



## Resources used and trusted regarding child health information by culturally and linguistically diverse communities in Australia: An online cross-sectional survey

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### ABSTRACT

**Background:** Parents' play a proactive role in seeking health information to ensure optimal growth and development for their children. To date, very little is known about the differences between information seeking behaviour for child health and engagement with resources between culturally and linguistically diverse (CALD) and non-CALD parents.

**Objective:** To investigate the differences in resources used and trusted for information related to child health behaviours and engagement with online features among CALD and non-CALD respondents in Australia.

**Methods:** An analysis of a theory informed online cross-sectional survey was conducted using data from 122 CALD and 399 non-CALD parents who had a child younger than 24 months or were currently pregnant in Australia. Descriptive statistics and chi-squared were used to compare the differences, and logistic regression models were used to identify factors associated with using health resources.

**Results:** The most trusted sources for information reported by respondents were health professionals (76.2 %), websites run by health professionals (59.5 %), and government websites (53.2 %). Social media was significantly more trusted as a source of information for child health behaviours among CALD respondents than non-CALD respondents (odds ratio (OR) 1.92,  $P = 0.01$ ). In contrast, booklets/ pamphlets and friends were significantly more trusted by non-CALD parents than for CALD parents (OR 0.54,  $P = 0.02$ ). General search engines were used very frequently among CALD respondents for child health information (39.3 % vs 24.1 %,  $p = 0.013$ ). Overall, the most common features respondents enjoyed on websites were images (81 %), videos (40.1 %), and discussion forums (39.9 %). CALD respondents significantly favoured videos ( $p = 0.003$ ) while non-CALD respondents preferred obtaining information through attachments ( $p < 0.001$ ).

**Conclusions:** Despite parents' reporting health professionals, websites run by health professionals, and government websites as trustworthy, general search engines and social media were still the most frequently used information source for parents with young children. Credible resources parents deem as trustworthy should take into account effective and engaging means of disseminating information that are accessible to both CALD and non-CALD communities.

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## 1. Introduction

The first 2000 days of life is foundational for a child's physical, social, emotional and cognitive wellbeing [1–2]. Parents' abilities to make informed decisions for their children's early exposure to different health behaviours are important in mediating the impact of several developmental and health conditions such as childhood obesity [3].

Traditionally, parents have been noted as active health information seekers reflecting their roles as caregivers for their family members [4–6]. Thus, parents' selection of health information resources is a crucial element in guiding decisions around child health. A 2020 systematic review reported that parents predominantly use the internet for health information related to their child [7]. Parents face difficulties in assessing the trustworthiness of websites and, concerning, often find unreliable information to be helpful in aiding health-related decisions for their child [7]. Additionally, previous studies have shown that migrants and ethnic minority communities frequently use unreliable resources for health information due to the additional language barriers they face accessing trustworthy sources [8–9]. This is problematic given that delayed access to credible sources and healthcare services in early life may lead to poor health outcomes which set children on a lifelong negative health trajectory [10].

Globally, high income countries, including Australia, are experiencing an ongoing increase in immigration flow and growth of culturally and linguistically diverse (CALD) communities [11]. Approximately 3.6 % of the world's population currently live in a country other than their countries of birth [12]. In 2021, 26 % of Australia's population were born overseas and one-fifth spoke a language other than English at home [13].

In the first few years post-migration to Australia, CALD communities have lower rates of obesity, high blood pressure, and overall mortality compared to the Australian-born population [14]. However, this health advantage, commonly referred to as the "healthy migrant effect", appears to deteriorate over time [14]. This may be caused by the health disparities that CALD communities experience due to language barriers, social disconnection, low socio-economic status, lack of cultural relatedness, and limited health literacy in the country of migration [14–15]. A 2022 scoping review exploring CALD populations' access to health services in the Australian universal health care system found that people of CALD backgrounds had limited access to resources and low use of health services leading to unmet healthcare needs [16]. This was attributed to a lack of awareness of existing health services, miscommunication with health professionals, and poor availability of multilingual health materials [16]. An Australian qualitative study reported significant barriers to effective navigation and use of health services among CALD communities given the complexity of the Australian health system, lack of culturally competent health professionals, and poor health literacy [17]. Such barriers can influence CALD communities to resort to other sources for health information that are of questionable credibility [18]. Thus, CALD community members need to rely on their own judgment to differentiate between credible and non-credible sources and the quality of the information found.

