

RESEARCH ARTICLE

Reach, acceptability and impact of an online parent healthy lifestyle intervention during the COVID-19 lockdown: A pilot study

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Abstract

Issue addressed: There is growing evidence that online parent-focused child healthy lifestyle interventions can improve healthy eating practices and food environments in the home. Greater understanding of whether and how parents engage with these online interventions is needed. This study evaluated the reach, acceptability and impacts of an online parent healthy lifestyle intervention.

Methods: A pilot study was conducted in New South Wales during the COVID-19 pandemic when stay-at-home public health orders were in place (July–August 2021). A concurrent mixed methods design was adopted. Data collection measures were: an online participant survey at baseline, post-intervention and 3-month follow-up; two online post-intervention focus groups; and web metrics at post-intervention and 3-month follow-up.

Results: There were 181 intervention participants, primarily mothers with high education levels and living in advantaged areas: 43 (24%) completed surveys post-intervention; and of these, 35 (81%; 19% of participants) completed surveys at follow-up. Sixteen mothers participated in focus groups. Parents' knowledge, self efficacy, role modelling and behaviours improved, but there were no significant differences detected over time. Metrics and survey data indicated webinar recordings, particularly the topics of 'Fussy Eating' and 'Screen time and sleep', had the greatest engagement and most perceived them as useful (93% and 96%, respectively).

Conclusions: An online healthy lifestyle intervention to support parents in providing opportunities for their children to engage in healthier lifestyle behaviours was appealing and acceptable to mothers and has the potential to improve families' healthy lifestyle behaviours. Enhancing intervention reach amongst fathers and priority populations, as well as incorporating design elements to enhance engagement will be important.

So what?: An online healthy lifestyle intervention reached and engaged parents, despite being faced with additional parenting challenges arising from COVID-19 stay-at-home orders.

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KEYWORDS

children, health behaviours, health promotion strategies, parents, self efficacy

1 | INTRODUCTION

Childhood obesity remains one of the most significant public health issues in Australia.¹ Overweight and obesity in childhood can increase the risk of physical health problems, as well as contribute to anxiety and depression through stigmatisation.¹ In the state of New South Wales (NSW), almost a quarter (24%) of children aged 5–16 years are above a healthy weight.² A range of settings-based childhood overweight and obesity prevention programs have been delivered in NSW, mostly focusing on engaging educators, children and community stakeholders.²

Parent-focused strategies that promote healthy home environments and increase parent health literacy and self-efficacy are needed, given parents' key influence on children's healthy lifestyle behaviours.³ Many parents use online communications to obtain health and wellbeing information for their children⁴ and are generally receptive to interventions promoting children's healthy lifestyles.⁵

Engaging parents in online healthy lifestyle interventions for their children has potential for broad reach and population impact.⁶ There is growing evidence they can improve parent's knowledge, self-efficacy, role modelling and behaviours, primarily related to children's healthy eating practices.^{7–14} Evidence on parental reach, engagement and impacts on child physical activity and sedentary behaviours are less certain, particularly for fathers.^{10,12,13,15} Further understanding of parent's acceptability of and engagement with these interventions may enhance design for broader reach and population impact.^{6,15,16}

This pilot study assessed the reach, acceptability and impacts of *Healthy Children, Happy Families* (HCHF), a free online healthy lifestyle intervention targeting parents and carers (hereafter referred to as parents) with children aged 0–12 years living in the South Eastern Sydney Local Health District (SESLHD). The HCHF intervention aimed to improve parents' beliefs, self-efficacy, intentions and behaviours (role modelling, routines and rules) related to providing healthier home environments. Intervention components focused on goal setting, peer support, tailored content and practical tools to support parental behaviour change, which were informed by the Theory of Planned Behaviour¹⁷ and Social Cognitive Theory.¹⁸ The 5-week intervention consisted of weekly 45-min webinars, electronic newsletters and a closed Facebook group. Weekly topics included: (i) screen time and sleep; (ii) fussy eating; (iii) food label reading; (iv) how to get active; and (v) healthy eating on a budget. Webinars were facilitated live via Zoom (7:30 PM mid-week) and utilised interactive elements such as polls, chat box and devoted question and answer time to facilitate goal setting, problem sharing and solving, peer support and to provide tailored advice. Webinars were designed using evidence-based content that provided practical strategies for parents to implement in their home environment. Different content experts presented each topic, with the structure

of the webinars remaining consistent across the 5 weeks. Recordings were made available on YouTube and shared in weekly newsletters, which also provided practical tools (e.g., recipes, games, ideas) and promoted upcoming webinars. Three weekly Facebook posts prompted goal sharing and ideas.

