

Title

Complementary and alternative medicine use in Australian children with acute respiratory tract infection - a cross-sectional survey of parents.

ABSTRACT

Background

Acute respiratory tract infection (ARTI) is a prevalent condition associated with serious health and economic implications. A range of strategies is used to manage ARTI in children, including complementary and alternative medicines (CAM). There has been little investigation into this area, and this study aims to address this knowledge gap.

Methods

Primary carers of children aged from 0-12 years that utilised CAM for ARTI were invited to participate in the online survey in 2019. Survey data were analysed descriptively.

Results

The 246 surveyed parents specified the types of CAM frequently used to manage ARTI in their children were home-remedies. Reasons parents reported using CAM were personal-beliefs and positive past-experience with CAM practitioners. Information sources that parents consulted when decision-making were education, naturopaths, and journals.

Conclusion

Parents utilised diverse interventions, with home-remedies dominating the choice. Parents were most likely well-informed. Notably, parents indicated a preference for an integrative healthcare approach.

MANUSCRIPT

BACKGROUND

Parenting is possibly the most significant public health issue confronting a society. (1) Parents are the single most significant variable in childhood illnesses. Children have different health needs to adults. Children's physiology and behaviour differences require distinctive healthcare that considers the rapid developmental change. (2) Commonly children have more illness per year than adults, and one of these is acute respiratory tract infections (ARTI).

Acute respiratory tract infections (ARTI) has a high prevalence rate of five incidences per year in children (3), high level of morbidity, mortality and disease burden in children (4), high demand for and burden on health services. (5-8) ARTI encompasses a large group of symptoms and conditions of the upper and lower respiratory system such as cough, fever, running nose, sore throat, blocked nose (6, 9), as defined in previous studies. (10, 11)

There are a range of strategies currently available for managing ARTI in children. These strategies can be broadly grouped into pharmaceutical treatments (i.e. prescription or over-the-counter medicines) or complementary and alternative medicines (CAM; prescribed, self-prescribed or home remedies). Pharmaceutical treatment options include the use of antipyretics, analgesics (12, 13), antitussives (14) and antibiotics. (15) In the younger child, pharmaceutical treatment options may be somewhat limited as many of these agents are not recommended for children under the age of 5 years. (14, 16-19) As such, CAM treatments (e.g. aromatherapy, vitamins and foods as medicine) might be considered a popular choice for parents of young children (11). Notwithstanding, there is currently limited evidence supporting CAM use in children with ARTI. (20-25)

Parents are often the frontline managers of their child's health. (26, 27) In most cases, parents make decisions on the type of care a child receives (10); this can include the management of a child's illness at home. (28) Indeed, when it comes to CAM use, evidence indicates that parents play an essential role in making decisions regarding the use of CAM in children up to 12 years of age. (28) A survey of 3015 South Australians (29)

found that in households with children (n=659), 42% of parents had prescribed CAM for their child, and less than 8% received prescribed treatment from a CAM therapist. With the increasing prevalence of CAM use, and in particular, the self-prescribing of CAM, it is important to gain insight into why and how parents select CAM for their children. This may assist health practitioners in delivering safe and effective care to children with acute respiratory tract infections.

To date, there has been limited research exploring the role of CAM in children with ARTI; there is also little known about a parent's decision-making process regarding the use of CAM for this condition. Findings from a recent qualitative descriptive study (10) suggest that a parent's use of CAM for childhood ARTI may be explained through internal and external drivers. Lucas et al (11) reported that internal drivers related to personal philosophy, the effectiveness of CAM and past experience with CAM. By contrast, external drivers related to information sources like media, friends and education, as well as physical barriers such as cost, time, lack of government rebates, and palatability of remedies. Safety was another factor influencing a parent's use of CAM, with parents typically utilising a step-down approach, which generally started with CAM, and progressed to biomedical management as needed. Kitchen medicine was identified as the most common form of CAM utilised by this purposive sample of parents. (10)

While such research contributes to our understanding of the role of CAM for childhood conditions, there continues to persist ongoing knowledge gaps in this area. For example, no known research has described at a population level, the CAM management strategies / remedies utilised by parents to manage ARTI in children, or the processes involved in formulating such a decision. In the absence of such research, important questions regarding parent use of CAM for children with ARTI remain unanswered. Our research aims to answer these questions and in turn, address persistent knowledge gaps.

Objectives

The purpose of this research was twofold: (1) identify the CAM management strategies / remedies utilised by parents in the past 12 months to treat ARTI in children aged from 0-12 years, and (2) explore the parental decision-making processes that contribute to the choice of CAM management strategies / remedies used to treat ARTI in children.

METHODS

Study Design

This research used a cross-sectional study design. Ethics approval was granted by the Human Research Ethics Committee of the University of South Australia (ID: 0000035018).

Setting and respondents

The required sample size was based on an estimated target population of 3,974,490 parents of 0-12 year old children who utilise CAM and live in Australia (30, 31). Based on this data, and a $\pm 6\%$ margin of error and 95% confidence interval for any individual item on the questionnaire, a sample size of 267 was required. The inclusion criteria for this research were: (a) primary carer (e.g. mother, father, grandparent or significant others [foster parents, aunts, uncles]) of one or more children aged between 0-12 years, (b) resident of any Australian State or Territory, (c) utilised CAM (either self-prescribed or recommended by a health professional) for the management of ARTI in their children in the past 12 months, (d) have access to the internet, and (e) are able to read and understand written English.

As a means of maximising the number of respondents, several recruitment strategies were undertaken. These strategies included the use of Social media (Facebook groups and pages) and mainstream media (media release, television interview and parenting magazine advertisements). Figure 1 provides an overview of the recruitment strategy. All strategies were linked to a Facebook page or recruitment flyer that contained the survey link (Figure 1). Additionally, the Facebook page and recruitment flyer contained general information about the research and gave the potential respondent an avenue to message the lead researcher.

