

Complementary and Alternative Therapy Use in Children with Cerebral Palsy

Maryam Oskoui, Pamela Ng, Michele Zaman, David Buckley, Adam Kirton, Esias van Rensburg, Ellen Wood, Michael Shevell, Annette Majnemer

ABSTRACT: *Objective:* To describe complementary and alternative medicine (CAM) use amongst children with cerebral palsy (CP) in Canada and to identify factors associated with CAM use. *Methods:* We conducted a cross-sectional study, utilising data from the Canadian CP Registry. We explored the association between CAM use and regional, socioeconomic and CP phenotypic variables, and parental perception of the family-centredness of clinical care using the Measures of Process of Care-56 (MPOC-56). Chi-square analyses were performed, and odds ratios (OR) and 95% confidence intervals (CI) were obtained. Mann–Whitney *U* tests were used to compare MPOC-56 scores between CAM users and non-CAM users. *Results:* The study sample consisted of 313 families of which 27% reported CAM use in the past year. Children with CP using CAM were more likely to reside in Western Canada (OR 3.3, 95% CI 1.6–6.7), live in a two-parent household (OR 3.5, 95% CI 1.5–8.4), have an ataxic/hypotonic or dyskinetic CP subtype (OR 3.0, 95% CI 1.5–6.1) and have a greater motor impairment (OR 2.8, 95% CI 1.7–4.9). MPOC-56 subscale scores were not significantly associated with CAM use. *Conclusion:* Physicians need to be aware of existing CAM therapies, the level of evidence supporting their efficacy (beneficence), their associated risks of adverse events (non-maleficence) and enable fair access to care that may be of benefit to each child.

RÉSUMÉ : *Utilisation de thérapies complémentaires et alternatives chez des enfants atteints de paralysie cérébrale.* *Objectif :* Décrire l'utilisation de thérapies complémentaires et alternatives (TCA) au Canada dans le cas d'enfants atteints de paralysie cérébrale (PC) ; identifier les facteurs associés à l'utilisation des TCA. *Méthodes :* Nous avons effectué une étude transversale au moyen des données du Registre canadien de la paralysie cérébrale. Nous avons aussi exploré l'association entre l'utilisation des TCA et des variables régionales, socioéconomiques et phénotypiques liées à la paralysie cérébrale. Qui plus est, nous nous sommes penchés, à l'aide de l'outil *Measures of Process of Care-56* (MPOC-56), sur la perception des parents au sujet des soins cliniques centrés sur la famille. À cet égard, nous avons réalisés des tests du chi carré et obtenu des rapports des cotes (RC) et des intervalles de confiance (IC) à 95 %. Enfin, des tests *U* de Mann-Whitney ont été utilisés afin de comparer entre eux les scores du MPOC-56 obtenus par les utilisateurs de TCA et ceux qui n'y ont pas recourus. *Résultats :* L'échantillon à l'étude se composait de 313 familles dont 27 % d'entre elles ont indiqué avoir eu recours aux TCA au cours de l'année précédente. Les enfants atteints de PC ayant utilisé des TCA étaient plus susceptibles d'habiter dans l'Ouest du Canada (RC 3,3 ; IC 95 % 1,6-6,7), de vivre dans un ménage biparental (RC 3,5 ; IC 95 % 1,5-8,4), de montrer un sous-type ataxique/hypotonique ou dyskinétique de PC (RC 3,0 ; IC 95 % 1,5-6,1) et de souffrir d'un handicap moteur plus important (RC 2,8 ; IC 95 % 1,7-4,9). Finalement, mentionnons que les scores obtenus à la sous-échelle MPOC-56 n'ont pas été notablement associés à l'utilisation de TCA. *Conclusion :* En plus de permettre un accès équitable aux soins pouvant être utiles à chaque enfant, les médecins se doivent donc de connaître les TCA existantes, le niveau de preuve rattaché à leur efficacité (bienfaisance) ainsi que les risques d'événements indésirables qui leur sont associés (non-malfaisance).