To date, credible health websites are still very text-dominant with a general readability score above the recommended Australian reading level (Grade 8 or lower) [19]. A 2022 global systematic assessment of 66 websites that promote infant health behaviours found that the online written information had a high median readability score of Grade 8.5 [20]. Furthermore, only 21 % of websites had a multilingual option and 14 % presented information that addressed culture in texts or images [20]. This is particularly difficult for CALD communities with limited English proficiency where research has shown the benefits of visual multimedia-based information such as animation, audio, and infographics in aiding migrants who face literacy challenges in understanding online information [19,21–22].

These barriers to accessing reliable health sources limit CALD communities' abilities to make informed health decisions for themselves and

their families. This in turn can impact child-rearing practices around nutrition, sleep, play, and overall development resulting in disruptions that can persist far into adulthood and lead to lifelong impairments [23–25].

Considering the challenges to accessing reliable health resources by CALD communities and the limited research on parents' general health information seeking, there is a need to explore what resources and online features CALD parents' turn to for general child health information, specifically in the Australian context. The aim of this study therefore was to explore differences in resources used and trusted for information related to child health behaviours (nutrition, sleep, and play) and engagement with online features between CALD and non-CALD communities living in Australia.

## 2. Methods

### 2.1. Study design

An online cross-sectional survey was administered to parents of young children or currently pregnant women between February and May 2022. The survey was distributed through several social media platforms. The survey data were collected using an online survey designed on REDCap (Research Electronic Data Capture) project system [26].

### 2.2. Study participants

Study participants were eligible if they were currently pregnant or had a child younger than 24 months, aged 16 years and over, lived in Australia, were capable of reading and writing English, and able to provide electronic consent.

Participants were recruited through flyers that were advertised on social media platforms of various early childhood organisations, such as Raising Children's Network, Karitane, Inner West Mums, and Tresillian. Additionally, a Facebook page named Parent Research Connection was used to conduct targeted advertisement based on culture, sex, age, interests, and location (Socio-Economic Indexes for Areas) [27], and has been shown to be an effective recruitment method [28].

### 2.3. Survey data

The survey questionnaire was developed using a theory-informed stepwise approach by mapping the questions to the Capability, Opportunity, Motivation, Behaviour (COM-B) and Self-determination theory (SDT) models to achieve a robust and comprehensive understanding of parents' behaviour. Behaviour change models such as the COM-B and SDT, provide a basis for understanding behaviour changes [29–33]. The COM-B model proposes that behaviour is influenced by interactions between physical and social opportunity, physical and psychological capability, and autonomous and reflective motivation. While the SDT model provides a comprehensive theoretical framework through which to understand motivated behaviour by addressing needs for competence, autonomy, and relatedness [31–33]. These models are effective in systematically guiding the development of tools and interventions [29–33].

This study is part of a larger survey that consisted of 26 multiple choice research questions and 14 demographics questions. The overall survey data consisted of multiple questions pertaining to survey respondents' sources of information for child health behaviours (e.g., nutrition, sleep, and active play) and confidence/ barriers in using the internet to search for child health information. This study particularly focussed on the survey questions that explored resources trusted for information related to child health behaviours and participants *capability* and *opportunity* to search and access this information, basic demographics, frequency of using online resources to access child health information and *motivation* behind their resource selection and engagement with online features (Appendix 1). The survey items were

sourced from other surveys and slightly amended to suit our study aims [6,34–36].

The survey respondents were categorised according to whether they were born in a non-English speaking country or spoke a language other than English at home (CALD) in comparison to the others (non-CALD). All completed surveys were de-identified and kept confidential electronically. To assess the overall clarity of the survey questions and identify any gaps or failures in the survey instrument, a pilot test was conducted with 5 parents of young children eligible for study participation. Their data were not included in the final analysis.

#### 2.4. Ethical considerations

This project was approved by the Ethics Review Committee (RPAH Zone) of the Sydney Local Health District (X21-0351). All survey respondents were provided with the participant information sheet using the format specified by the committee. They demonstrated their agreement to participate by signing the e-consent form on the first page of the survey before continuing with the survey questions. All participants were notified that they had the right to refuse to participate and could subsequently withdraw from the survey at any time.

#### 2.5. Data analysis

Statistical analyses were conducted using SPSS 27 [37]. Descriptive statistics and chi-squared tests were conducted to investigate the differences between CALD and non-CALD respondents in relation to (i) other demographic characteristics, (ii) sources they trusted and used for information on child health behaviours, (iii) frequency of online platform usage, and (iv) engagement with online features. Frequencies were categorised and proportions were compared between the two groups using Pearson chi-squared tests or Fisher exact tests as appropriate.