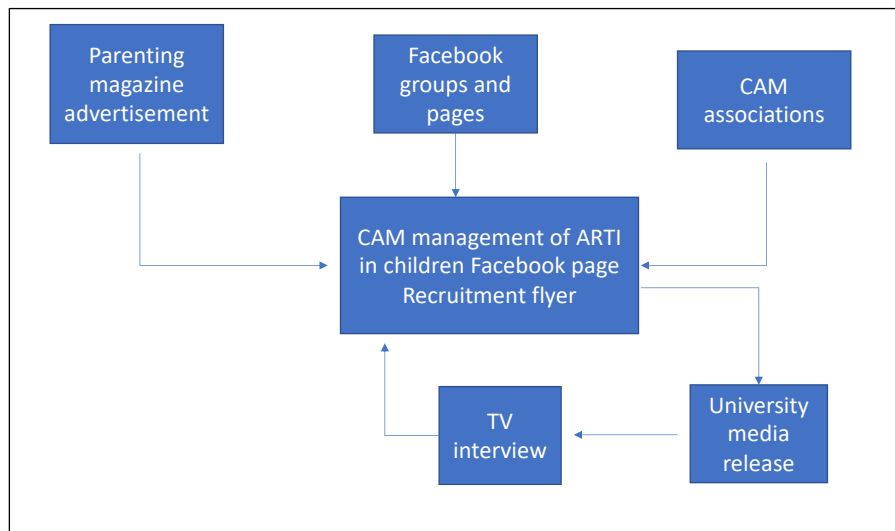


Figure 1. Schematic of the process used to identify and recruit respondents

Survey development

A customised survey instrument was developed for this research. Questions included in the instrument were derived from previous stages of this project (i.e. evidence from a systematic review (11), and themes, codes and quotes from two qualitative studies) (10, 32) Development of the survey instrument was undertaken by the research team using an iterative consultative process, during which the structure and content of the instrument was continually revised. The draft instrument was piloted with a non-probability convenience sample of ten respondents, the aim of which was to obtain feedback on the structure, content, ease of use and completion time. Feedback from these respondents resulted in further refinements to the instrument, including clear descriptions of CAM treatment, and simplification of some questions as well as the response choices. The final instrument comprised of 34 items, including questions about the parent's children (7 items), the parent's use of CAM (10 items), factors influencing the parent's decision-making process (5 items) and parent's demographic data (12 items). The mean completion time of the instrument was 15 minutes.

Data collection and data analysis

The survey was administered using the online LimeSurvey[®] platform. Respondents were required to provide informed consent prior to survey participation. Data were collected between April and July 2019. On completion of the study, survey data were directly downloaded to Microsoft Excel (version 19.29). Data were initially reviewed for completeness and errors, with the "cleaned" version exported into SPSS (version 21) for data analysis. Given the nature of this research, descriptive data analysis was undertaken using SPSS (version 21). Frequency distribution and chi-squared test were used to report categorical data, and the t-test used to report continuous data.

RESULTS

A total of 395 respondents participated in the survey, of which data from only 246 respondents could be used (Figure 2). A large proportion of respondents failed to complete more than 25% of the survey ($n = 147$), with one respondent not providing consent and one respondent not meeting the inclusion criteria. Data from these 149 respondents were excluded from the analyses.

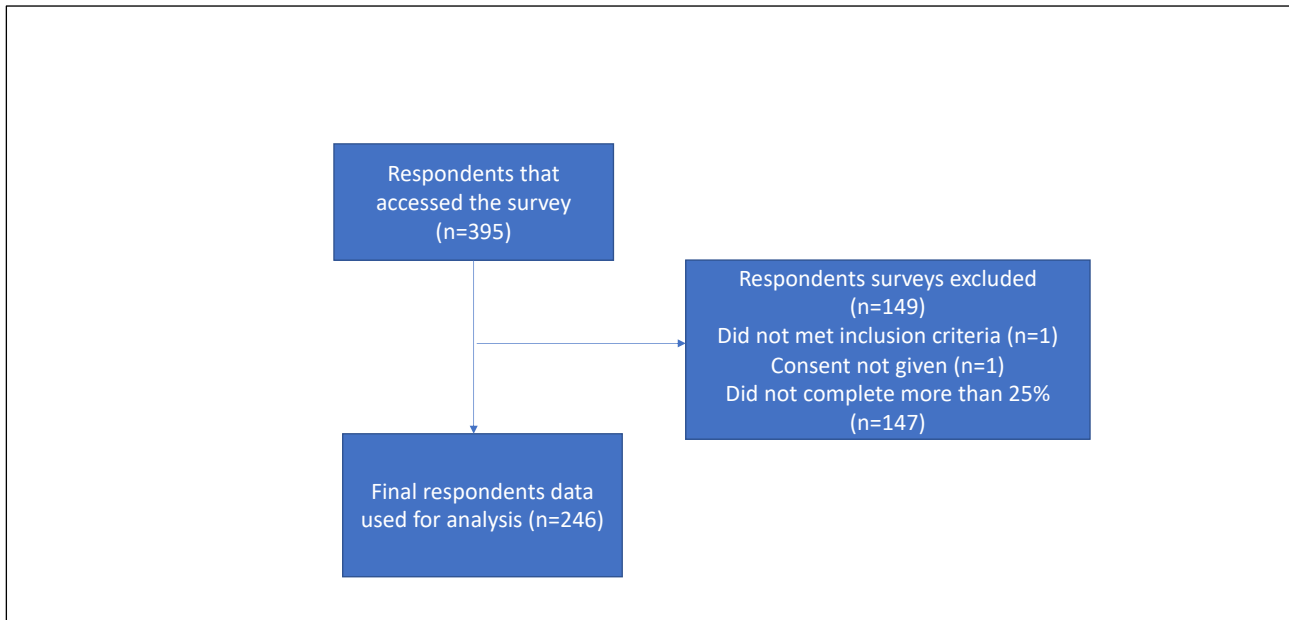


Figure 2. Respondent flow chart

Respondent characteristics

Respondents were predominantly female ($n=220$, 89.4%), with a mean age of 35.3 years (Table 1). Respondents largely lived on the east coast of Australia, within the states of Victoria, New South Wales and Queensland. Most (84%) respondents were tertiary educated, and 54.1% had a gross combined household income over AU\$100,000. The majority of respondents were Caucasian ($n=191$, 85.5%), born in Australia ($n=189$, 84.4%) and lived with their partner and children ($n=196$, 87.6%). With regards to private health insurance, almost half ($n=105$, 46.8%) of respondents had a combination of hospital and extras cover.

