The use of complementary/alternative medicine among paediatric patients

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Abstract

The use of complementary and alternative medicine (CAM) is increasing. The aim of this study was to characterise the use of CAM among patients in an outpatient clinic in a paediatric department.

All patients aged 0–18 years, attending the paediatric outpatient clinic at Hans Christian Andersen Children's Hospital during a 2-week period, in the autumn of 2020, were asked to participate. In total, 771 patients (83.2%) participated. Data were collected using a structured questionnaire, which consisted of 12 questions. CAM was divided into three groups: Herbal medicine (herbal drugs or dietary supplements) (HM), alternative therapy (AT) (e.g. acupuncture) and chiropractic (CHI). Of the 771 paediatric patients enrolled in this study, 59% (n = 455) had used complementary and alternative medicine at least once. CHI was the most used type of CAM and is especially used for disorders not usually treated with conventional medicine, such as infantile colic. *Conclusion*: The prevalence of children using CAM in Denmark is high and increasing, compared to previous studies. Paediatricians should be aware of this, and paediatric patients should be interviewed about their use of CAM with regard to side-effects, interactions or lack of compliance with conventional medicine.

Introduction

Complementary and alternative medicine (CAM) is widely used by paediatric patients [1, 2].

The term CAM covers a broad variety of therapeutic products and approaches and may be defined as "a group of diverse medical and health care systems, practices and products that are not presently considered to be part of conventional medicine" [1].

A systematic review from 2014 included 58 studies from 19 countries and found that the use of CAM varies considerably, ranging from 10.9%-87.6% for lifetime uses and 8.0-48.5% for current use, depending on country, health status and CAM modality [2]. According to studies in Australia [3], Denmark [4] and Germany [5] 40–60% of paediatric patients use CAM, but within groups of patients with certain diagnoses up to 80% of the children use CAM [6, 7]. CAM is often used as a supplement to conventional medicine or for symptoms not usually treated with conventional medicine, such as infantile colic or to strengthen the immune system [1, 4].

This study aimed to characterise the use of CAM among paediatric patients in an outpatient clinic. We wanted to examine the prevalence, types of CAM and factors associated with its use. In addition, we investigated by whom CAM was recommended, whether CAM replaced conventional treatment or was used as a supplement, and how often the patients experienced side-effects. Finally, the expenses related to CAM was registered.

Materials And Methods

Patients

During a two-week period, in November 2020, all patients (aged 0–18 years) and parents attending the outpatient clinic at Hans Christian Andersen Children's Hospital in Odense, Denmark, were invited to participate in this study. Parents with insufficient proficiency of the Danish language were excluded.

Questionnaire

The prevalence of CAM use was assessed using a questionnaire, which included questions on the child's age, reason for outpatient visit, other chronic diseases, use of medication, and whether they were following the Danish Childhood Vaccination program. Furthermore, we asked about parental occupation, which was divided into the following socioeconomic groups, in accordance with the classification from The National Institute of Public Health [8]: 1) Self-employed, 2) Skilled workers, 3) Unemployed, 4) Salaried employed (non-manual workers) and 5) Unskilled workers.

Regarding CAM, the children and adolescents were asked about use within the last month and more than a month ago. Questions regarded indications, duration, positive effects, if they experienced any side effects and whether CAM replaced conventional treatment, was used as a supplement, or was used for conditions, which are not usually treated with conventional medicine. The questionnaire also contained questions in regard to who recommended the use of CAM.

Finally, we asked how much money parents spent on CAM on average per month. The questionnaire was completed by the parents and the children themselves, while they were at the hospital. The same interviewer introduced the questionnaire and was accessible for answering questions at all times.

CAM was divided into three groups: Herbal medicine (herbal drugs or dietary supplements) (HM), alternative therapy (AT) (e.g. acupuncture) and chiropractic (CHI). HM was further subdivided into dietary supplements, herbal drugs and vitamins/minerals. The Danish Medicines Agency maintains a list of authorized herbal drugs with marketing authorisation in Denmark [9]. Iron-supplement, Vitamin D and K for children aged below 1 year as well as ordinary multivitamin tablets were not registered as CAM. Examples of AT are treatments such as reflexology, craniosacral therapy and acupuncture. Chiropractors in Denmark have been authorized healthcare professionals since 1992, and public subsidies are given for the treatment [10]. However, CHI is included as CAM in this study, since this is the case in several other studies. Furthermore, many physicians may regard some forms of CHI as an unconventional treatment.