Keywords: Cerebral palsy, Pediatric neurology

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INTRODUCTION

Complementary and alternative medicine (CAM) represents a wide range of interventions used in conjunction with, or to replace, conventional medical treatment and care.^{1,2} CAM interventions range from natural products (herbs, vitamins and minerals), to mind and body practices (including yoga, chiropractic intervention, acupuncture, massage therapy, movement therapies and osteopathy) and other therapies (such as folk medicine, Chinese medicine, homeopathy and naturopathy).² Results of the 2012 US National Health Interview Survey reported CAM

use by 12% of the paediatric population.³ CAM use amongst children with chronic medical conditions has been estimated to be three times higher than in healthy peers, with an even higher rate of CAM usage reported amongst children with cerebral palsy (CP).⁴ CP is the leading cause of physical disability in children and is a heterogeneous group of disorders of movement and posture, with multiple associated comorbidities.⁵ Estimates of CAM use amongst children with CP range from 27% to 56%,^{4,6,7} based on regional samples or small samples of older children or adolescents with CP. The factors shown in these studies to be

From the Department of Pediatrics, McGill University, Montreal, QC, Canada (MO, MS); Department of Neurology and Neurosurgery, McGill University, Montreal, QC, Canada (MO, MS); Centre for Outcomes Research and Evaluation, Research Institute of the McGill University Health Centre, Montreal, QC, Canada (PN, AM); Department of Epidemiology, Biostatistics and Occupational Health, McGill University, Montreal, QC, Canada (MZ); Janeway Children's Hospital, St. John's, NL, Canada (DB); Departments of Pediatrics and Clinical Neurosciences, Cumming School of Medicine, University of Calgary, Calgary, AB, Canada (AK); BC Children's Hospital, Vancouver, BC, Canada (ER); IWK Health Centre, Halifax, NS, Canada (EW); and School of Physical and Occupational Therapy, McGill University, Montreal, QC, Canada (AM)

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Correspondence to: Maryam Oskoui, Montreal Children's Hospital, 1001 Décarie Boulevard, Rm B05.2248, Montreal, QC, Canada, H4A 3J1. Email: maryam.oskoui@mcgill.ca

associated with CAM use include parental use of CAM, CP subtype (more specifically, spastic quadriplegia) and more severe motor impairment.^{4,7,8} However, there are gaps in the literature with respect to the discussion of factors linked with CAM use. For instance, in prior studies factors such as household income and parental education have been inconsistently associated with CAM use.^{6,7} Additionally, past studies have not considered the potential association between parents' perceptions of the care received by their child and CAM use. Satisfaction with care has been demonstrated to be important in relation to the use of CAM therapies. A study done by Liptak et al. concluded that the lower families rated their satisfaction for their child's health services the more likely families were to request information on CAM and support from the community.⁹ If parents are not satisfied with the level of care their child is receiving through conventional medical therapy, they may feel they have to take additional steps in order to help their child. This could encourage their willingness to use CAM therapies in hopes to supplement their child's current health care plan.

Furthermore, the healthcare field has gone through significant advancement in addressing the psychosocial facets of medicines resulting in a shift towards emphasising family-centred care (FCC).¹⁰ FCC can be defined as a holistic health care delivery model that aims to strengthen the relationship between health care providers and patient families.¹¹ An important aspect of FCC is the affirmation that health care decisions will be made in a manner that responds to the needs and wants specific to patients and their families.^{10–12} The strengthening of the relationships between families and the health care team are believed to play a vital role in improving perceptions of satisfaction of care.^{11,13} Parents with children with a disability are more likely to experience depression compared with other parents, a large part of this emotional distress is associated with the feelings of helplessness and lack of information and satisfaction about their child's health care.¹⁴ A study conducted by King et al., indicated that there was a significant relationship between more FCC and more satisfaction of health care services and less parental emotional distress.¹² Likewise, results from a systematic literature review by Kuhlthau et al. concluded that evidence in the literature suggests that FCC is associated positively with the satisfaction of health services for children with special health care needs.¹⁵