Table 1. Demographic characteristics of respondents ($n=246$)

Variable	Category	Result
Gender, n (%)	Female	220 (89.5)
	Male	3 (1.2)
	Prefer not to say	2 (0.8)
	N/A	21 (8.5)
Age (years), mean (SD)		35.2 (13.3)
Location, n (%)	Residential Suburb	130 (58.1)
	Rural	37 (16.5)
	Regional city	32 (14.3)
	Residential city	24 (10.7)
	Remote	1 (0.4)
State currently reside in n (%)	Victoria	98 (43.8)
	Queensland	42 (18.8)
	New South Wales	37 (16.5)
	South Australia	15 (6.6)
	Western Australia	16 (7.1)
	Tasmania	11 (4.9)
	Northern Territory Australian Capital Territory	3 (1.4) 2 (0.9)
Country of birth	Australia	189 (84.4)
	New Zealand	12 (5.5)
	Germany	4 (1.8)
	United Kingdom	4 (1.8)
	India	2 (0.8)
	South Africa	2 (0.8)
	Other	11 (4.9)

Ethnicity	Caucasian/white	191 (85.5)
	European	15 (6.8)
	Asian	5 (2.4)
	Multiracial	4 (1.8)
	Aboriginal/Torres strait Islander	2 (0.8)
	Other	6 (2.7)
Highest qualification, <i>n</i> (%)	Doctorate	14 (6.3)
	Master's Degree	30 (13.4)
	Postgraduate Certificate/Diploma	27 (12.1)
	Bachelor's degree (including Honours)	92 (41.1)
	Associate / Advanced Diploma	25 (11.1)
	Vocational qualifications	15 (6.7)
	Completed Year 12 or equivalence	15 (6.7)
	Less than year 12	2 (0.8)
Other	4 (1.8)	
Household combined annual income (gross before tax) <i>n</i> (%) [AUD]	Below \$30,000	9 (4.1)
	Between \$30,000 and \$79,999	35 (15.4)
	Between \$80,000 and \$99,999	23 (10.3)
	Between \$100 000 and \$149,999	66 (29.5)
	Between \$150,000 and \$199,999	31 (13.9)
	\$200,000 or more	24 (10.7)
	Prefer not to say	36 (16.1)
Private Health Insurance, <i>n</i> (%)	Yes, hospital cover and extras	105 (46.8)
	No	74 (33.0)
	Yes, extras only	27 (12.1)
	Yes, hospital cover only	18 (8.1)
Household occupants, <i>n</i> (%)	Live with a partner and a child/children	196 (87.6)
	Live with a child/children only	18 (8.1)
	Live with a partner, child/children and extended family	7 (3.1)
	Live with child/children and other/s	1 (0.4)
	Other	2 (0.8)

AUD – Australian dollars; N/A – No response

Regarding the children of the parents, there was an even split of male ($n=241$, 49.1%) and female ($n=250$, 50.9%) offspring, with ages ranging from 1 month to 26 years (mean age 7 years, standard deviation 4.3703). One-quarter ($n=130$, 26%) of children had no diagnosed condition, 10.6% ($n=52$) had dermatitis / atopic eczema, 9.6% ($n=47$) had asthma, 6.3% ($n=31$) had anxiety, 2.6% ($n=13$) had autism spectrum disorders and 10.9% ($n=54$) had other conditions. There were 33.4% ($n=164$) children that there was no data regarding diagnosis's. One in five children (19.8%, $n=97$) were on current medication, which included prescription medicines and supplements. The number of years that parents had utilised CAM in their children ranged from 6 months (any condition: $n=2$, 0.8%; ARTI: $n=3$, 1.2%) to the child's whole life (any condition: $n=193$, 78%; ARTI: $n=153$, 62%).

CAM remedies used for the management of ARTI

The CAM interventions used most commonly by parents for the management of ARTI in their children were chest rubs or herbal liniments ($n=167$, 67.9%). This was followed by ingestibles like combined lemon and honey drinks ($n=164$, 66.7%), probiotics ($n=158$, 64.2%) and honey alone ($n=153$, 62.2%). The fifth most frequently used CAM remedy was food (e.g. soups) ($n=148$, 60.2%).

Table 2. CAM remedies utilised for the management of ARTI

Management strategy	Respondents <i>n</i> (%)
Chest rubs or herbal liniments	167 (67.9)
Drink (e.g. lemon and honey)	164 (66.7)
Probiotics	158 (64.2)
Honey	153 (62.2)

Vitamin C (e.g. powder or tablets)	148 (60.2)
Foods (e.g. soup, dhal)	148 (60.2)
Aromatherapy (e.g. eucalyptus oil)	131 (53.3)
Lifestyle change in clothing (e.g. singlets, scarves, hats, coats)	124 (50.4)
Garlic (e.g. food or medicinal tablets or liquids)	122 (49.6)
Lifestyle change in activities (e.g. use of electronics or physical activity [rest])	121 (49.2)
Lifestyle change in environment (e.g. improving bedroom ventilation, removing dust)	114 (46.3)
Over-the-counter medication (e.g. Panadol, Nurofen)	112 (45.5)
Herbal combination	108 (43.9)
Elderflower (e.g. tea or syrup or liquid)	103 (41.9)
Zinc	101 (41.1)
Multi-Vitamin / multi-mineral	100 (40.7)
Echinacea (e.g. tea or syrup or liquid)	97 (39.4)
Homoeopathic remedy	93 (37.8)
Magnesium bath soaks	92 (37.4)
Vaporiser	91 (37.0)
Ginger (food or medicinal tablets or liquids)	85 (34.6)
Vitamin D	63 (25.6)
Prescription medication (pharmaceutical e.g. antibiotics)	60 (24.4)
Fish oil or essential fatty acids	57 (23.2)
Salt lamp	56 (22.8)
Celloids / tissue salts	52 (21.1)
Peppermint (e.g. tea or syrup or liquid)	49 (19.9)
Olive leaf extract	48 (19.5)
Turmeric (e.g. food or drink)	48 (19.5)
Chiropractic treatment	45 (18.3)
Ivy leaf extract	44 (17.9)
Flower Essences	27 (11.0)
Massage therapy/myotherapy	26 (10.6)
Compress, (e.g. chest or leg; herbal or food lemon wrap or potato wrap)	24 (9.8)
Onion and honey syrup	17 (6.9)
Reiki/energy therapy	15 (6.1)
Osteopathic treatment	13 (5.3)
Yarrow (e.g. tea or syrup or liquid)	13 (5.3)
Acupuncture	6 (2.4)
Cupping	5 (2.0)
Moxibustion (Chinese herbal heat stick)	2 (0.8)
Bloodletting (i.e. a traditional Chinese medicine technique to remove a small amount of blood)	1 (0.4)
Over the counter supplement combination (CAM)	1 (0.4)
Gua Sha (Chinese spoons massage)	1 (0.4)
Other*	14 (5.7)

*Other included Andrographis, health food shop herbal remedies, increasing breastfeeding, Movicol, pelargonium, thyme, prayer healing, traditional Chinese medicine blends, colloidal silver, licorice, bloodroot, American ginseng, wild hound and saltwater nebulizers.