Statistics

Data management and statistical analyses were performed using IBM SPSS Statistics version 26 for macOS. Descriptive statistics were used to identify the most commonly used modalities of CAM. For comparison of proportions the chi-square test ($\chi 2$) and 95% confidence intervals (CI) were used. The p-value of significance was < 0.05.

Results

A total of 927 patients attended the paediatric outpatient clinic at Hans Christian Andersen Children's Hospital during the two-week study period and 771 questionnaires were completed. Thus, the response rate was 83.2% (771/927).

Among the participants 53% (n = 408) were boys and 47% (n = 363) were girls. The mean age was nine years (range: 0–18 years). Of the 156 patients that did not answer the questionnaire, 66 patients refused to participate due to lack of time, 29 patients had insufficient proficiency of the Danish language, and 61 patients did not receive the invitation. These patients did not differ from the included patients, with regard to gender, age and diagnosis.

Use of CAM

Of the 771 patients enrolled in this study, 455 (59%; 95% CI: 56–62) patients had received CAM at least once. Of the users, 50.1% (n = 228) were boys and 49.9% (n = 227) were girls. The mean age was 4 years. Most frequently used was CHI (34%), secondly AT (22%) and thirdly HM (17%) (Table 1) and 79% had used one, 18% had used two and 3% had used all three kinds of CAM. No association was found between gender and the use of CAM within the previous month ($p > 0.6$) or previously ($p > 0.08$). Equally, the proportion of CAM users within the last month ($p > 0.5$) or previously ($p > 0.2$) did not differ with regard to age (Table 2).

Table 1
Use of the different CAM types

CAM therapy	Patients (N = 771), n (%)
HM	N = 129[a] (17%)
Dietary supplements	N = 27
Herbal medicine	N = 82[b]
Vitamins/minerals	N = 35
AT	N = 167[c] (22%)
Reflexology	N = 75
Craniosacral therapy	N = 37
Acupuncture	N = 16
Massage	N = 14
Osteopath	N = 12
Others[d]	N = 25
CHI	N = 265 (34%)
Total use of CAM	N = 455[e] (59%)

[a] *Fifteen patients used two types of HM*

[b] *Echinacea was the most popular type of herbal medicine (28%)*

[c] *Twelve patients used two types of AT*

[d] *Healing, diet, kinesiology, acupressure, relaxation, hypnotherapy, laser, biopath*

[e] *Eighty-two patients used two types and twelve patients used three types of CAM.*

The most common indications for CAM use were joint or musculoskeletal symptoms (n = 196), and gastrointestinal symptoms including infantile colic (n = 178) (Table 3). CAM was primarily used for symptoms not usually treated with conventional medicine (60%) or as a supplement for conventional medicine (33%). Only 7% of the patients used CAM as a replacement for conventional medicine (Table 2).

Table 3
The use of HM, AT and CHI in relation to indication

Table 2: The use of HM, AT and CHI in relation to age, expenses, positive effect, other effects and side effects given as percentage (95% CI)

	Use within the last month			Use more than a month ago			Total use
	HM	AT	CHI	HM	AT	CHI	
	N, % (95% CI)						
Number of users	22, 3% (2–4)	23, 3% (2–4)	34, 4% (3–6)	107, 14% (11–16)	144, 18% (17–22)	231, 30% (27–33)	561[a]
Median age in years (range)	9 (2–18)	7 (0–15)	5 (0–16)	7 (0–17)	5 (0–17)	2 (0–15)	
Expenses (EURO) median	0–13	27–67	0-13[b]				
Median period for how long CAM was used	1–4 weeks	1–4 weeks	1–6 months				
Positive effect[c]:							
Yes	42, 33% (23–44)	91, 54% (44–67)	195, 74% (64–85)				
Do not know	73, 57%	40, 24%	43, 16%				
Other effect[c]:							
Yes	4, 3% (0.9-8)	15, 9% (5–14)	15, 6% (3–9%)				
Do not know	67, 53%	45, 27%	52, 20%				
Side effects[c]:							
Yes	2, 2% (0.2-6)	4, 2% (0.6-6)	6, 2% (0.8-5)				
Do not know	4, 3%	7, 4%	6, 2%				

Table 2: The use of HM, AT and CHI in relation to age, expenses, positive effect, other effects and side effects given as percentage (95% CI)			
Treatment used as supplement[c]	46, 36% (26–48)	81, 49% (39–60)	60, 23% (17–29)
Treatment replaced conventional treatment[c]	8, 6% (3–12)	14, 8% (5–14)	18, 7% (4–11)
Treatment used against symptoms, for which conventional treatment are not normally used[c]	75, 58% (46–73)	72, 43% (34–54)	187, 71% (61–81)

[a] Eighty-two patients used two types and twelve patients used three types of CAM. The actual number of CAM users: N = 455.