To examine whether CALD status was an independent factor associated with trusted sources for information related to child health behaviours we firstly ran a crosstab analysis and removed those sources with P values > 0.25. Secondly, we developed three logistic regression models for trusted sources, i.e. booklets/pamphlets, social media, and friends (P < 0.25). In each model building process we excluded one variable at a time from the model to see whether it contributed to a 10 % difference in the odds ratios (ORs). Variables were progressively dropped until only those with P < 0.05 and those confounding variables remained in the model. A P value < 0.05 was considered as a cut off point for statistical significance in the final model.

### 3. Results

#### 3.1. Study population

Table 1 presents comparisons of participants' socio-demographic characteristics for CALD and non-CALD survey respondents. Of the 521 participants who completed the survey, 122 (23 %) were classified as CALD and 399 (77 %) as non-CALD.

The ages of the respondents ranged from 16 to 44, predominantly between 30 and 34 years (41.1 %). The majority of the respondents were employed (84.1 %), had completed tertiary education (73.3 %) and were either married or living with their de facto partner (94.6 %).

Participants' age, employment status, education level and marital status were significantly different between CALD parents and non-CALD parents. 140 participants were born in a country other than Australia with a total of 42 different countries reported. The most common countries of birth were China (n = 20), India (n = 18), and New Zealand (n = 8). Additionally, there were 20 different main languages reported by the 70 participants who stated that they spoke a language other than English at home, the most common languages being Chinese (n = 22), Hindi/Punjabi/Urdu (n = 16), and Arabic (n = 6).

**Table 1**

Socio-demographic characteristics of the survey respondents, and between CALD and non-CALD survey respondents.

	Total N = 521 n (%)	CALD <sup>F</sup> n = 122, n (%)	Non- CALD n = 399, n (%)	P value
<b>Parent's age</b>				<b>0.013</b>
16–24	31 (6)	5 (4.1)	26 (6.5)	
25–29	134 (25.7)	19 (15.6)	115 (28.8)	
30–34	214 (41.1)	60 (49.2)	154 (38.6)	
>35	142 (27.3)	38 (31.1)	104 (26.1)	
<b>Baby's age<sup>c</sup></b>				<b>0.283</b>
0–3 months	72 (24.5)	15 (20.5)	57 (25.8)	
3–6 months	75 (25.5)	16 (21.9)	59 (26.7)	
6–9 months	49 (16.5)	14 (19.2)	35 (15.8)	
9–12 months	29 (9.9)	5 (6.8)	24 (10.9)	
12–24 months	69 (23.5)	23 (31.5)	46 (20.8)	
<b>Parental status</b>				<b>0.140</b>
Pregnant	183 (35.1)	44 (36.1)	139 (34.8)	
Parent of a child younger than 2 years	294 (56.4)	73 (59.8)	221 (55.4)	
Both pregnant and parent of a child younger than 2 years	44 (8.4)	5(4.1)	39 (9.8)	
Other <sup>a</sup>	140 (26.9)	116 (95.1)	24 (6)	
<b>Total number of children</b>				<b>0.519</b>
Pregnant women	117 (22.5)	32(26.2)	85 (21.3)	
1 child	263 (50.5)	59 (48.4)	204 (51.1)	
2 or more children	141 (27.1)	31 (25.4)	110 (27.6)	
<b>Employment status</b>				<b>&lt;0.001</b>
Employed <sup>b</sup>	438 (84.1)	90 (73.8)	348 (87.2)	
Other <sup>a</sup>	83 (15.9)	32 (26.2)	51 (12.8)	
<b>Education level</b>				<b>&lt;0.001</b>
Up to HSC/TAFE/Diploma <sup>E</sup>	124 (23.8)	13 (10.7)	111 (27.8)	
University degree or higher	382 (73.3)	106 (86.9)	276 (69.2)	
Other <sup>a</sup>	15 (2.9)	3 (2.5)	12 (3)	
<b>Marital status</b>				<b>0.038<sup>D</sup></b>
Married or de-facto partner	493 (94.6)	120 (98.4)	373 (93.5)	
Other <sup>a</sup>	28 (5.4)	2 (1.6)	26 (6.5)	

a: Other includes prefer not to say.

b: Employed includes paid and unpaid maternity leave, student, full time career, full and part time employment.

c: Total number of parents with babies N = 294.

d: P value reported from Fisher's Exact Test.

e: HSC: Higher School Certificate; TAFE: Technical and Further Education.

f: CALD: Culturally and linguistically diverse communities.