Types of health practitioners utilised by parents

Parents consulted a range of health practitioners for the management of their child's ARTI. The most commonly consulted practitioners were naturopaths (n=124, 50.4%), followed by general practitioners (GP) (n=63, 25.6%), chiropractors (n=42, 17.1%) and pharmacists (n=42, 17.1%) (Table 3). However, when it came to the management of any health condition, parents largely consulted general practitioners (n=198, 80.5%), with naturopaths reported as the second most commonly visited practitioner (n=119, 48.4%).

Table 3. Types of practitioners that parent's consulted about their child's ARTI

Type of Health Practitioner consulted	Respondents n (%)
Naturopath	124 (50.4)
General medical practitioner (GP)	63 (25.6)
Herbal medicine practitioner	41 (4.1)
Chiropractor	42 (17.1)
Pharmacist	42 (17.1)
Homoeopath	37 (15.0)
Health Food store Employee	27 (11.0)
Nutritional/diet-based therapist	26 (10.6)
Pharmacy store employee	18 (7.3)
Aromatherapist	13 (5.3)
Kinesiologist	12 (4.9)
Osteopath	11 (4.5)
Traditional Chinese Medicine Practitioner, Acupuncturist or Herbalist	10 (4.1)
Integrative Medicine practitioner	10 (4.1)
Massage therapist	6 (2.4)
Anthroposophic practitioner	6 (2.4)
Reiki/Energy Healer	4 (1.6)
Ayurveda therapist	3 (1.2)

Internal drivers of CAM use in ARTI

Of the 246 respondents, there were 225 responses to this question. The internal drivers refer to the individual's influences on their decision-making, for example, their past experiences. The principal internal driver for parents to utilising CAM for childhood ARTI was personal belief [e.g. belief in a natural cure, treating the underlying cause, boosting the immune system] (n=173, 76.8%), followed by positive past experience with CAM practitioners (n=145, 64.4%). Other internal factors that influenced parent decision making regarding CAM use was the perceived effectiveness of medical treatment (n=101, 44.8%), as well as the individualisation of CAM treatments (n=94, 41.7%) (Figure 3).

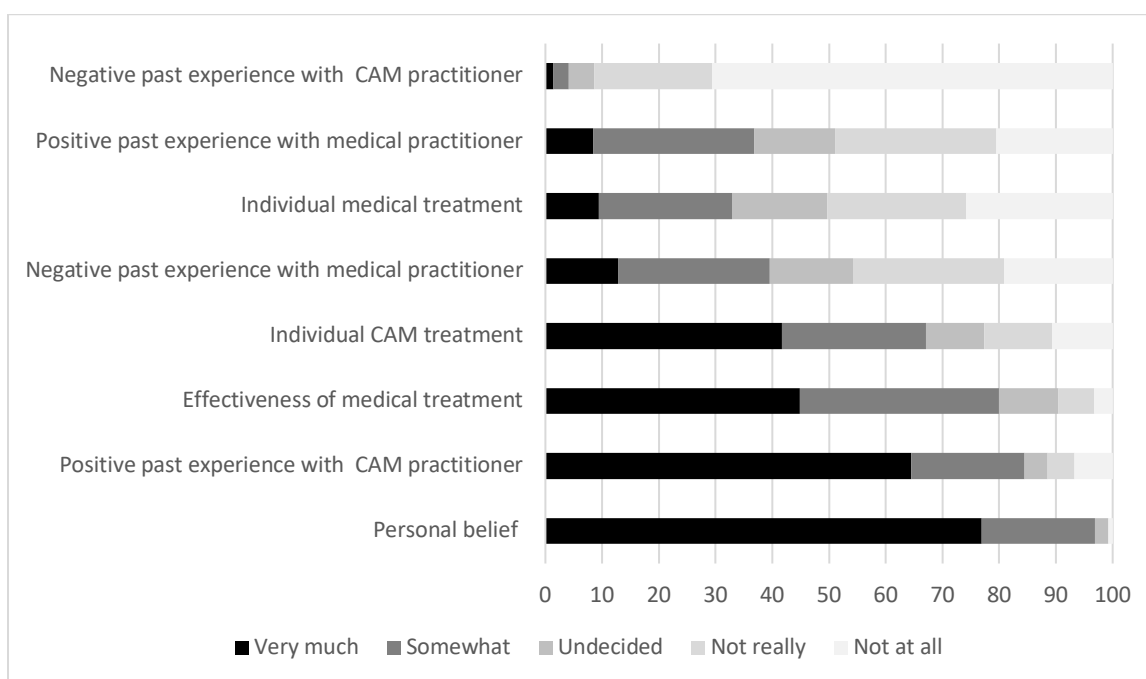
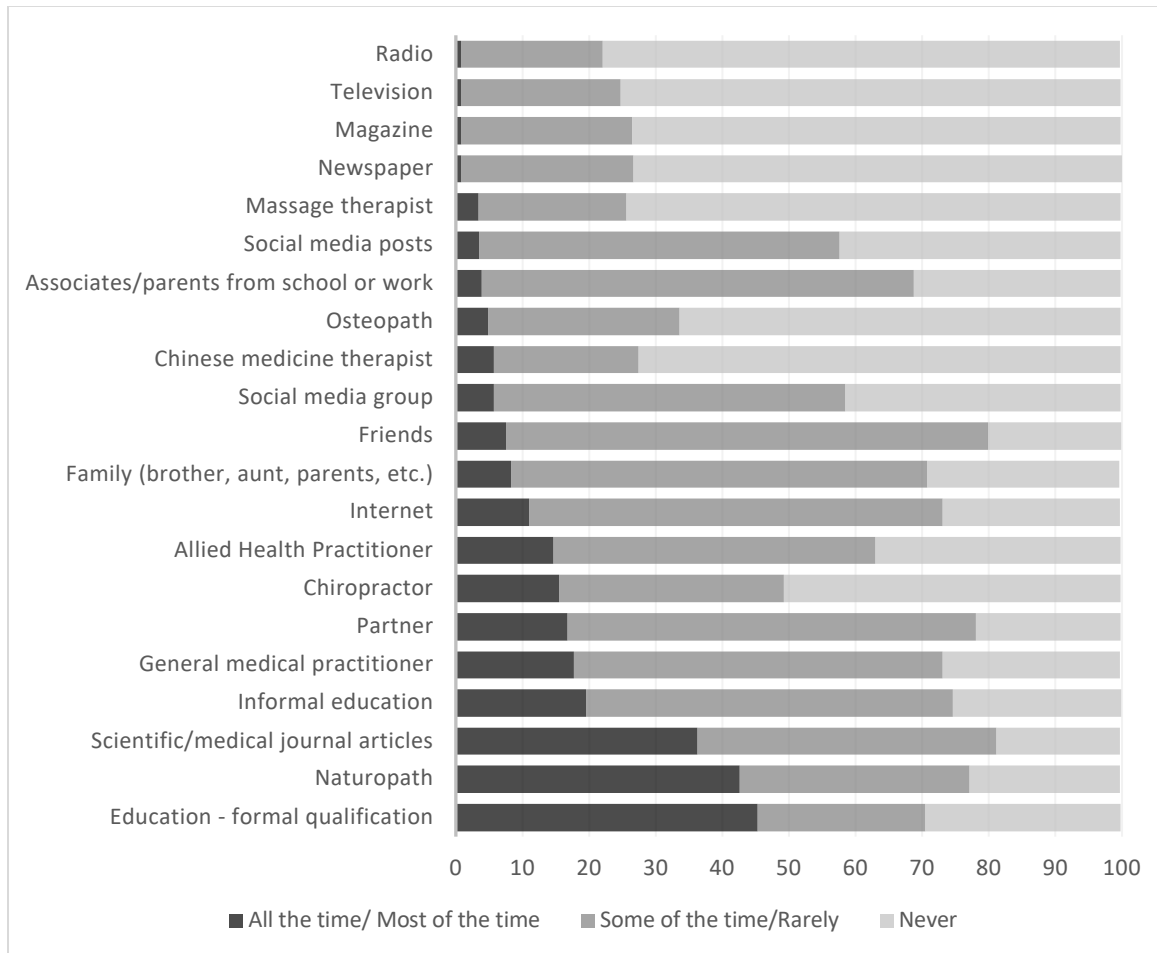