Given the paucity of evidence for the effectiveness of many CAM interventions for children with CP^{16,17}, the child's health care providers have a role to inform families and set reasonable expectations when making decisions regarding the use of these therapies. However, the majority of the literature available on the epidemiological characteristics of CAM has emphasised that families do not discuss CAM interventions with their care providers.^{4,10,15} Thus, considering the findings illustrating the significant use of CAM, physicians need to be cognizant about their patients' families resorting to alternative treatments.¹⁰ Physicians need to create a positive environment where open dialogue about the safety and efficacy of CAM can take place.¹² However, low ratings of physician knowledge of CAM interventions have been reported.⁹ Knowledge of the factors associated with CAM use could enhance understanding of the potential mediators at play, such as dissatisfaction with health care services or lack of progress for their child with more severe disabilities, and may improve health professionals' ability to contribute to shared decision-making with regards to CAM.

Using data from a population-based registry, with information regarding parental perceptions of the family-centredness of their child's care, this study will provide insight into the use of CAM in young children with CP in Canada. The primary objective of this exploratory study was to describe CAM usage by children with CP in Canada. Our secondary objective was to identify potential factors associated with CAM use, including socioeconomic factors, CP-related impairments and parental perceptions of the family-centredness of their child's health care. We hypothesised that CAM usage would be greater amongst children with more severe CP subtypes and functional profiles, higher socioeconomic status and lower levels of perceived family-centredness of healthcare services.

METHODS

This study utilises data from the Canadian Cerebral Palsy Registry (CCPR), a population-based registry of children with CP. Children are enrolled in the CCPR at the age of 2 and must meet international consensus criteria for CP. The CCPR is a source of rich epidemiological data including pre-, peri- and neonatal CP risk factors, sociodemographic characteristics and phenotypic data. The Registry's methods of case ascertainment, data collection and procedures have been previously described in detail.^{18–20}

For this study, participants were recruited from four CCPR sites: British Columbia (Vancouver), Southern Alberta (Calgary), Newfoundland and Labrador and Nova Scotia over a period of 5 years (2012–2016). Recruited children were born between 2008 and 2014. Data collection at these four sites incorporated the Measure of Processes of Care-56 (MPOC-56) survey and a Health Services Utilization questionnaire in addition to the standard CCPR data collection. The additional data collection was carried out at these four sites during the expansion of the CCPR, funded by the Public Health Agency of Canada. As a result, MPOC data and data on CAM use were only available for CCPR expansion sites. Ethical approval was obtained from the research ethics board of the McGill University Health Centre Research Institute (the CCPR's host institution) and each participating CCPR site.

The MPOC-56 is a 56-item assessment of parental perceptions regarding the family-centredness of the care provided to their child.²¹ King et al. states that the MPOC-56 assessment of family-centredness strongly correlated with the satisfaction of care, it specifically assesses how the respondents experience the behaviours of their health care services which strongly contribute to the "satisfaction" of care received.¹³ The MPOC-56 questionnaire has been validated in parents of children with a neurodevelopmental disability.¹³ The MPOC-56 survey consists of five subscales: (1) Enabling and Partnership, (2) Providing General Information, (3) Providing Specific Information, (4) Comprehensive Care for the Child and Family and (5) Respectful and Supportive Care. The items in each subscale are rated on a Likert scale ranging from 1 – "Not at All" to 7 – "To a Very Great Extent." The MPOC-56 does not yield a total score, but rather scores are obtained for each subscale. Scores can only be calculated for each subscale if two-thirds or more of the subscale items are complete and valid (i.e. responses other than "not applicable").²² The Health Services Utilization survey was developed and used previously within the CP population.²³

It includes items related to sociodemographic factors, medication and intervention history, use of CAM, schooling and use of rehabilitation services. Respondents were asked to identify all CAM interventions their child has used in the past year. Questionnaires were completed onsite or at home and returned by mail.