#### 3.2. Trusted sources for information

Table 2 summarises the sources trusted for information on child health behaviours by the survey respondents, including comparisons between CALD and non-CALD respondents. The most trusted sources reported by both CALD and non-CALD parents were health professionals (76.2 %), websites run by health professionals (59.5 %), and government websites (53.2 %). CALD parents were significantly more likely to trust social media platforms such as Facebook, Instagram, WeChat,

**Table 2**  
Trusted sources used for information on child health behaviours of the survey respondents and comparisons between CALD and non-CALD respondents.

Most trusted sources	Total N = 521 n (%)	CALD <sup>b</sup> n (%)	Non- CALD n (%)	P value <sup>a</sup>
Health professionals	397 (76.2)	86 (70.5)	311 (77.9)	0.091
Websites run by health professionals	312 (59.9)	66 (54.1)	246 (61.7)	0.136
Government websites	277 (53.2)	59 (48.4)	218 (54.6)	0.224
Local Health Service websites	196 (37.6)	40 (32.8)	156 (39.1)	0.208
Family members	148 (28.4)	32 (26.2)	116 (29.1)	0.542
Medical journals (PubMed/MEDLINE)	132 (25.3)	28 (23)	104 (26.1)	0.489
Friends	121 (23.2)	19 (15.6)	102 (25.6)	0.022
General search engine (Yahoo, Google, Bing, etc)	99 (19)	28 (23)	71 (17.8)	0.204
Social media (e.g. Facebook, Instagram, WeChat, WhatsApp, blogs)	89 (17.1)	29 (23.8)	60 (15)	0.025
Booklets/ Pamphlets	70 (13.4)	9 (7.4)	61 (15.3)	0.025
Online parent groups	67 (12.9)	17 (13.9)	50 (12.5)	0.685
Face to face parent groups	30 (5.8)	4 (3.3)	26 (6.5)	0.179
Blogs	24 (4.6)	5 (4.1)	19 (4.8)	0.760
TV	3 (0.6)	0 (0)	3 (0.8)	0.337

a: P value: Pearson chi-squared.

b: CALD: Culturally and linguistically diverse communities.

WhatsApp, or blogs for information related to child health behaviours (nutrition, sleep, and active play) (23.8 %) compared to non-CALD parents (15 %). Conversely, friends and booklets/ pamphlets were significantly more trusted by non-CALD parents than for CALD parents (25.6 % and 15.3 %, respectively). No other trusted source responses were statistically different between CALD and non-CALD respondents.

Table 3 shows associations of CALD status with trusted sources, i.e. booklets/pamphlets, social media and friends, after adjustments for other demographic factors. CALD survey respondents were significantly more likely to trust social media as a source of information for child health behaviours compared to non-CALD respondents (OR 1.92, 95%CI 1.16–3.19, P = 0.01), after adjusting for participants’ marital status. Further, respondents from a CALD background were less likely to trust friends as a source of information compared to non-CALD respondents (OR 0.54, 95%CI 0.31–0.92, P = 0.02).

After adjusting for parents’ age and education levels, no significant difference was found between CALD and non-CALD respondents regarding trust of booklets/pamphlets as an information source (OR 0.51, 95%CI 0.24–1.07, P = 0.07).

### 3.3. Frequency of using online resources

Almost all participants reported using the internet on a daily basis (99.5 %). Most had unlimited data access to the internet (93.5 %), while 6.5 % of respondents had restricted access. The most common online sources reported by survey respondents to be used “very frequently” for information regarding their child’s health behaviours were general search engines (27.6 %), social media (18.2 %), and websites for hospitals or other health services (12.3 %) respectively. Respondents from a CALD background were significantly more likely to use general search engines “very frequently” compared to those from non-CALD backgrounds (39.3 % vs 24.1 %). Survey respondents showed a relatively similar use of social media, websites for parents, online parent group,

**Table 3**  
Associations of CALD status with trusted sources, i.e. booklets/pamphlets, social media and friends, after adjustments for other demographic factors.