Figure 3. Internal drivers of parent decision-making

External Information sources

Of the 246 respondents, there were 225 responses to this question. External information sources refer to the resources that parents draw information from to inform their decision-making regarding the use of CAM in their child. There was a diverse range of external information sources utilised by parents. The parent’s formal education / qualification was the most frequently used source of information (n=102, 45.3% using this resource all / most of the time) (Figure 4). This was followed by naturopaths (n=96, 42.6% all / most of the time) and scientific/medical journal articles (n=82, 36.3% all / most of the time). Parents sometimes or rarely utilised friends (n=163, 72.4%) and associates/parents from their workplace or their child’s school (n=146, 64.8%) to inform their decision making. Mainstream (traditional) media were the least utilised source of information, including magazines (n=165, 67.1% never using this resource), television (n=169, 68.7%), radio (n=175, 71.7%) and newspapers (n=174, 70.7%).



Figures 4. External information sources used to facilitate parent decision-making regarding CAM use for a child with ARTI

Factors that limit the use of CAM

Cost was the most commonly reported barrier to parents using CAM for their children with ARTI; in particular, the cost of services (i.e. CAM consultations, with 58.3% reporting this as somewhat/very much a barrier) and prescribed treatments (with 50.6% reporting this as somewhat/very much a barrier) (Table 4). Personal costs, such as the cost of behaviour change (e.g. changing a diet) were not an obstacle to CAM use for most respondents (with 77.4% reporting this as not at all/not really a barrier). Similarly, the time required to change behaviours was reported by most (76%) as not at all/not really a barrier to CAM use. Interestingly, two-thirds (67%) of parents believed the taste of remedies was not at all/not really a barrier to using CAM in their child with ARTI.

Table 4. Barriers to using CAM for a child with ARTI

<i>Reasons</i>	<i>Somewhat / Very Much n (%)</i>	<i>Undecided n (%)</i>	<i>Not at all / Not really n (%)</i>
<i>Time required to see a CAM practitioner</i>	73 (32.5)	19 (8.5)	133 (59.0)
<i>Time required to change behaviours (e.g. change diet)</i>	43 (19.2)	11(4.8)	171 (76.0)
<i>Cost of CAM consultations</i>	131 (58.3)	15 (6.6)	79 (35.1)
<i>Cost of CAM prescribed remedies.</i>	114 (50.6)	12 (5.4)	99 (44.0)
<i>Cost of behaviour change (e.g. changing a diet)</i>	40 (17.8)	11 (4.8)	174 (77.4)
<i>Taste of CAM remedies</i>	60 (26.7)	14 (6.3)	151 (67.0)

DISCUSSION

The purpose of this research was to gain an understanding of the types of CAM that Australian parents use for the management of ARTI in their children, as well as the factors that impact this decision-making process. The findings of this research suggest that a diverse range of interventions are used by parents to manage ARTI in children. Despite the diversity of interventions, there was a common thread that seemed to unite these strategies – the focus on home remedies. The use of CAM was driven by both internal factors (i.e. personal philosophy, positive past experience) and external influences (i.e. parents’ formal education, CAM practitioners [i.e. naturopaths], and scientific/medical journals).

The CAM management strategies used most frequently by parents for the management of ARTI in their children were chest rubs, drinks, probiotics, honey, vitamin C, food, aromatherapy, lifestyle changes, garlic and lifestyle change. Of the top ten most frequently reported CAM management strategies, eight were considered to be easily accessible in most homes. For this reason, many of these remedies could be described as home remedies. There is limited research surrounding home remedies. (33). Nevertheless, home remedies were popular in low-income countries with traditional culture and a mixed picture in higher-income countries. (34) Parisius, Stock-Schröer (33) cross-sectional survey found that 80% of respondents used home remedies in Germany for minor illnesses, (the most common symptoms were ARTI related) because of good past experience with home remedies. Home remedies were found to be a standard treatment across Asia for ARTI in a 2018 systematic review (11); as well as in an Australia qualitative study, parents frequently utilised home remedies for ARTI in children. (10) It could be suggested that home remedies are used due to easy access, low cost and perceived effectiveness.