2 | METHODS

The pilot study was conducted in July–August 2021 during the COVID-19 pandemic when NSW stay-at-home public health orders were in place, reflecting a time when family life and children's activities were atypical, parents of school-aged children were engaged in home-schooling their children, and mostly working from home. The study adopted a concurrent mixed methods design, co-designed in a research-practice partnership involving health promotion practitioners at SESLHD and researchers from the Prevention Research Collaboration, The University of Sydney.

Participants were recruited to HCHF through established SESLHD communication channels that frequently engaged with parents including schools, early child care centres, community organisations, local councils and SESLHD clinical and non-clinical services. Recruitment was primarily through electronic channels, partly due to coinciding with the COVID-19 lockdown, and material included a flyer/poster, social media tile and invitation letter. Parents registered by completing an online screening survey on the Research Electronic Data Capture (REDCap) web platform prior to the intervention. They were eligible if aged ≥ 18 years, were a parent or carer of at least one child aged ≤ 12 years, resided in SESLHD and could access the Internet.

Three data collection methods were employed: an online survey with participants at baseline (June 2021), post-intervention (August 2021) and 3-month follow-up (November 2021); two online participant focus groups post-intervention (31 August and 7 September 2021); and web metrics post-intervention (August 2021) and 3-month follow-up (November 2021). The survey was hosted on REDCap and provided flexibility for completion over multiple sittings. Focus groups were conducted on Zoom by an external research company and explored participant satisfaction with the intervention in greater depth, to understand how and why the intervention did or did not impact these outcomes or mediators. A discussion guide was developed by the research team, which prompted on whether the intervention met expectations, the most and least useful parts, parent's confidence or motivation to make changes related to their children's lifestyle behaviours, and facilitators or barriers to putting learnings into practice. Focus groups were audio-recorded, transcribed and thematically analysed using an inductive approach by the external research company. At least two members of the research team reviewed the recordings, transcripts and/or report drafts (Leonie Cranney, Lisa Moorhouse and Jessica Wrigley).

TABLE 1 Survey respondent characteristics at each data collection point.

Sociodemographic characteristic		n (%) / median (IQR)		
		Completed baseline only (n = 181)	Completed baseline and post (n = 43)	Completed baseline and follow-up (n = 35)
Gender	Male	11 (6%)	0 (0%)	1 (3%)
	Female	170 (94%)	43 (100%)	34 (97%)
Age category ^a	Young (18–34 years)	40 (22%)	9 (21%)	9 (26%)
	Middle aged (35–54 years)	140 (77%)	34 (79%)	26 (74%)
Number of children aged 0–12 years	1 child	69 (38%)	15 (35%)	14 (40%)
	2–3 children	108 (60%)	28 (65%)	21 (60%)
	4+ children	4 (2%)	0 (0%)	0 (0%)
Age of children ^b	Youngest	2.7 (1.4–4.6)	2.6 (1.2–4.3)	2.6 (1.2–4.3)
	Oldest	5.1 (2.7–8.2)	5.1 (2.3–7.4)	5.1 (2.3–7.4)
Relationship to child(ren) ^a	Parent/step-parent	179 (98%)	43 (100%)	35 (100%)
	Other	2 (1%)	0 (0%)	0 (0%)
Live with spouse or partner	Yes	160 (88%)	42 (98%)	34 (97%)
	No	21 (12%)	1 (2%)	1 (3%)
Main language spoken at home	English	144 (80%)	37 (86%)	33 (94%)
	Other	37 (20%)	6 (14%)	2 (6%)
Aboriginal and/or Torres Strait Islander Origin	Yes	2 (1%)	1 (2%)	1 (3%)
	No	179 (99%)	42 (98%)	34 (97%)
Education	Less than university	40 (22%)	9 (21%)	9 (26%)
	University	141 (78%)	34 (79%)	26 (74%)
Index of Relative Socio-economic Disadvantage (SEIFA) ^c	Most disadvantaged (fourth and fifth quintile)	23 (13%)	7 (16%)	5 (14%)
	Third quintile	38 (21%)	9 (21%)	9 (26%)
	Most advantaged (first and second quintile)	120 (66%)	27 (63%)	21 (60%)

^aOne participant at baseline preferred not to answer.