	Booklets/Pamphlets				Social media				Friends			
	n (%)	OR	95% CI	P <sup>b</sup> value	n (%)	OR	95% CI	P value	n (%)	OR	95% CI	P value
<b>Cultural background</b>												
Non-CALD	61 (15.3)				60 (15)				102 (25.6)			
CALD <sup>d</sup>	9 (7.4)	0.507	0.240–1.074	0.072	29 (23.8)	1.921	1.156–3.192	0.012	19 (15.6)	0.537	0.313–0.920	0.024
<b>Marital status</b>												
Married or de-facto partner	67 (13.6)				79 (16)				111 (22.5)			
Other <sup>a</sup>	3 (10.7)				10 (35.7)	3.338	1.466–7.597	0.004	10 (35.7)			
<b>Parents age</b>				0.061								
16–24	9 (29)				5 (16.1)				5 (16.1)			
25–29	24 (17.9)	0.581	0.232–1.452		27(20.1)				22 (16.4)			
30–34	20 (9.3)	0.309	0.121–0.786		37 (17.3)				56 (26.2)			
>35	17 (12)	0.417	0.158–1.099		20 (14.1)				38 (26.8)			
<b>Education level</b>				0.176								
Up to HSC/TAFE/ Diploma <sup>c</sup>	21 (16.9)				17 (13.7)				26 (21)			
University degree or higher	44 (11.5)	0.804	0.445–1.451		69 (18.1)				89 (23.3)			
Other <sup>a</sup>	5 (33.3)	2.371	0.710–7.915		3 (20)				6 (40)			

Statistical test: Logistic regression model.

a: Other includes prefer not to say.

b: P value reported from Pearson chi-squared.

c: HSC: Higher School Certificate; TAFE: Technical and Further Education.

d: CALD: Culturally and linguistically diverse communities.



**Table 4**  
Frequency of using online sources for child health information.

	Total N = 521 n (%)	CALD n (%)	Non- CALD n (%)	P value
<b>Social media (e.g. Facebook, Instagram, WeChat, WhatsApp, blogs)</b>				<b>0.732</b>
Very frequently	95 (18.2)	25 (20.5)	70 (17.5)	
Frequently	121 (23.2)	28 (23)	93 (23.3)	
Sometimes	142 (27.3)	36 (29.5)	106 (26.6)	
Rarely	87 (16.7)	16 (13.1)	71 (17.8)	
Never	76 (14.6)	17 (13.9)	59 (14.8)	
<b>Websites for parents</b>				<b>0.725</b>
Very frequently	59 (11.3)	14 (11.5)	45 (11.3)	
Frequently	200 (38.4)	47 (38.5)	153 (38.3)	
Sometimes	197 (37.8)	50 (41)	147 (36.8)	
Rarely	50 (9.6)	8 (6.6)	42 (10.5)	
Never	15 (2.9)	3 (2.5)	12 (3)	
<b>Online parent groups</b>				<b>0.591</b>
Very frequently	45 (8.6)	12 (9.8)	33 (8.3)	
Frequently	86 (16.5)	17 (13.9)	69 (17.3)	
Sometimes	133 (25.5)	37 (30.3)	96 (24.1)	
Rarely	110 (21.1)	23 (18.9)	87 (21.8)	
Never	147 (28.2)	33 (27)	114 (28.6)	
<b>Apps</b>				<b>0.062</b>
Very frequently	54 (10.4)	21 (17.2)	33 (8.3)	
Frequently	127 (24.4)	29 (23.8)	98 (24.6)	
Sometimes	165 (31.7)	37 (30.3)	128 (32.1)	
Rarely	95 (18.2)	21 (17.2)	74 (18.5)	
Never	80 (15.4)	14 (11.5)	66 (16.5)	
<b>General search engine (Yahoo, Google, Bing, etc)</b>				<b>0.013</b>
Very frequently	144 (27.6)	48 (39.3)	96 (24.1)	
Frequently	199 (38.2)	35 (28.7)	164 (41.1)	
Sometimes	136 (26.1)	28 (23)	108 (27.1)	
Rarely	28 (5.4)	8 (6.6)	20 (5)	
Never	14 (2.7)	3 (2.5)	11 (2.8)	
<b>Websites for hospitals or other health services</b>				<b>0.269</b>
Very frequently	64 (12.3)	21 (17.2)	43 (10.8)	
Frequently	184 (35.3)	44 (36.1)	140 (35.1)	
Sometimes	182 (34.9)	37 (30.3)	145 (36.3)	
Rarely	67 (12.9)	13 (10.7)	54 (13.5)	
Never	24 (4.6)	7 (5.7)	17 (4.3)	
<b>Government websites</b>				<b>0.554</b>
Very frequently	52 (10)	15 (12.3)	37 (9.3)	
Frequently	205 (39.3)	44 (36.1)	161 (40.4)	
Sometimes	182 (34.9)	42 (34.4)	140 (35.1)	
Rarely	59 (11.3)	13 (10.7)	46 (11.5)	
Never	23 (4.4)	8 (6.6)	15 (3.8)	
<b>Medical journals (PubMed/ MEDLINE)</b>				<b>0.281</b>
Very frequently	20 (3.8)	5 (4.1)	15 (3.8)	
Frequently	73 (14)	19 (15.6)	54 (13.5)	
Sometimes	154 (29.6)	31 (25.4)	123 (30.8)	
Rarely	154 (29.6)	31 (25.4)	123 (30.8)	
Never	120 (23)	36 (29.5)	84 (21.1)	
<b>Other sources of information</b>				<b>0.984</b>
Very frequently	14 (2.7)	3 (2.5)	11 (2.8)	
Frequently	59 (11.3)	15 (12.3)	44 (11)	
Sometimes	185 (35.5)	41 (33.6)	144 (36.1)	
Rarely	136 (26.1)	33 (27)	103 (25.8)	
Never	127 (24.4)	30 (24.6)	97 (24.3)	