The primary outcome was the use of CAM in the past year, defined as a binary variable (yes/no). Predictor variables included the province of residence, socioeconomic factors, CP clinical profile, and MPOC. Socioeconomic variables included maternal and paternal level of education (post-secondary vs. secondary or less), maternal and paternal employment status (employed vs. unemployed), annual household income (less than \$40,000/year, \$40,000–\$79,999/year and \$80,000 or more/year) and type of household (single-parent vs. two-parent household). CP phenotypic variables were CP subtype (spastic hemiplegia, spastic diplegia, spastic triplegia/quadruplegia, and other defined as ataxic, hypotonic and dyskinetic subtypes), CP severity was determined by the Gross Motor Function Classification System Level (GMFCS [I–III Ambulant vs. IV–V More severe motor impairment]), presence of cognitive, cortical visual, and sensorineural auditory impairment, epilepsy, communication and feeding difficulties (i.e. gavage, gastrostomy or jejunostomy) and the total number of comorbidities experienced by the child.

Data analysis was conducted using SPSS 24 (IBM Corp. 2016, Armonk, NY, USA). Descriptive statistics were calculated to obtain a profile of the sample. Medians and interquartile ranges (IQRs) were calculated for continuous variables and counts, and proportions were derived for categorical variables. Univariate analyses were used to assess the effect of each predictor on CAM use. Chi-square was used to test sub-group differences for categorical variables. Mann–Whitney *U* test was used to test group differences for non-normally distributed continuous variables. OR and 95% CI were calculated where appropriate. Significance was determined using two-tailed tests, with the probability of type I error of $p < 0.05$. Due to the exploratory nature of this study, a Bonferroni correction was not applied to mitigate the risk of Type II error, thereby allowing for the identification of associations of potential interest for future investigation.²⁴

RESULTS

Characteristics of the Study Population

A total of 336 families were approached for recruitment at the 4 expansion sites, and 313 families enrolled in the CCPR and completed the questionnaires (93%) (Table 1). CAM use in the past 12 months was reported by 27% of the sample. Amongst CAM users, 62% reported using a single CAM intervention and 38% reported using more than one type of CAM intervention. The most frequently reported CAM interventions were massage therapy (21%), chiropractic intervention (17%) and movement therapies such as Feldenkrais and Anat Baniel (8%). Supplemental Table 1 presents all the CAM interventions reported by participants. There were no significant differences identified between single and multiple CAM users.

Families were from British Columbia (41%), Alberta (34%), Nova Scotia (19%) and Newfoundland and Labrador (6%). The majority of families (82%) identified themselves as a two-parent

household, and 36% of families reported an annual household income of more than \$80,000/year. Most mothers (70%) and fathers (59%) had post-secondary education. Fifty percent (50%) of mothers and 85% of fathers were employed.

Regional differences were noted with participants from Western Canada (British Columbia and Alberta) having higher odds of being CAM users (OR 3.3, 95% confidence interval [CI] 1.6–6.7) than those in Atlantic Canada (Nova Scotia, Newfoundland, Labrador). There were no significant differences in CAM use by maternal and paternal education, maternal and paternal employment status or annual household income. A gradient however is noted in the latter, increasing CAM use seen with higher household income. Children with CP from two-parent households had higher odds of being CAM users (OR 3.5, 95% CI 1.5–8.4) than single-parent households. Two-parent households were correlated with other sociodemographic factors, such as being from western provinces and having higher household incomes, but were not correlated with any clinical factors (Supplemental Table 2).

Clinical Profile

Over half of the children were male (54%) (Table 2). The median age at the time of questionnaire completion was 3.00 (IQR 2.3–3.7) years old. Spastic hemiplegia was the most frequently reported CP subtype (35%) and 68% of the sample was ambulant either with or without assistance (i.e. GMFCS I–III).

CAM users were more likely to have an ataxic, hypotonic or dyskinetic CP subtype (OR 3.0, 1.5–6.1) compared with non-CAM users. CAM users were also more likely to be non-ambulant (i.e. GMFCS of IV–V) (OR 2.8, 95% CI 1.7–4.9), and have a visual impairment (OR 2.3 95% CI 1.2–4.5) and communication difficulties (OR 2.0, 95% CI 1.1–3.4) compared to non-CAM users.