[b] Due to subsidy from health insurance, otherwise 27–67 EURO

[c] Calculated for the total numbers of users within the last month and more than a month ago.

Among the patients who used HM and AT, the most frequent referrer was family and friends (71%), secondly the internet (11%). However, among the patients who used CHI, the most frequent referrer was the health visitor (46%), who especially recommended CHI to patients with infantile cholic or joint symptoms. Examples of others who recommended the use of CAM were doctors, nurses, pharmacies, newspapers or alternative therapists.

CHI was the most frequently used type of CAM (34%, n = 265) (Table 1). It was especially used against joint symptoms (n = 149) and gastrointestinal symptoms including infantile colic (n = 86) (Table 3). The majority of patients reported beneficial effect of CHI (74%; 95% CI: 64–85), which was found to be significant better compared with the effect of HM (33%; 95% CI: 23–44) and borderline significant compared with the effect of AT (54%; 95% CI: 44–67) (Table 2). Among the CHI users, 93% (n = 246) reported that they have consulted a chiropractor more than once: 71% received 2–5 treatments, 16% received 5–10 treatments and 7% of the patients received more than 10 treatments.

The most frequent type of AT was reflexology (n = 75) and craniosacral therapy (n = 37) (Table 1), especially used against gastrointestinal symptoms (n = 77) including infantile cholic (Table 3). Among the 23 current users, one patient used more than one type of treatment, and among the 144 previous users, 11 patients used more than one type.

Also, 17% (n = 129) used herbal medicine, including dietary supplements, primarily to strengthen the immune system. HM was the cheapest and considered the least effective treatment (Table 2).

Diagnosis

Lifetime use of CAM (within the last month and more than a month ago) correlated to the present diagnosis of the patients ($P < 0.05$) (Table 4). The most frequent users of CAM were patients who suffered from gastrointestinal diseases (including colic), and secondly patients with asthma, allergies and eczema (Table 4). Patients suffering from cancer, endocrine diseases, joint diseases and cardiac diseases used CAM less frequently. A total of 136 (18%) patients had more than one chronic disorder, which was found to be associated with an increased lifetime use of CAM ($X^2 = 6.969$, df = 1, $p = 0.008$).

Table 4
Correlation between diagnosis and use of CAM ranked according to the most frequent users within the last month

	Use within the last month			**Use more than a month ago**			**Total**
	HM	AT	CHI	HM	AT	CHI	
Indication	N = 22	N = 23[a]	N = 34[a]	N = 107[b]	N = 144[c]	N = 231[d]	N = 561[e]
To strengthen the immune system	13	1	0	75	7	0	96
Gastrointestinal symptoms incl colic	3	11	3	12	66	83	178
CNS symptoms	0	2	1	3	20	7	33
Incontinence	0	0	0	1	0	0	1
Asthma, eczema, allergy	3	1	0	10	9	1	24
Joint or musculoskeletal symptoms	1	6	29	5	35	120	196
Mental disorders, relaxation, sleep	0	3	0	5	16	0	24
Breastfeeding problems	0	0	1	0	0	14	15
Bone strength	2	0	0	9	0	0	11
Health check	0	0	1	0	0	10	11
Others[f]	0	0	0	2	2	0	4

[a] One person had two indications

[b] Fifteen persons had two indications

[c] Eleven persons had two indications

[d] Four persons had two indications

[e] In total, thirty-one persons had two indications

[f] Obesity, cancer, anti-inflammatory

Present diagnosis	**Use the last month** **Number of users (%) – ranking number**	**Use more than a month ago** **Number of users (%) – ranking number**	**Sample size**

	Use within the last month		Use more than a month ago	Total
Gastrointestinal diseases incl. colic	25 (18%) – 1	88 (62%) – 1	141	
Asthma, eczema, allergy	22 (11%) – 2	117 (58%) – 2	202	
CNS diseases	8 (8%) – 3	54 (52%) – 4	103	
Others	3 (8%) – 4	12 (31%) – 10	39	
Endocrine diseases	5 (7%) – 5	29 (41%) – 7	71	
Joint diseases	5 (7%) – 6	28 (41%) – 8	69	
Cardiac diseases or observation of this	4 (5%) – 7	32 (43%) – 6	75	
Infection or observation after hospitalization	1 (4%) – 8	13 (52%) – 5	25	
Diseases of the urinary system	1 (3%) – 9	20 (56%) – 3	36	
Cancer	0 (0%) – 10	4 (40%) – 9	10	
Total number of users *(n)*	74	397	771	