^bFor parents with only one child, their child was considered both oldest and youngest.

^cSocio-Economic Indexes for areas.

Intervention participants were offered reimbursements for survey completion and focus group participation. Web metrics assessed participant engagement with intervention components and included opens and click rates of email communications (including newsletters) via Mailchimp, numbers of live webinar participants, webinar recording views and Facebook post views, likes and comments.

2.1 | Measures

The survey assessed parent behavioural outcomes within the previous month related to role modelling, family rules and routines associated with healthy eating, physical activity, sleep and screen time (Appendix S1). It also examined mediators of these outcomes (attitudes, self-efficacy and behavioural intentions), as well as participant's engagement and satisfaction with intervention components. Knowledge questions were based on current healthy lifestyle recommendations for children up to 12 years of age (physical activity, screen time and sleep)¹⁹ and behavioural questions

were adapted from the NSW Schools Physical Activity and Nutrition Survey²⁰ and the Growing Healthy Kids²¹ Population Health Survey. Healthy lifestyle behaviours, attitudes and intentions were measured using five-point Likert response scales (respectively, ranging from 'Never or Rarely' to '7 times per week or more'; 'Strongly disagree' to 'Strongly agree'; and 'Not at all likely' to 'Extremely likely'). The survey was pre-tested on a convenience sample of eight parents.

2.2 | Statistical analysis

Survey data were analysed descriptively using R statistical software²² to assess intervention reach, exposure and satisfaction. For participants completing all three surveys, data were individually linked using a unique identifier. Matched pairs tests examined changes in attitudes, self-efficacy, behaviour and behavioural intentions from baseline to post- and 3-month follow-up. Descriptive analyses of web metrics data were conducted using Microsoft Excel.

3 | RESULTS

3.1 | Intervention reach and study sample characteristics

The recruitment resulted in 187 parents registering for the intervention, 181 (97%) of whom completed baseline surveys and were included in the intervention. Less than one quarter of those (43; 24%) completed surveys post-intervention, most of whom also completed the follow-up survey ($n = 35$; 19%). Sixteen intervention participants participated in the focus groups, who were all mothers with 1–3 children.

Intervention participants were mostly mothers (or stepmothers) with 2 or 3 children, and had achieved University education, resided in the most socioeconomically advantaged areas, lived with a spouse and spoke English as the main language at home (Table 1). Sociodemographic characteristics of post-intervention and follow-up survey participants generally reflected registered intervention participants, but there were slightly fewer single parents and parents who spoke a language other than English at home.

3.2 | COVID-19 pandemic lockdown and its impact on family lifestyles

Focus group participants frequently discussed challenges they faced during the intervention period due to the unprecedented context of the COVID-19 pandemic and stay-at-home orders. This resulted in many parents juggling work and family responsibilities including home schooling. Although one focus group participant reflected they had more opportunities for family outdoor recreation, most had less time for physical activity and healthy food preparation.

'I'm finding in lockdown kids are eating a lot more. I feel like they're just constantly in the pantry. So they're just going for the chips and all that kind of stuff'.

They also experienced increased difficulties managing their child(ren)'s screen time because it was the primary means of communication for home schooling, as well as connecting with peers and extended family.

'For me it's getting worse in lockdown—they're just always on their device. You know, schoolwork, and then straight after schoolwork they're on devices, they're playing with friends'.

3.3 | Participant engagement and satisfaction

Participants' intervention engagement depended on their communication preferences and accessibility, as well as the perceived relevance for their families. Webinars had the greatest engagement (live attendance and recording views), which varied by intervention topic (Table 2). 'Fussy eating' and 'Screen time and sleep' had the most engagement. 'Healthy

eating on a budget' had the least engagement, which is consistent with baseline survey results showing less than half of registered intervention participants believed it was expensive to purchase ingredients to prepare healthy meals. Focus group findings suggest parents' webinar engagement was largely influenced by their pre-existing knowledge on the topic and its relevance to their family. For example, some focus group participants with older children noted fussy eating was less relevant than screen time, but those with younger children tended to perceive all topics as relevant.

'Having a two-year-old, I like watching things about all the kids because then I know what to expect and how to set up things...so I don't get to the stage where it's an issue'.