MPOC-56 Scores

A total of 282 valid responses were obtained for the MPOC-56 (Table 3). The Respectful and Supportive Care scale was the highest rated with a median score of 6.4 (IQR 5.7–6.9). The Providing General Information scale received the lowest rating with the greatest variability seen in scores (median 4.8, IQR 3.2–6.0). There were no significant differences identified between CAM users and non-users with regards to their scores on the various MPOC subscales.

DISCUSSION

This study draws from a national registry of young children with CP, and incorporates data related to parental perceptions of family-centredness of healthcare services. The findings of this study show a high prevalence of CAM use amongst young children with CP, and suggest that for families with CP, the decision to initiate use of a CAM therapy is associated with the child's level of functional impairment, but also on sociodemographic and environmental factors. Furthermore, parental perceptions of the family-centredness of conventional health services were not associated with CAM use.

Although the province of Quebec was not included in our study, a Canadian study recruiting exclusively in Quebec of

Table 1: Sociodemographic profile of children with CP by the use of CAM

Characteristics	Total (n = 313)	CAM users (n = 86)	CAM non-users (n = 227)	p-value	OR (95% CI)
Province, n (%)					
British Columbia	128 (41%)	45 (35%)	83 (65%)	0.004	^a 3.3 (1.6–6.7)
Alberta	106 (34%)	31 (29%)	75 (71%)		
Nova Scotia	59 (19%)	9 (15%)	50 (85%)		
Newfoundland and Labrador	20 (6%)	1 (5%)	19 (95%)		
Maternal education, n (%)					
More than HS	220 (70%)	66 (30%)	154 (70%)	0.089	1.7 (0.9–3.0)
HS or less	88 (28%)	18 (20%)	70 (80%)		
Missing	5 (2%)	2 (40%)	3 (60%)		
Paternal education, n (%)					
More than HS	186 (59%)	58 (31%)	128 (69%)	0.099	1.6 (0.9–2.7)
HS or less	108 (35%)	24 (22%)	84 (78%)		
Missing	19 (6%)	4 (21%)	15 (79%)		
Mother employed, n (%)					
No	152 (49%)	43 (28%)	109 (72%)	0.668	1.1 (0.7–1.8)
Yes	157 (50%)	41 (26%)	116 (74%)		
Missing	4 (1%)	2 (50%)	2 (50%)		
Father employed, n (%)					
No	21 (7%)	4 (19%)	17 (81%)	0.320	0.6 (0.2–1.8)
Yes	267 (85%)	78 (29%)	189 (71%)		
Missing	25 (8%)	4 (16%)	21 (84%)		
Household income, n (%)					
Less than 40,000/year	86 (27%)	19 (22%)	67 (78%)	0.395	^b 1.3 (0.8–2.2)
40,000–79,000/year	86 (27%)	24 (28%)	62 (72%)		
80,000+/year	114 (36%)	35 (31%)	79 (69%)		
Missing	27 (9%)	8 (30%)	19 (70%)		
Household type, n (%)					
Two-parent	256 (82%)	78 (30%)	178 (70%)	0.004	3.5 (1.5–8.4)
Single-parent	54 (17%)	6 (11%)	48 (89%)		
Missing	3 (1%)	2 (67%)	1 (33%)		

Bold represents a significant *p*-value (less than 0.05).

^aBritish Columbia and Alberta vs. Nova Scotia and Newfoundland and Labrador.

^b\$80,000+/year vs. less than \$80,000/year.

CAM use in adolescents with CP showed similar results with 27% of the sample using CAM interventions.⁶ Other studies in the USA and the UK have shown higher estimates of CAM use amongst children with CP, as high as 56%.⁷ Differences in reported CAM use prevalence can be due to smaller sample sizes in previously reported studies and differences in CP severity, age and study methodology. Furthermore, this may also relate to different health care contexts regarding access to low/no-cost rehabilitation and other health care services. High estimates of CAM use amongst individuals with CP indicates that physicians should be prepared to discuss CAM therapies with families in order to help guide their decisions to initiate use. Physicians could also be prepared to direct families to resources for further information on CAM services.^{25,26}

Our findings also show that families generally find the conventional health services that their child receives to be family-centred. This is supported by another Canadian study, in which families were asked to rate the family-centredness of the clinical services they received, indicating that CAM users and non-users in this sample did not differ significantly with regards to the level of family-centred care received.⁸ Although no association was identified between CAM use and scores on the MPOC-subcales, it is important to note that most participants' ratings for each MPOC-56 subscale were skewed to higher ratings of family-centredness of care. Families were, for the most part, satisfied with the quality and processes of care received in the public health care system. Nonetheless, an important subset elected to also pursue CAM services, often at an added cost.