Further analyzes of data from Table 4 found that use of CHI within the last month, was more frequent among patients suffering from gastrointestinal diseases including infantile colic (38%) and asthma, allergies and eczema (32%) ($X^2 = 27$, df = 16, $p = 0.04$). There was no correlation between a previous use of CHI and present diagnosis ($X^2 = 26$, df = 16, $p = 0.06$).

Present diagnosis did not correlate with use of AT within the last month ($p > 0.7$). A previous use of AT was more frequent in children suffering from asthma, allergies and eczema (31%), gastrointestinal diseases (including cholic) (27%) and CNS diseases (16%) ($X^2 = 20$, df = 16, $p = 0.03$).

There was no association between use of HM within the last month and the present diagnosis of the patients ($p > 0.4$). However, patients suffering from asthma, allergies and eczema (28%) and gastrointestinal diseases (25%) had previously used HM more frequently ($X^2 = 32$, df = 16, $p = 0.02$). The most popular type of HM among these patients, were herbal drugs to strengthen the immune system (Table 1).

Vaccination

747 patients (97%) followed the Danish Childhood Vaccination program, 16 patients followed it partly due to specific treatment of disease, and eight patients were not following the program. Of the eight

patients who did not follow the program, seven (88%) had used CAM at least once and of the 16 patients following it partly, 11 (69%) had used CAM at least once. However, no significant association was found between vaccinations and the use of CAM ($X^2 = 3.392$, df = 2, p = 0.183).

Socioeconomic aspect

There was no association between parental occupation and the use of CAM. The use of CAM was also analyzed in relation to income, by dividing parental occupation into the following groups: 1 + 2 + 4 (high income) and 3 + 5 (low income). The use of CAM and parental income did not correlate ($p > 0.6$). Furthermore, the parents were asked if they had a health science education, but no association was found ($X^2 = 1.911$, df = 1, p = 0.167).

Discussion

This study found that 455 (59%; 95% CI: 56-62) of 771 children and adolescents visiting a paediatric outpatient clinic had used CAM at least once. A Danish questionnaire study from 2003 (n=622), also performed at Hans Christian Andersen Children's Hospital, found that 53% of the patients had used CAM [4]. A German questionnaire-based survey from 2011 (n=405), found that 57% of the patients had used CAM [5]. A systematic review from 2013 included 11 surveys (n=17.631) and demonstrated that the average prevalence of CAM use was 42% [11]. The proportion in a similar Australian study from 2015 (n=883) was 44% [3]. Thus, the various studies show that the proportion of CAM users varies over the years, but appears to be increasing over time, since the prevalence found in our study and recent literature is higher than ever.

The Danish study published in 2003 found that the most popular type of CAM was HM, secondly AT and finally CHI, only used by 14% of the patients [4]. These frequencies are somewhat different now, where CHI is the most popular type of CAM used by 34%, secondly AT and thirdly HM.

Patients suffering from gastrointestinal diseases including infantile colic was the most frequent users of CAM, both within the last month and previous, with a total of 113 out of 141 patients (80%) (Table 4). The most popular type of CAM among these patients were CHI, with the majority being recommended CHI by their health visitor (46%). The latter is comparable to other studies [12], and may explain the great increase in use of CHI. A systematic review from 2019 investigated four high quality RCTs and found the effect of chiropractic on infantile colic to be inconclusive [13]. Several studies indicate a positive effect. However, the studies are too small and methodologically prone to bias to draw reliable conclusions [14, 15].

Patients suffering from asthma, allergies and eczema were also frequent users of CAM, with a total of 139 out of 202 patients (69%) (Table 4). This is in accordance with previous studies [6, 16, 17]. They preferred HM, often to strengthen the immune system and not specifically to treat the disease. This pattern is recognized in cancer patients as well [4, 5].

The wish to strengthen the immune system was a frequent indication (Table 3), and the most popular type of herbal drug for this was Echinacea (28%), an extract of plant. A Cochrane review found no evidence to recommend Echinacea products for the treatment or prevention of the common cold [18]. The most frequently used dietary supplement was lactic acid bacteria, including Lactobacillus reuteri, which is a well-studied probiotic bacterium, that has shown to be promising for colic in breastfed infants [19-21].

