980
5	(9.74 %)	(8.39 %)	(8.44 %)
6	85 (3.48 %)	2068	2153
7	26 (1.06 %)	(3.02 %)	(3.04 %)
	3 (0.12 %)	683 (1.00 %)	709 (1.00 %)
	3 (0.12 %)	178 (0.26 %)	181 (0.26 %)
	1 (0.041 %)	28 (0.041 %)	31 (0.04 %)
		10	11 (0.02 %)
		(0.0015 %)	
Level of conventional health professional contacts (number of professions)			
0 (no contact)	643	27,814	28,457
1	(26.3 %)	(40.7 %)	(40.2 %)
2	979	25,812	26,791
3	(40.1 %)	(37.7 %)	(37.8 %)
4	630	12,478	13,108
5	(25.8 %)	(18.2 %)	(18.5 %)
6	160	1925	2085
7	(6.55 %)	(2.81 %)	(2.94 %)
	22 (0.90 %)	279 (0.41 %)	301 (0.43 %)
	7 (0.29 %)	67 (0.98 %)	74 (0.11 %)
	3 (0.12 %)	13 (0.019 %)	16 (0.22 %)
	0 (0.00 %)	4 (0.0058 %)	4 (0.0056 %)

Table 4
Poisson regression parameters.

Variable	*P*-value	IRR	95 % CI for IRR
CAM utilisation	< 0.001	1.24	(1.18, 1.29)
Gender = female	< 0.001	1.10	(1.08, 1.12)
Age (years)	< 0.001	1.0025	(1.0019, 1.0031)
IMD score	0.193	0.9996	(0.9991, 1.0002)
Number of Mental Health conditions	< 0.001	1.17	(1.16, 1.18)
Number of Physical Health conditions	< 0.001	1.16	(1.14, 1.17)

$p < 0.001$.) The main predictors of accessing practitioner-led CAM services in the previous 3 months were female gender, older age and increased incidence of mental and physical health conditions.

Other studies that have evaluated self-reported access to CAM services have shown a wide range of results. A UK survey reported that between 2 % and 49 % of the UK general population surveyed reported consulting a CAM practitioner within the previous 12 months [18]. A more recent UK survey of a nationally representative adult quota sample (n = 4862) of the general population reported a figure of 16 % [19]. In the USA, around one third of adults was reported as accessing at least one form of CAM in the previous year [8]. A systematic review of 89 international studies suggested CAM use as being between 41.1 % and 51.8 % over a 12-month period [7]. These findings demonstrate that there is a lack of consistency regarding utilisation of practitioner led CAM. Our study findings of a prevalence of 3.5 % for access to CAM services fall within the range of results reported, but at the lower end. This may be explained by the fact that the Yorkshire Health Study asked participants about CAM consultations in the previous 3 months, rather than 12 months, which was the time period used in other surveys [7,8,18,19]. A 3-month period was selected to offset potential recall bias, which may be greater when asking participants to estimate the number of CAM contacts over a 12-month period.

This study adds to the growing body of evidence that the use of CAM is increasing in current healthcare practice in the UK. Several studies and surveys indicate an increasing trend in both public interest and clinical integration of CAM therapies. One key indicator is the increase in the number of patients seeking CAM treatments alongside conventional medical care. A major survey conducted by Ipsos MORI [20] found that around 20 % of the UK population had used some form of CAM in the past year, and the types of CAM most commonly used reported in this survey, which include herbal medicine, acupuncture and chiropractic care, are similar to those reported by respondents in the current survey. Another indicator is the integration of CAM into NHS services. While the NHS has traditionally focused on conventional medicine, there is a growing recognition of the potential benefits of CAM. For example, some NHS trusts now offer acupuncture, particularly for pain management and conditions such as migraine. There has also been an increase in NHS funding for research into the effectiveness of CAM, reflecting a wider acceptance within the medical community. The Royal London Hospital for Integrated Medicine (RLHIM), part of the University College London Hospitals NHS Foundation Trust, is one of the leading providers of integrated CAM services, combining conventional and alternative approaches [21]. There is also a growing body of evidence supporting the effectiveness of certain CAM therapies for specific conditions. For example, the National Institute for Health and Care Excellence (NICE) recommends acupuncture for the management of chronic pain, marking a shift in official guidelines towards the inclusion of CAM [22].