Chest rubs were the most commonly used management strategy for ARTI in children. Given that participating parents drew upon scientific journals to inform their decision making, it is possible that the body of evidence in support of these treatments could have been a driving factor. For example, the use of chest rubs has been previously demonstrated to be an effective treatment for this condition. In a randomised, partially double-blinded study of 138 children, Paul, Beiler (35) reported nocturnal symptomatic relief in children with upper respiratory tract infections (with symptoms that lasted seven or more days) when using five millilitres (mls) of vapour rubs before bed. The children improved by the second night. Similarly, many of the foods used as medicine in children with ARTI have been supported by clinical research, including lemon and honey drink (11), honey (23, 36-38), garlic (20) and soups (10, 39). The ready and immediate access to and availability of these remedies also might explain the popularity of these treatments.

Personal belief systems were an important driver for why participating parents elected to use CAM for the management of their child’s ARTI. In the context of this study, these belief systems referred to an individual’s health beliefs and their underlying philosophy of wellbeing. (10) This finding aligns with previous research, which has consistently identified personal values as a key determinant of CAM use. (40-42) The link between beliefs and behaviour is called the theory of planned behaviour, and it refers to influences on decision-making. Furthermore, Kidwell and Jewell (43) discuss the theory of planned

behaviour that links a person's beliefs to behaviour, influencing their decision-making. This theory appears to apply to this population.

A parent's educational status was also identified as a key factor influencing the use of CAM in children with ARTI. To some extent, this finding was not surprising given the plethora of studies already reporting a positive correlation between the level of education and CAM use. (44-46) The educational status may influence on CAM usage due to graduates obtaining greater information literacy, higher income, and critical thinking skills. Consistent with other populations (10, 47), education status and personal philosophy also appear to be important pull factors toward CAM for Australian parents.

Currently, the literature discusses the primary health information sourced from either GP (44, 46) or CAM practitioners (10, 48). Naturopaths were an influential source of information, and this could be due to them being the second largest CAM practitioners in Australia (49) as well as their popularity. In Australia, naturopaths are one of the top five CAM practitioners consulted by 6.2% of adults. (50, 51) These findings might correspondingly indicate there is no one singular source of information and CAM consumers might use several sources when making health care decisions.

Why Australian parents chose to self-prescribe CAM may partly to do with the prohibitive costs associated with accessing CAM for their children, which has been supported by previous research. (52) CAM practitioners seem to be aware of this issue and have addressed it using novel means such as using dietary remedies and decreasing the amount of remedies prescribed. (32) However, the CAM self-prescribing strategy might be a false economy as, over the long term, the burden of care might be inadvertently shifted to other health practitioners. (53)

While some have suggested that CAM users may have a negative perception of biomedicine (47), this research did not support this notion. Parents' in this research reflected a desire for a nuanced and integrated approach where health practitioners, biomedical and CAM, work together. These findings are consistent with other research which have explored the use of CAM and biomedicine. (12, 54, 55), and oppose the popular notion of "us versus them" when describing CAM and biomedicine, when, in fact, the reality reflects a more integrated approach by parents of children with ARTI.

Limitations

As with any research, there are limitations to this study as well. Given that this research was focussed on Australian, English-speaking parents, generalisability of these findings to a global context is limited. This is particularly important as CAM is widely practised in various parts of the world where English is not the first language. As the survey was disseminated through electronic means, it is likely that those without access to a computer or the internet could not participate.

Given that there are no centralised access points to parents of children with ARTI, this recruitment strategy was the most feasible and practical. Given the breadth and depth of the survey, respondent burden was likely. For example, some respondents completed 32 questions then stopped, with the final four questions regarding decision-making not answered by 8% of respondents. Finally, while the final sample size was smaller than anticipated, it was similar to or greater than the sample sizes of other CAM surveys (56-59). Notably, respondents who did complete the survey in full appeared to have similar demographic characteristics to the typical CAM consumer, including similar age, sex, education level, and income (44, 45, 60)

CONCLUSION

This research has provided new insights into Australian parents' self-reported use of CAM, and the drivers of CAM use, for children with ARTI. Easily accessible and readily available home remedies seem to be the first port of call for many parents. However, contrary to the view that CAM users are anti-mainstream medicine, participating parents reportedly engaged with both CAM and biomedicine for the management of ARTI in their child. A parent's decision to use CAM was primarily underpinned by, and informed from, their own educational background, as well as consultation with a trained health practitioner and the scientific literature, with minimal reliance on the media. These decisions were superimposed by a parent's personal

philosophy and belief systems, and their past experiences of engaging with CAM. Collectively, these findings highlight a rich, diverse and yet considered approach by parents when choosing to engage with CAM for their child's ARTI, which brings together the strengths of CAM as well as biomedicine.

List of Abbreviations

ARTI - acute respiratory tract infection
CAM - complementary and alternative medicine
GP - general medical practitioner
TCM - traditional Chinese medicine