Almost all participants who had viewed or read HCHF webinars and newsletters, respectively, found the information at least moderately useful. Focus group participants appreciated webinars' expert presenters, evidence-based content, practical strategies and tips, and the interactive 'polling' element. They recommended more time for parents to workshop common experiences and issues. Webinar recordings were particularly valued by focus group participants because they could watch them at a more convenient time (for some, the timing of live webinars conflicted with domestic duties), revisit content themselves, or share it with their partners and children. This reinforced key messages and supported consistent changes within the home environment.

'I could ask (*husband*) to watch the replays as well because it's not enough for me to kind of talk about it with him. It's important for him to go and watch it'.

The closed Facebook group had 55 registered users, with a moderate level of engagement but low peer interaction (Table 2). Focus group participants reflected that Facebook was suitable for most parents, but they preferred to receive information through webinars and newsletters. Barriers to engagement with this medium included lack of time, repeated intervention content, as well as low peer interaction, which in turn, reduced participants' desire to post.

Focus group participants recommended a longer intervention period with more time between sessions, to allow practical application of recommended strategies in their home, particularly given their increased domestic responsibilities and reduced amount of free time during COVID-19 lockdown. They also felt the Facebook group would be better suited to a longer-term, broader intervention focused on peer support and links with other community-based family activities.

3.4 | Attitudes, self efficacy, intentions and behaviours

Most registered intervention participants perceived healthy lifestyle behaviours as important for their children at baseline, specifically: healthy eating (93%); being physically active (91%); healthy sleep routines (91%) and healthy screen time behaviour (83%). Focus group participants spontaneously raised concerns about

TABLE 2 Number and proportion of parents who engaged with intervention components and found them useful, by topic, post-intervention and at follow-up.

Intervention week and topic	Webinars				Newsletters		Facebook group (n = 55)		
	Web metrics		Survey respondents (n = 41)		Survey respondents (n = 43)		Web metrics		
	Attendees (watched live) n (%) ^a	Views of recording		Attended/ viewed, n (%) ^b	Found at least moderately useful, n (%) ^b	Read, n (%) ^b	Found at least moderately useful, n (%) ^b	Views post-intervention	Likes and comments
		Post-intervention	3-month follow-up						
1. Screen time and sleep	37 (20%)	50	95	28 (68%)	27 (96%)	26 (60%)	24 (92%)	114	6
2. Fussy eating	23 (13%)	82	165	28 (68%)	26 (93%)	22 (51%)	20 (91%)	72	9
3. Label reading	18 (10%)	2	45	23 (56%)	22 (96%)	21 (49%)	19 (90%)	59	5
4. How to get active	20 (11%)	13	40	26 (63%)	23 (88%)	17 (40%)	15 (88%)	36	0
5. Healthy eating on a budget	16 (9%)	25	39	26 (63%)	23 (88%)	17 (40%)	15 (88%)	25	1

^aDenominator = number of registered *Healthy Children*, *Healthy Families* participants (range 13–21).

^bDenominator = number of post survey respondents.

pester power, children's screen time and sedentary behaviour, older sibling role modelling, having limited time for healthy food preparation and developing positive relationships with food. They agreed that providing a healthy home environment for their children was important.

'I think that being healthy and having a healthy environment is really important. It's obviously important to start young, because it will go into their later years and when they're adults'.

Survey participants' self-efficacy, intentions and behaviours generally improved from before to after the intervention, but statistically significant differences were not detected (Table 3). Focus group participants reported they had established new rules around screen time and unhealthy foods in the household, and provided more opportunities for their children to eat vegetables.

'I've been very, very conscious now of at least an hour before bedtime, that screens are off. it takes a night or two, but after that, ...I was like, TV off now, end of story, and they turned it off'.

'I'm definitely chucking more raw veggies in with their snacks... and I discovered my three-year-old eats raw cauliflower'.

4 | DISCUSSION

This pilot study shows that an online child-focused healthy lifestyle intervention was able to reach and engage parents during the unique

and challenging context of COVID-19 pandemic stay-at-home orders. Our findings indicate intervention participants were making positive changes to ensure healthier home environments despite the significant challenges faced. Our qualitative and quantitative findings together suggest that participants' self-efficacy, intentions and behaviours related to their children's healthy lifestyles improved, yet we were unable to detect statistically meaningful effects. This may be due to the absence of a true effect, or a limitation of our low sample size to detect a true effect.