P value: Pearson chi-squared.

websites for hospitals or other health services, government websites, and medical journals for child health information (Table 4).

### 3.4. Engagement and features

#### 3.4.1. Mode of delivering online information

More than two-third of respondents found short paragraphs a useful mode of delivering health information online (73.9 %) followed by dot/bullet points (65.3 %) and pictures (50.3 %). Long paragraphs and podcasts were among the less commonly preferred delivery modes for information. CALD respondents significantly favoured information via videos (48.4 % vs 33.3 %,  $p = 0.003$ ) while non-CALD respondents had a preference for ascertaining additional information through attachments

(41.9 % vs 23.8 %,  $p < 0.001$ ). Some participants (2 %) had additional suggestions for other elements they found useful. These included diagrams, short articles, summary pages, and important summary points at the top of the page (Appendix 2).

#### 3.4.2. Feature preferences

The most common features respondents enjoyed seeing on websites were images (81 %), videos (40.1 %), and discussion forums (39.9 %), whereas quizzes, and chatbots were less commonly preferred. Few people favoured games, with CALD people favouring it somewhat more than non-CALD ( $P = 0.01$ ). Moreover, 5.6 % of respondents enjoyed other additional features such as infographics, referral to services, mini educational power point slides, and links to research and evidence (Appendix 2).

The majority (83.2 %) of participants stated that a personalisation option to create a login or follow a pregnancy/ child milestone would be beneficial on a web-based platform. A multi-lingual option was another feature mentioned among 35.7 % of respondents, with a significantly higher response among CALD respondents (54.1 %,  $P < 0.001$ ) compared to non-CALD respondents (30.1 %). Several participants suggested that language options should be inclusive of all Australians, while others gave specific language recommendations such as Arabic, Hindi, Bengali, Chinese, Hungarian, and French.

#### 3.4.3. Online behaviours

Compared to non-CALD respondents, searching websites using key words was a significantly more common behaviour among CALD respondents (63.1 % vs 50.4 %,  $P = 0.014$ ). Most respondents (59.1 %) reported scrolling through the information quickly to obtain the answers they need relating to their child's health and wellbeing (Appendix 2).

#### 3.4.4. Online engagement with chats/ posts/ forums

The use of chats, posts or forums for child's health behaviours was common, with a large proportion (78.7 %) stating they read entries written by other people. This was significantly higher among the non-CALD respondents (81.2 %) compared to CALD respondents (70.5 %). A small percentage of the respondents (20.9 %), actively participated in chats, posts or forums by either asking questions or sharing their personal experiences. This was less common among CALD respondents, as a higher percentage had reported "I do not use any chats/ posts/ forums" (24.6 % vs 16.3 %,  $P = 0.038$ ) (Appendix 2).

## 4. Discussion

This online cross-sectional Australian survey provides a better understanding of resources used and trusted among CALD and non-CALD respondents, and online features they prefer to obtain information related to child health behaviours. A key finding of this study is that health professionals, websites run by health professionals, and government websites were identified as the most trusted information sources by respondents, although they were less frequently used for information related to their child's health behaviours. Our findings are in line with a survey conducted with postpartum mothers in Eastern Canada which found that, among 561 women, Google, non-government websites, and social media were favoured over government websites for parents seeking infant health information [38]. This may be explained by the often static nature of government websites. A recent systematic assessment of health websites found government websites to be of lower quality and interactivity compared to media and private owned websites [20]. This in turn raises concerns around accessibility of these credible websites and how well health information on these websites meets the requirements of parents. This reinforces the need for adopting an interactive user-centred design approach to inform the development of resources [39–40].