References

1. Hoghugh M. The importance of parenting in child health. *BMJ clinical evidence*. 1998;316(7144):1545-50.
2. National Research Council (US). *Children's Health, The Nation's Wealth: Assessing and Improving Child Health*. (US) IoM, editor. Washington (DC): National Academies Press (US); 2004.
3. Chonmaitree T, Revai K, Grady JJ, Clos A, Patel JA, Nair S, et al. Viral upper respiratory tract infection and otitis media complication in young children. *Clinical Infectious Disease*. 2008;46:815–23.
4. GBD 2016 Causes of Death Collaborators. Global, regional, and national age-sex specific mortality for 264 causes of death, 1980–2016: a systematic analysis for the Global Burden of Disease Study 2016. *The Lancet*. 2017;390:1151-210.
5. Cabral C, Lucas PJ, Ingram J, Hay AD, Horwood J. "It's safer to ..." parent consulting and clinician antibiotic prescribing decisions for children with respiratory tract infections: An analysis across four qualitative studies. *Social Science & Medicine*. 2015;136–137(0):156-64.
6. Cabral C, Ingram J, Lucas PJ, Redmond NM, Kai J, Hay AD, et al. Influence of Clinical Communication on Parents' Antibiotic Expectations for Children With Respiratory Tract Infections. *Annals of Family Medicine*. 2016;14(2):141-7.
7. Leder K, Sinclair MI, Mitakaki TZ, Hellard ME, Forbes A, Fairley CK. A community-based study of respiratory episodes in Melbourne, Australia. *Australian and New Zealand Journal of Public Health*. 2003;27(4):399-404.
8. Nyquist A-C, Gonzales R, Steiner JF, Sande MA. Antibiotic Prescribing for Children With Colds, Upper Respiratory Tract Infections, and Bronchitis. *JAMA*. 1998;279(11):875–7.
9. Zeng L, Zhang L, Hu Z, Ehle EA, Chen Y, Liu L, et al. Systematic Review of Evidence-Based Guidelines on Medication Therapy for Upper Respiratory Tract Infection in Children with AGREE Instrument. *PLoS ONE*. 2014;9(2).
10. Lucas S, Kumar S, Leach MJ, Phillips A. Parent use of complementary medicine remedies and services for the management of respiratory tract infection in children: a qualitative study. *Journal of Multidisciplinary Health Care*. 2019;12:749-66.
11. Lucas S, Leach M, Kumar S. Complementary and alternative medicine utilisation for the management of acute respiratory tract infection in children: A systematic review. *Complementary Therapies in Medicine*. 2018;37:158-66.
12. Little P, Moore M, Kelly J, Williamson I, Leydon G, McDermott L, et al. Ibuprofen, paracetamol, and steam for patients with respiratory tract infections in primary care: Pragmatic randomised factorial trial. *British Medical Journal*. 2014;348(7949):13.
13. (NICE) NiOHaCE. Fever in under 5s: assessment and initial management- Clinical Guidelines [CG160] 2013 [updated August 2017. Available from: <https://www.nice.org.uk/guidance/cg160/chapter/1-Recommendations#antipyretic-interventions-2>.
14. Isbister GK, Prior F, Kilham HA. Restricting cough and cold medicines in children. *Journal of Paediatrics and Child Health*. 2012;48(2):91-8.
15. McCullough AR, Pollack AJ, Plejdrup Hansen M, Glasziou PP, Looke DFM, H.C. B, et al. Antibiotics for acute respiratory infections in general practice: comparison of prescribing rates with guideline recommendations. *Medical Journal Australia*. 2017;207(2):65-9.

16. Weinberger M, Hendeles L. Nonprescription medications for respiratory symptoms: Facts and marketing fictions. *Allergy and Asthma Proceedings*. 2018;39(3):169-76.
17. Aono M, Bukirwa C, Luyinda E, Ochwo C, Nsambu E, Namugonza S, et al. Medicine use practices in management of symptoms of acute upper respiratory tract infections in children (≤ 12 years) in Kampala city, Uganda. *BMC Public Health*. 2017;17(1):1-8.
18. Therapeutic Goods Administration. Cough and Cold medicines for children-Change: Australian Government; 2012 [Behind the news]. Available from: <https://www.tga.gov.au/behind-news/cough-and-cold-medicines-children-changes>.
19. Centers for Disease Control (CDC). Infant deaths associated with cough and cold medications--two states, 2005. *MMWR Morb Mortal Weekly Report*. 2007;56(1):1-4.
20. Sobenin I, Andrianova I, Sereda E, Borodina L, Karagodin V, Orekhov A. The effects of time release garlic powder tablets on acute respiratory disease in children. *Medical and Science Journal*. 2011;9(5):31-7.
21. Rennard BO, Ertl RF, Gossman GL, Robbins RA, Rennard SI. Chicken Soup Inhibits Neutrophil Chemotaxis In Vitro. *Chest*. 2000;118(4):1150-7.
22. Saketkoo K, Januszkiewicz A, Sackner MA. Effects of drinking hot water, cold water, and chicken soup on nasal mucus velocity and nasal airflow resistance. *Chest*. 1978;74(4):408-10.
23. Ahmadi M, Moosavi S, Zakeri S. Comparison of the effect of honey and diphenhydramine on cough alleviation in 2-5-year-old children with viral upper respiratory tract infection. *Journal of Gorgan University of Medical Science*. 2013;15(2):8-13.
24. Ulbricht C, Basch E, Cheung L, Goldberg H, Hammerness P, Isaac R, et al. An evidence-based systematic review of elderberry and elderflower (*Sambucus nigra*) by the Natural Standard Research Collaboration. *Journal of Dietary Supplements* 2014;11(1):80-120.
25. Holzinger F, Chenot J-F. Systematic Review of Clinical Trials Assessing the Effectiveness of Ivy Leaf (*Hedera Helix*) for Acute Upper Respiratory Tract Infections. *Evidence-Based Complementary and Alternative Medicine* 2011;9.
26. De Clercq E, Ruhe K, Rost M, Elger B. Is decision-making capacity an "essentially contested" concept in pediatrics? *Medicine, Health Care, and Philosophy*. 2017;20(3):425-33.
27. Dare T. Parental rights and medical decisions. *Pediatric Anesthesia*. 2009;19(10):947-52.
28. Lim AG, Cranswick N, Skull S, South M. Survey of complementary and alternative medicine use at a tertiary children's hospital. *Journal of Paediatrics and Child Health*. 2005;41(8):424-7.
29. MacLennan A, Myers S, Taylor A. The continuing use of complementary and alternative medicine in South Australia: costs and beliefs in 2004. *Medical Journal Australia*. 2006;184(1):27-31.
30. Xue CC, Zhang AL, Lin V, Story DF. Complementary and alternative medicine use in Australia: a national population-based survey. *Journal of alternative and complementary medicine* 2007;13(6):643-50.
31. Armstrong A, Thiébaud S, Brown L. Australian adults use complementary and alternative medicine in the treatment of chronic illness: a national study. *Australian and New Zealand Journal of Public Health*. 2011;35(4):384-90.
32. Lucas S, Leach MJ, Kumar S, A.C. P. Complementary And Alternative Medicine Practitioner's Management Of Acute Respiratory Tract Infections In Children – A Qualitative Descriptive Study. *Journal of Multidisciplinary Health Care*. 2019;12:947-62.
33. Parisius LM, Stock-Schröer B, Berger S, Hermann K, Joos S. Use of home remedies: a cross-sectional survey of patients in Germany. *BMC family practice*. 2014;15:116.
34. Sebo P, Haller D, Sommer J, Excoffier S, Gaboreau Y, Maisonneuve H. General practitioners' perspectives on the use of nonpharmacological home remedies in two regions in Switzerland and France. *Swiss medical weekly*. 2018;148:w14676.
35. Paul IM, Beiler JS, King TS, Clapp ER, Vallati J, Berlin CMJ. Vapor rub, petrolatum, and no treatment for children with nocturnal cough and cold symptoms. *Pediatrics*. 2010;126(6):Paul, I. M., Beiler, J. S., King, T. S., Clapp, E. R., Vallati, J., & Berlin, C. M., Jr (2010). Vapor rub, petrolatum, and no treatment for children with nocturnal cough and cold symptoms. *Pediatrics*, 126(6), 1092-9. doi:10.542/peds.2010-1601.
36. Tharakan T, Bent J, Tavaluc R. Honey as a Treatment in Otorhinolaryngology: A Review by Subspecialty. *Annals of Otolaryngology, Rhinology & Laryngology*. 2019;128(3):193-207.