According to regional surveys reported in 2018, the prevalence of CAM usage in Yorkshire is slightly higher than the national average, with around 30 % of the population reporting the use of CAM therapies [23]. This higher usage can be attributed to a combination of factors, including a strong cultural affinity towards traditional practices and the availability of CAM practitioners in the region. Moreover, Yorkshire has seen a growing interest in herbal medicine and osteopathy, likely influenced by the region's rural and semi-rural demographics where such practices have historical roots. The increased availability of CAM practitioners in Yorkshire, coupled with a population that may have a predisposition towards natural and holistic health approaches, drives this higher usage compared to other regions [24]. Our findings from the Yorkshire Health Study support the evidence from studies in other populations that have suggested that multimorbidity, as well as other measures of health status, is a key predictor of use of both conventional health professionals and CAM service utilisation [6,14]. Our findings also support the importance of individual characteristics including age, gender and socioeconomic factors in predicting uptake of health services. [9,20]. They add to the existing understanding of the relationship between the use of practitioner-led CAM and health services delivered by conventional health professionals, suggesting that despite the

evidence than use of CAM services may be driven by dissatisfaction with conventional medicine, it does not predict more limited use of those services. Of note was our finding that having one or more mental health condition was a predicator of CAM use which is supported in previous studies [14] which have suggested extensive CAM use among US mental health consumers [25], psychiatric unit residents in Norway [26], and in young US adults [27] for example. These represent quite specific populations, and our study adds to understanding that this may also be the case among a broader general population in South Yorkshire.

The study has some strengths and limitations that warrant consideration. The use of self-report data about different contacts over a three-month period is a limited measure of service use and subject to reporting bias. Analyses could be replicated using other outcome measures and ideally using independent measures of service use rather than relying on self-report. Alternative measures of service use might include the total number of visits made over the preceding three months. and different measures may identify different patterns in relationships between practitioner-led CAM and conventional health professional service use. The number of controlling variables in the regression model we developed is limited as we could only include those variables reported in both waves of the YHS data collection. This precluded variables such as levels of education, which may have some substantive relationship with the outcome measure; similarly, ethnicity was collected in only the first wave of survey data collection but not in the second wave and so was not included in the combined data for analysis. It is also recognised that the data on which this study is based is over a decade old and some caution is needed and the study reflects trends and patterns at this time and may not reflect current trends and treatment and service use. However, given the paucity of studies on this topic these data add important and original information to the international literature on this topic.

In summary, there is strong evidence of a growing trend towards the use of CAM in the UK, driven by increasing public interest, greater integration within NHS services, professional acceptance and economic growth in the CAM sector. This shift suggests that CAM is playing an increasingly important role in the wider healthcare landscape in the UK.

Recent data suggests that the integration of CAM into mainstream healthcare practice in Yorkshire, as in the rest of the UK, remains limited but is evolving. Some General Practitioners (GPs) in Yorkshire are more open to referring patients to CAM practitioners, especially when conventional treatments do not fully address patient needs, or in cases where patients express a strong preference for alternative approaches. However, this is often done with caution due to the varying levels of evidence supporting different CAM therapies [28]. NHS services in Yorkshire, similar to those across the UK, are increasingly under pressure due to rising demand and limited resources. This situation has led to a more pragmatic approach where GPs may consider CAM as part of a broader, patient-centred approach, especially for chronic conditions like pain management and mental health issues where patients might benefit from a holistic approach [29]. As healthcare in the UK continues to evolve, the role of CAM in regions like Yorkshire might expand, particularly if supported by further research and evidence of efficacy.