Table 2: Clinical profile of children with CP by the use of CAM

Characteristics	Total (n = 313)	CAM users (n = 86)	CAM non-users (n = 227)	p-value	OR (95% CI)
Sex, n (%)					
Male	169 (54%)	49 (29%)	120 (71%)	0.515	1.2 (0.7–2.0)
Female	144 (46%)	37 (26%)	107 (74 %)		
Gestational age, n (%)					
Term	148 (47%)	43 (29%)	105 (71%)	0.554	1.2 (0.7–1.9)
Preterm	165 (53%)	43 (26%)	122 (74%)		
Age of child median (IQR)	3.00 (2.3–3.7)	2.8 (2.2–3.4)	3.1 (2.4–3.8)	0.494	–
CP subtype, n (%)					
Spastic hemiplegia	110 (35%)	18 (16%)	92 (84%)	0.001	^a 3.0 (1.5–6.1)
Spastic diplegia	70 (22%)	19 (27%)	51 (73%)		
Spastic tri-/quadriplegia	88 (28%)	29 (33%)	59 (67%)		
Hypotonic, ataxic or dyskinetic	36 (11%)	18 (50%)	18 (50%)		
Missing	9 (3%)	2 (22%)	7 (78%)		
GMFCS, n (%)					
IV–V	87 (28%)	38 (44%)	49 (56%)	p < 0.001	2.8 (1.7–4.9)
I–III	213 (68%)	45 (21%)	168 (79%)		
Missing	13 (4%)	3 (23%)	10 (77%)		
Cognitive impairment, n (%)					
Yes	55 (18%)	15 (27%)	40 (73%)	0.885	1.0 (0.5–2.1)
No/uncertain	175 (56%)	46 (26%)	129 (74%)		
Missing	83 (26%)	25 (30%)	58 (70%)		
Visual impairment, n (%)					
Yes	44 (14%)	19 (43%)	25 (57%)	0.012	2.3 (1.2–4.5)
No	223 (71%)	55 (25%)	168 (75%)		
Missing	46 (15%)	12 (26%)	34 (74%)		
Sensorineural auditory impairment, n (%)					
Yes	34 (11%)	14 (41%)	20 (59%)	0.051	2.1 (1.0–4.3)
No	245 (78%)	62 (25%)	183 (75%)		
Missing	34 (11%)	10 (29%)	24 (71%)		
Communication difficulties, n (%)					
Yes	162 (52%)	54 (33%)	108 (67%)	0.016	2.0 (1.1–3.4)
No	114 (36%)	23 (20%)	91 (80%)		
Missing	37 (12%)	9 (24%)	28 (76%)		
Epilepsy, n (%)					
Yes	103 (33%)	32 (31%)	71 (69%)	0.250	1.3 (0.8–2.1)
No	201 (64%)	50 (25%)	151 (75%)		
Missing	9 (3%)	4 (44%)	5 (56%)		
Feeding difficulties, n (%)					
Yes	39 (12%)	14 (36%)	25 (64%)	0.200	1.7 (0.9–3.4)
No	257 (83%)	67 (26%)	190 (74%)		
Missing	17 (5%)	5 (29%)	12 (71%)		

Bold represents a significant p-value (less than 0.05).

^aHypotonic, ataxic or dyskinetic CP vs. Spastic hemi-, di-, tri- and quadriplegia.