37. Paul IM, Beiler J, McMonagle A, Shaffer ML, Duda L, Berlin CMJ. Effect of honey, dextromethorphan, and no treatment on nocturnal cough and sleep quality for coughing children and their parents. *Archives of Pediatrics and Adolescent Medicine*. 2007;16(12):140-1146.
38. Cohen HA, Rozen J, Kristal H, Laks Y, Berkovitch M, Uziel Y, et al. Effect of honey on nocturnal cough and sleep quality: a double-blind, randomized, placebo-controlled study. *Pediatrics*. 2012(3):465-71.
39. Lucas S, Kumar S, Leach M. Use of complementary and alternative medicine in children: research opportunities and challenges in an ever growing field. *Australian Journal of Herbal Medicine*. 2015;27(4):136-41.
40. Bishop FL, Yardley L, Lewith GT. A systematic review of beliefs involved in the use of complementary and alternative medicine. *Journal of Health Psychology*. 2007;12(6):851–67.
41. Astin JA. Why Patients Use Alternative Medicine Results of a National Study. *JAMA* 1998;279(19):1548-1553 doi:10.1001/jama.279.19.1548. 1998;279(19):1548-53.
42. Lindeman M. Biases in intuitive reasoning and belief in complementary and alternative medicine. *Psychology and Health*. 2011;26(3):371-82.
43. Kidwell B, Jewell R. The influence of past behavior on behavioural intent: an information-processing explanation. *Psychology and Marketing*. 2008;25:1151-66.
44. Eardley S, Bishop FL, Prescott P, Cardini F, Brinkhaus B, Santos-Rey K, et al. A systematic literature review of complementary and alternative medicine prevalence in EU. *Forsch Komplementmed*. 2012;19(Suppl 2):18-28.
45. Leach MJ, Lauche R, A.L. Z, Cramer H, Adams J, Langhorst J, et al. Characteristics of herbal medicine users among internal medicine patients: A cross-sectional analysis. *Journal of Herbal Medicine*. 2017;10:59-63.
46. Frass M, Strassl RP, Friehs H, Müllner M, Kundi M, Kaye AD. Use and Acceptance of Complementary and Alternative Medicine Among the General Population and Medical Personnel: A Systematic Review. *The Ochsner Journal*. 2012;12(1):45-56.
47. McLaughlin D, Lui C-W, Adams J. Complementary and alternative medicine use among older Australian women - a qualitative analysis. *BMC Complementary Alternative Medicine*. 2012;12:34.
48. Robinson A, Cooper S. Trusted Information Sources: The Preferred Option for Complementary and Alternative Medicine Users. *Complementary Health Practice Review*. 2007;12(2):120-38.
49. Leach MJ. Profile of the complementary and alternative medicine workforce across Australia, New Zealand, Canada, United States and United Kingdom. *Complementary Therapies in Medicine*. 2013;21:364-78.
50. Wardle J, Steel A, Casteleijn D, Bowman D. An evidence-based overview of naturopathic practice in Australia. *Australian Journal of Herbal and Naturopathic Medicine*. 2019;31(1):9-13.
51. Steel A, McIntyre E, Harnett J, Foley H, Adams J, Sibbritt D, et al. Complementary medicine use in the Australian population: Results of a nationally-representative cross-sectional survey. *Science Reports*. 2018;8(1):17325–.
52. Mühlbacher AC, Bethge S, Reed SD, Schulman KA. Patient Preferences for Features of Health Care Delivery Systems: A Discrete Choice Experiment. *Health Services Research*. 2016;51(2):704–27.
53. Leach MJ, Steel A. The potential downstream effects of proposed changes in Australian private health insurance policy: The case for naturopathy. *Advances in Integrative Medicine*. 2018;5:48-51.
54. McCaffrey AM, Pugh GF, O'Connor BB. Understanding patient preference for integrative medical care: results from patient focus groups. *Journal of general internal medicine*. 2007;22(11):1500-5.
55. Templeman K, Robinson A. Integrative medicine models in contemporary primary health care. *Complementary Therapies in Medicine*. 2011;19(2):84-92.
56. Puataweepong P, Sutheechet N, Ratanamongkol P. A Survey of Complementary and Alternative Medicine Use in Cancer Patients Treated with Radiotherapy in Thailand. *Evidence-Based Complementary and Alternative Medicine*. 2012;2012:670408–.
57. Adams D, Whidden A, Honkanen M, Dagenais S, Clifford T, Baydala L, et al. Complementary and alternative medicine: a survey of its use in pediatric cardiology. *CMAJ open*. 2014;2(4):E217–24.
58. Truter I, Naidoo R, Sewpersad A, Muller N, Magwala S, Kabasa B. Complementary and Alternative Medicine in the Management of Pain: A South African Community Survey. *Value in Health*. 2017;20(9):A547–A.

59. Ferry P, Johnson M, Wallis P. Use of complementary therapies and non-prescribed medication in patients with Parkinson's disease. *Postgraduate Medical Journal*. 2002;78(924):612-4.
60. Frass M, Strassl RP, Friehs H, Mullner M, Kundi M, Kaye AD. Use and acceptance of complementary and alternative medicine among the general population and medical personnel: a systematic review. *Ochsner Journal*. 2012;12(1):45-56.