Finally, the economic impact of CAM cannot be overlooked. The CAM market in the UK is growing, with the herbal medicine market alone expected to be worth over £ 300 million by 2025. This economic growth reflects increased consumer spending on CAM products and services, further evidence that CAM is becoming an increasingly important part of healthcare practice in the UK [30].

5. Implications for further research

Future research should focus on exploring further the patterns and prevalence of the use of CAM, the adoption of CAM considering the sociocultural influences, its impact on improving patients' outcomes and their quality of life, the level of its integration into the healthcare practices and finally its public health and economic impact. These will help to clarify how the use of CAM in Yorkshire compares nationally with the rest of the UK and would inform the healthcare practice and policy makers at the regional and national levels.

CRediT authorship contribution statement

John Stephenson: Writing – review & editing, Writing – original draft, Methodology, Formal analysis. **Felicity Astin:** Writing – review & editing, Writing – original draft, Conceptualization. **Elizabeth Goyder:** Writing – review & editing, Writing – original draft, Conceptualization. **Javid Farideh:** Writing – review & editing, Writing – original draft. **Richard Cooper:** Writing – review & editing, Writing – original draft.

Declaration of Competing Interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: Elizabeth Goyder reports financial support was provided by National Institute for Health Research (NIHR) Collaborations for Leadership in Applied Health Research and Care (CLAHRC) Yorkshire and Humber (NIHR200166) and the University of Sheffield. If there are other authors, they declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References

[1] Health Foundation Briefing, in: M. Stafford, A. Steventon, R. Thorlby, R. Fisher, C. Turton, S. Deeny (Eds.), Understanding the Health Care Needs of People with Multiple Health Conditions, The Health Foundation, London, UK, 2018.

[2] National Health Service Long Term Plan (2019) accessed at ⟨https://www.longtermplan.nhs.uk/online-version/⟩.

[3] Randall D. Cebul, James B. Rebitzer, Lowell J. Taylor, Mark E. Votruba, Organizational fragmentation and care quality in the U.S. Healthcare system, J. Econ. Perspect. 22 (4) (2008) 93–113.

[4] Frandsen, R.B., Joynt, K.E., Rebitzer, J.B., Jha, A.K., 2015. Care fragmentation, quality and costs among chronically ill patients The America Journal of Managed Care 21(5):355-362..

[5] National Health Service health information accessed on 7th January 2022 at Complementary and alternative medicine - NHS ⟨(⟩⟨www.nhs.uk⟩).

[6] E. Harris, C. Barker, K. Burton, M. Lucock, F. Astin, Self-management support activities in primary care: a qualitative study to compare provision across common health problems, Patient Educ. Couns. (2020 Jul), https://doi.org/10.1016/j.pec.2020.07.003.

[7] P. Posadzki, L.K. Watson, A. Alotaibi, E. Ernst, Prevalence of use of complementary and alternative Medicine (CAM) by patients/consumers in the UK: systematic review of surveys, Clin. Med. (Lond.) 13 (2) (2013 Apr) 126–131.

[8] T.C. Clarke, L.I. Black, B.J. Stussman, P.M. Barnes, R.L. Nahin, Trends in the use of complementary health approaches among adults: United States, 2002–2012, Natl. Health Stat. Rep. 79 (2015) 1.

[9] M. Tangkiatkumjai, H. Boardman, D.M. Walker, Potential factors that influence usage of complementary and alternative Medicine worldwide: a systematic review, BMC Complement Med Ther. 20 (2020) 363, https://doi.org/10.1186/s12906-020-03157-2.

[10] K.J. Hunt, H.F. Coelho, B. Wider, R. Perry, S.K. Hung, R. Terry, E. Ernst, Complementary and alternative Medicine use in england: results from a national survey, Int. J. Clin. Pract. 64 (2010) 1496–1502, https://doi.org/10.1111/j.1742-1241.2010.02484.x.

[11] L. Chen, A. Michalsen, Management of chronic pain using complementary and integrative Medicine, BMJ 24357 (2017 Apr) j1284, https://doi.org/10.1136/bmj.j1284.