Table 3: MPOC-56 subscale scores by the use of CAM

MPOC-56 subscale median (IQR)	Total (n = 313)	CAM users (n = 86)	CAM non-users (n = 227)	p-value
Enabling Partnership Score (n = 307)	6.1 (5.3–6.8)	6.1 (4.5–6.8)	6.0 (5.5–6.9)	0.066
Providing General Information Score (n = 291)	4.8 (3.2–6.0)	4.6 (3.1–5.8)	4.9 (3.3–6.1)	0.240
Providing Specific Information Score (n = 296)	6.0 (5.0–6.6)	6.0 (5.0–6.6)	6.0 (5.0–6.6)	0.600
Comprehensive and Coordinated Care Score (n = 307)	6.1 (5.3–6.7)	5.8 (4.9–6.7)	6.1 (5.5–6.7)	0.132
Respectful and Supportive Care Score (n = 309)	6.4 (5.7–6.9)	6.3 (5.5–6.9)	6.4 (5.7–7.0)	0.392

Regional variation in the use of CAM has been previously identified in Canada, with individuals in Western provinces (British Columbia and Alberta) being more likely to use CAM compared to those in Eastern provinces (Quebec and Atlantic Canada), as a result of variation in provincial coverage of CAM.²⁷ Furthermore, in a survey of families attending paediatric subspecialty outpatient clinics in Ottawa and Edmonton, regional variation was also identified with significant differences in CAM use identified between the two regions.²⁸ Children from two-parent households were more likely to be CAM users. This could be a result of parents having more time to seek out different resources for their child or having access to higher disposable income or private insurance coverage for CAM therapies. Issues related to access to CAM therapies should be considered when informing and counseling families.

The use of CAM interventions is higher in children with more severe motor disability, which is also correlated with a higher prevalence of comorbidities. A Canadian survey study of children with chronic medical conditions, including CP, found that motor impairment was associated with CAM intervention use.⁸ Similar findings were also seen in adolescents with CP.⁶ Having a profile of children more likely to use CAM therapies could help physicians to identify patients who are potential CAM users and to better tailor their discussions around CAM interventions.

Our survey did not include items related to parental perspectives regarding CAM and parental use of CAM interventions, which has been previously shown to be an important predictor of CAM use in paediatric populations.^{7,29,30} These findings are generalisable to young children with CP, and not to older children with CP as CAM usage may change with age.

CONCLUSION

The American Academy of Pediatrics has published a set of recommendations to assist physicians in counselling families about CAM use for their child with a chronic illness and disability.³¹ They emphasise respecting family-centred care while endorsing treatments in accordance with science and proven experience. Indeed, research into the effectiveness of many CAM therapies is challenging, with poor quality studies and minimal adverse event reporting. Several systematic reviews, including specifically in CP population, are available to help guide

physicians. The four principles of biomedical ethics are also helpful in guiding physicians in this process. These include (1) respect for patient's autonomy (2) non-maleficence (3) beneficence and (4) justice. Given the high prevalence of CAM use amongst children with CP, physicians need to be aware of existing CAM therapies, the level of evidence supporting their efficacy (beneficence), their associated risks of adverse events (non-maleficence) and promote fair access to care that may be of benefit to each child. CAM use in children with CP is multifactorial with regional and sociodemographic factors as well as CP related functional impairments and comorbidities as potential factors influencing decisions to initiate CAM therapy. In dialogues between the physician and families, these factors can be considered in terms of anticipatory guidance in the pursuit of CAM therapies. Understanding the motivation for CAM use, particularly in the context of biomedical ethics principles referenced above can guide physicians to inform and counsel families and better manage their expectations regarding CAM therapies. Families that are optimally informed can better contribute to the shared decision-making process and choose the approach that best meets the needs and goals for their child.

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STATEMENT OF AUTHORSHIP

MO led the study design and conceptualisation, data acquisition, interpretation of data and drafting and revising the manuscript. PN contributed to the data analysis and interpretation and drafting and revising the manuscript. MZ contributed to the interpretation of data and drafting and revising the manuscript. DB, AK, ER, EW and MS contributed to the acquisition of data, and revision of the manuscript for intellectual content. AM contributed to the study design and conceptualisation, interpretation of data and revising the manuscript

SUPPLEMENTARY MATERIAL

To view supplementary material for this article, please visit <https://doi.org/10.1017/cjn.2020.188>.

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