In agreement with previous studies, gender and age did not significantly influence the use of CAM [4, 5]. Some studies have demonstrated a lower use among small children [2, 3]. However, our results and those of others [4, 5] did not support this finding. On the contrary, it seems that children aged less than 5 years were the most likely to have used CAM, which may be explained by the frequent use against infantile colic.

Other reasons could be recall bias, an age effect (e.g. more likely to be ill and resort to CAM use), a time effect (e.g. CAM more popular in the last 5 years) or a combination [4, 22].

Several studies have shown that parents, who used CAM for their children were more skeptical about vaccines [23-25]. A qualitative study found that parents, who were vaccine opponents, embraced CAM as a protective strategy for the immune system, and that they preferred to discuss vaccine recommendations with their CAM provider instead of their medical doctor [24]. This is comparable to our study, where the majority of patients who did not follow the vaccine program had used CAM at least once (75%) compared to the average usage of 59%. However, no significant association between following the Danish Childhood Vaccination Program and using CAM was found, which can be due to a small sample size of non-vaccinated children and therefore low statistical power.

The majority of patients reported a positive effect from CHI (74%) and AT (50%), while HM was considered the least effective treatment, with a reported positive effect of 33% (Table 2). It is remarkable that CHI and AT, which both involves a CAM provider, were considered to be more efficient compared with HM, where the patients often are the primary manager themselves.

Less than half of the patients, had discussed their use of CAM with their doctor [4, 6, 11]. This may be because the majority were never asked about CAM, and because of the patients being unaware of the importance of telling their doctor. A study from 2020 found, that the most common reason for the patients not wanting to tell their doctor about their CAM use, was that the doctors were not sufficiently informed about CAM [26]. This is unfortunate, as CAM might have adverse effects caused by interaction between CAM and conventional medicine, a worsening of the present diagnosis because of cessation of conventional treatment and side-effects of CAM [27-29]. Side-effects caused by HM can be difficult to predict because of insufficient declaration of content. The Danish National Board of Health rarely receives reports about malpractice in relation to the use of CAM [30], which is consistent with our study where only 3% (12 out of 455 patients) reported negative side effects.

CAM was primarily used as a supplement for conventional medicine or for symptoms where medical treatment is not normally used, such as infantile colic or to strengthen the immune system (Table 2). 9%

of the CAM users or 5% of the total pediatric patient population used CAM instead of medical treatment, which is in accordance with previous studies [4, 22]. Previous studies found that the majority does not use CAM as a result of being dissatisfied with conventional medicine [4, 8] but largely because CAM is more congruent with their own values [29], experience CAM as a more individual treatment [30], for colic where medical treatment has little to offer exhausted parents [12], or to offer hope when conventional medicine might have outplayed its role in very ill patients [31].

Limitations

The participants were asked about their use of CAM within the last month and more than a month ago. Thus, it is possible that recall bias may occur and result in an underreporting of CAM use. Furthermore, it is possible that the parents have been reluctant to reveal the use of CAM. However, since the survey was voluntary and anonymous, the number of patients where this is the case is probably low, and therefore not considered to significantly influence the results of this study. Our results are based on data from self-administered questionnaires, which can result in a lower response rate and underestimated use compared to interviewer-administered questionnaires. However, the questionnaires were completed at the hospital and the interviewer was present at all times. Also, there is no widely accepted definition of CAM, and comparison with studies from other countries and between historical cohorts can therefore be difficult.

In conclusion, 59% of the patients had used CAM at least once, which is an increase compared to previous Danish and foreign studies. Most frequently used was CHI (34%), secondly AT (22%) and thirdly HM (17%). A positive effect was reported from 33-74%, although studies have lacked the scientific rigor to establish clear effects of CAM. However, the prevalence of CAM use is higher than ever before and pediatricians should therefore have sufficient knowledge about CAM and be prepared to provide guidance on this topic.

Abbreviations

AT: Alternative therapy

CAM: Complementary/alternative medicine

CHI: Chiropractic

CNS: Central nervous system

HM: Herbal medicine

Declarations

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Conflict of interest: The authors declare that they have no conflict of interest in relation to this article.

Availability of data and material: All authors made sure that all data and materials as well as software application support their published claims and comply with field standards.

Code availability: Not applicable.

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Ethics approval: The study was conducted in accordance with the rules of the local ethics committee.

Consent to participate: Informed consent was obtained from all individual participants included in the study.
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