[12] J. Mbizo, A. Okafor, M.A. Sutton, B. Leyva, L.M. Stone, O. Olaku, Complementary and alternative Medicine use among persons with multiple chronic conditions: results from the 2012 national health interview survey, BMC Complement. Altern. Med. 18 (1) (2018) 1–12.

[13] R.C. Kessler, P.A. Berglund, M.L. Bruce, J.R. Koch, E.M. Laska, P.J. Leaf, R. W. Manderscheid, R.A. Rosenheck, e E. Walters, P.S. Wand, The prevalence and correlates of untreated serious mental illness, Health Ser. Res 36 (6 Pt 1) (2001) 987–1007.

[14] M. Alwhaibi, R. Bhattacharya, U. Sambamoorthi, Type of multimorbidity and complementary and alternative Medicine use among adults, Evid. Based Complement. Altern. Med. 2015 (362582) (2015), https://doi.org/10.1155/2015/362582.

[15] D. Sharp, A. Lorenc, P. Little, M. Stewart, S. Hollinghurst, G. Feder, H. MacPherson, Complementary Medicine and the NHS: experiences of integration with UK primary care, Eur. J. Integr. Med. 24 (2018) 8–16.

[16] WHO Self-care interventions for health (June 2022) ⟨https://www.who.int/news-room/fact-sheets/detail/self-care-health-interventions⟩ (2022).

[17] Stephenson J., Smith C.M., Goyder E.C., Holding E., Haywood A., Crum A., Blackburn J., Cooke J., Relton C., Bissell P. Cohort profile update: the Yorkshire health study. International Journal of Epidemiology. 2021 Aug;50(4):1070-d.].
[18] P.E. Harris, K.L. Cooper, C. Relton, K.J. Thomas, Prevalence of complementary and alternative Medicine (CAM) use by the general population: a systematic review and update, Int. J. Clin. Pract. 66 (10) (2012 Oct) 924–939.
[19] D. Sharp, A. Lorenc, R. Morris, G. Feder, P. Little, S. Hollinghurst, S.W. Mercer, H. MacPherson, Complementary Medicine use, views, and experiences: a national survey in england, bjgpopen18X101614, BJGP Open 2 (4) (2018 Nov 14), https://doi.org/10.3399/bjgpopen18X101614.
[20] Ipsos M.O.R.I. (2020). Complementary and Alternative Medicine Survey. Retrieved from [Ipsos MORI].
[21] Royal London Hospital for Integrated Medicine (2021). About Us. University College London Hospitals NHS Foundation Trust.
[22] National Institute for Health and Care Excellence (NICE) (2021). Chronic pain: assessment and management. NICE guidelines.
[23] National Institute for Health Research. (2018). Use of Complementary and Alternative Medicine (CAM) in the UK: Regional Perspectives. NIHR Journals Library.
[24] Public Health England, Health Profile for England: Regional Health Indicators, PHE Publications, 2017.
[25] L. Clossey, M.D. DiLauro, J.P. Edwards, C. Hu, H. Pazaki, A. Monge, K. Smart, Complementary and alternative Medicine (CAM) use among mental health consumers, Community Ment. Health J. 59 (8) (2023 Nov) 1549–1559.
[26] M. Wemrell, A. Olsson, K. Landgren, The use of complementary and alternative Medicine (CAM) in psychiatric units in Sweden, Issues Ment. Health Nurs. 41 (10) (2020 Oct) 946–957.
[27] K.J. Kemper, P. Gardiner, G.S. Birdee, Use of complementary and alternative medical therapies among youth with mental health concerns, Acad. Pedia 13 (6) (2013 Nov-Dec) 540–545.
[28] N.H.S. England, Complementary and Alternative Medicine: NHS Guidelines, NHS England Publications, 2022.
[29] BMC Complementary Medicine and Therapies, Integration of CAM in UK Primary Care: Current Trends and Future Prospects, BMC, London, 2021.
[30] Statista (2023). Herbal Medicine Market in the UK.