Interestingly, compared with non-CALD participants, CALD respondents were more likely to trust social media platforms for

information related to children's health behaviours. Similarly, an online survey comparing the resource preferences between American mothers and recent immigrant Korean mothers found that Korean mothers trusted and used social media sites (e.g. Facebook, Instagram etc.) significantly more than American-born mothers when seeking health-related information for their children [41]. This could be because CALD respondents may face barriers in accessing health information in their native languages from credible sources or because they wish to stay connected to their cultural beliefs and practices through family and friends from their countries of origin [9,42–44]. Such an approach may be of concern given that social media platforms have the capacity to amplify and disseminate misinformation rapidly resulting in poorer health outcomes among consumers [45–46]. While it is important to acknowledge the statistical significance indicating that CALD parents were more inclined to trust social media, it is important to highlight that these sources were selected by a minority within both communities. The predominant sources of information such as health professionals and local and government websites, remain the primary and influential channels for both communities.

Booklets and pamphlets were reported by CALD respondents as a less trusted source used for child health information. The previously mentioned survey conducted on American and Korean mothers also found, in contrast, that Korean immigrant mothers were more likely to use books/ booklets as their health information source related to children [41]. However, only Korean immigrant mothers who completed a doctoral degree were significantly more likely to use books/ booklets as their health information source than Korean immigrant mothers without a doctoral degree. This may be due to the absence of appropriate and comprehensible in-language education materials that makes them inaccessible to those with limited education and literacy levels. Multiple studies that conducted suitability assessments of printed health education materials in various countries including Australia, found that these resources have high literacy levels, are information dense, and are neutral in terms of cultural appropriateness [47–51].

#### 4.1. Frequency of internet usage

The internet plays an important role in supporting parents to obtain health information. Almost all survey respondents reported using the internet on a daily basis, representing a significant increase in internet usage over the past years [52–54]. This can be explained by the continuous technological advances and developments that are enabling parents to easily access health information online [55–57].

When examining the frequency of internet usage for child health information, our study showed that search engines, social media, and websites for hospitals or other health services were among the most frequently used digital sources. Specifically, CALD respondents had a higher percentage of using general search engines very frequently for information on children's health behaviours than to non-CALD respondents. A 2020 systematic review looking at parents' online health information seeking behaviours, reported that the Google search engine was used by almost all parents, and was the most common starting point for gathering health information [7]. This highlights the importance for credible websites to optimise their search engine to maximize their chances of appearing at the top of a Google search.

#### 4.2. Website features

Most respondents favoured summarised information in the form of short paragraphs, bullet points and pictures. A considerable proportion of CALD respondents stated their preference for obtaining information via videos. This conforms with findings from previous studies showing the benefits of video-based health education in improving knowledge among CALD communities [21,58–61]. Additionally, visual aids such as videos or pictures have been shown to combat low literacy even in an individual's first language [62]. Non-CALD respondents displayed a

preference for obtaining additional information through attachments. This may be due to their desire to obtain in-depth information. Furthermore, language likely plays a role in the preference of non-CALD respondents for acquiring additional information through attachments. As English is commonly used as a predominant language in various informational resources, non-CALD individuals may find it easier to access a wider range of information in English [61].

Reading entries for chats, posts or forums in relation to child health behaviours was a common practice among the majority of respondents. However, participation in chats, posts or forums was a less common practice, especially among CALD respondents. This may be due to a fear of getting judged, experiencing online harassment, or sharing wrong information [63–65].

#### 4.3. Behaviour change wheel and Self determination theory models

This online survey questionnaire was developed based on two behaviour change models. The COM-B model posits that, for behaviour to occur, external factors such as physical and social opportunities should be present for the behaviour to take place [29–30]. In SDT a theory of motivation is based on three basic psychological needs- autonomy, competence, and relatedness [31–33]. Respondents reported daily access to the internet which highlights "physical opportunity" as a key enabler to adoption of behaviour. Autonomy refers to a person having choice and is willingly endorsing one's behaviour [31]. Even though respondents had the "physical opportunity" of selecting from a breadth of resources, they demonstrated autonomy over selecting their resource of choice regardless of its credibility.

We also found that non-CALD respondents trusted and approached their friends for health information demonstrating the presence of "social opportunity" or "relatedness" that was less existent among CALD respondents. In contrast, previous studies have found CALD communities to heavily rely on family members for health information [66–68]. This stark difference might be explained by the results of a qualitative study which found that ethnically diverse communities' rely on family members for health information when their information needs could not be met by the health care professional or other sources [69]. CALD respondents in our study were predominantly reliant on search engines and social media for information which may have been sufficient sources of information for them.

An individual's capacity to engage in the behaviour of interest physically and psychologically is defined as "capability" and doing it in an effective manner is defined as "competence" [30–31]. Our study found that respondents had the physical ability to search for information related to their child's health behaviours. However, CALD respondents' competence or psychological capability of knowing how and where to access credible online health information on child health behaviours may have been a barrier to adoption of effective search strategy to obtain credible health information. This interpretation is supported by a study of postnatal women who reported lacking the psychologically capability required to be equipped with sufficient health information due to such reasons as unavailable opportunities, moving to new areas, or not receiving sufficient advice from healthcare professionals [70].

Motivation is defined as all the brain processes that energise and direct behaviour, not just conscious decision-making [29]. Respondents believed that summarised information and video-based health education would really help improve their access to information and overall experience on web-based platforms, in turn, mediating and motivating them to engage with the resource. This is consistent with findings from several studies reporting that information presented in visual formats contributes to improvement in parental knowledge, satisfaction and health outcomes [71–72].

#### 4.4. Strength and limitations

To our knowledge, this study was the first to provide an overview of

the features and resources used and trusted for information related to child health behaviours and features preferred among CALD and non-CALD parents in Australia. Additionally, the survey was mapped to the COM-B and SDT behaviour change models that helped achieve a comprehensive understanding of parents' information seeking behaviours. The online survey had a relatively large sample size and used validated standardised survey instruments for quantitative analysis.

Limitations of the study included the recruitment strategy which did not reflect the breadth of educational diversity and digitally literacy we hoped to reach. Thus, the study sample was skewed towards respondents with a tertiary level of education and potentially higher socio-economic status. Another limitation was possible exclusion of those who were potentially more disadvantaged with no internet access or had lower English literacy levels, given that the survey was administered in English via the web only. This may restrict the generalisability of our results to parents in general. Additionally, we did not enquire about the language through which parents accessed resources. This information could have provided a clearer understanding into their reasoning behind selecting and favouring particular resources.

#### 4.5. Implications for practice

This study has several implications for practice and future research. We confirmed that parents use the web and online platforms (e.g. social media) very frequently for information related to child health behaviours. Therefore, there is great potential for government health agencies and health professionals to provide credible health information via these platforms bearing in mind the needs of their end users. Studies have found that engaging parents as co-researchers in the planning, design, data collection, analysis and dissemination of resources enhances the relevance of research to the target population and maximises parent empowerment [40]. Such an approach would be invaluable to optimise consumer engagement and uptake of credible resources. The lack of significant differences in the resources used and trusted for child health information by CALD and non-CALD communities may be attributed to the length of time CALD communities have resided in Australia. Notably, our study did not collect data on the duration of CALD communities' residence in the country. In order to gain a more comprehensive understanding, further research is needed that specifically focuses on CALD communities who have recently migrated to Australia, allowing for a meaningful comparison with non-CALD communities. Additionally, future research should also focus on exploring resources used and trusted for information related to child health behaviours among parents with limited internet access and lower English proficiency levels which may improve generalisability to the broader population.

## 5. Conclusion

The findings of this study demonstrates that almost all parents used online resources to seek health information related to their children. Parents have identified some credible sources (i.e., health professionals, websites run by health professionals, and government websites) as trustworthy but preferred to access less credible sources for health information. Given that CALD communities primarily referred to social media for information, delivering credible health information through these platforms can provide an opportunity to reach a broader audience and improve health outcomes. Moreover, the preference for summarised infographics and videos among CALD parents implies the need for health professionals and organisations to develop effective low literacy level, visual based, education resources that can be safely promoted through online platforms and accessible to diverse communities.

#### Authors' contributions

DJ and ST designed the study and the main conceptual ideas. DJ and ST developed the data collection instruments. LMW, LB, and CR revised the data collection instruments and provided feedback. DJ undertook statistical analysis under the supervision of LMW. DJ wrote the first draft

of the manuscript; all authors critically revised the paper and provided comments.

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#### Summary points

What was already known on the topic:

- Parents are active health information seekers and play a crucial role in making informed decisions for their children's early exposure to different health behaviours
- CALD communities face barriers identifying and accessing trustworthy sources due to several factors
- What this study added to our knowledge:
- The study provided important insights into child health-related information seeking behaviours among CALD and non-CALD populations in Australia
- The study highlights potential opportunities that platforms can take on to increase consumer engagement and uptake of credible resources for child health behaviours

#### Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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#### Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.ijmedinf.2023.105165>.

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