This intervention primarily reached mothers who were higher-educated, socioeconomically advantaged and spoke English at home, similar to other online parent healthy lifestyle interventions.^{8,9,11,15,23} Engaging fathers remains important and our qualitative findings suggest providing webinar recordings can enable their opportunistic participation, which may enhance reach and impacts through consistent application of family routines and rules. Previous Australian research suggests lower-educated parents may prefer a mix of online and face-to-face components.⁶ Given overweight and obesity rates increase with disadvantage and women from culturally and linguistically diverse communities face greater challenges accessing health services and online interventions,⁶ barriers to participation of priority populations and strategies to enhance reach in these groups should be explored.

Intervention recruitment was comparable¹⁵ or higher than previous Australian online parent healthy lifestyle interventions,^{11,24} and there was high participant engagement with webinar recordings, and live webinars to a lesser extent. Lack of time is a significant barrier to parent engagement in healthy lifestyle interventions,^{15,24} and options to view or revisit webinar content at any time were highly valued. Lack of time was also raised as a barrier to engagement with the closed Facebook group. Engagement with this modality was moderate and parent interaction was low, which has also been reported for similar interventions.¹⁵ Another Australian study has also noted its appeal to parents as part of an online healthy lifestyle intervention,⁶ but our qualitative

TABLE 3 Number and proportion of parents reporting self-efficacy and behaviours before and after the intervention and at 3-month follow-up.

Topic	Outcomes	Pre-intervention	Post-intervention	Follow-up
Physical activity				
Self-efficacy	Knowledge of Physical Activity Guidelines for children aged 1–5 ^a	6 (30%)	12 (55%)	6 (43%)
	Knowledge of Physical Activity Guidelines for children aged 5–12 ^b	11 (58%)	16 (84%)	8 (62%)
	Feel confident to encourage child(ren) to be physically active each day	15 (54%)	26 (93%)	13 (68%)
Behaviour	Parent role models being physically active, either organised sport or non-organised physical activities (walking, cycling, swimming, gym) ^c	12 (44%)	18 (67%)	9 (47%)
	Discusses being physically active every day with children	15 (56%)	23 (85%)	15 (79%)
Nutrition				
Self-efficacy	Feel confident to use the nutrition information on a food label to identify healthier packaged products	11 (38%)	21 (72%)	10 (50%)
	Feel confident to provide healthy meals and snacks at home	13 (37%)	26 (74%)	10 (48%)
	Feel confident to restrict the amount of unhealthy/processed food and drinks	11 (38%)	22 (76%)	9 (45%)
Behaviour	Family eats a homemade main meal made from basic ingredients ^c	19 (66%)	26 (90%)	15 (79%)
	Family rules to restrict the amount of snack foods	23 (74%)	28 (90%)	18 (90%)
	Parent role models eating fresh fruit or vegetables ^c	25 (74%)	33 (97%)	18 (86%)
	Discusses healthy eating with children	30 (88%)	32 (94%)	19 (90%)
Screen time				
Self-efficacy	Knowledge of screen time limits for children aged 1–5	17 (81%)	19 (86%)	12 (86%)
	Knowledge of screen time limits for children aged 5–12	18 (95%)	17 (94%)	13 (100%)
	Feel confident to limit child(ren)'s daily screen time to <2 h per day	14 (42%)	24 (73%)	11 (52%)
Behaviour	Family rules to limit the amount of screen time to <2 h per day ^c	23 (74%)	27 (87%)	18 (90%)
	Parent role models limited screen time use (<2 h per day) ^c	9 (29%)	18 (58%)	9 (45%)
	Discusses limiting screen time to <2 h per day with children	22 (71%)	25 (81%)	17 (85%)

Note: Denominator = survey participants who reported exposure to relevant intervention topic (webinar/newsletter).

^aAustralian 24-h Movement Guidelines for the Early Years (Birth to 5 years).

^bAustralia's Physical Activity and Sedentary Behaviour Guidelines.

^cOn most days of the week during the last month.

findings suggest strategies to enhance parent interaction and connect participants with other community events should be considered.

Other key factors that enhanced engagement were topic relevance, interactive elements and access to expert knowledge. The topic 'Fussy eating' was the most popular, which seems a key concern amongst Australian parents of children aged 2–5 years.⁶ 'Screen time and sleep' also had moderate engagement and was perceived as useful by most survey participants. A previous online intervention reported parents found screen time content the least useful¹⁵ and our findings may be due to our focus on its impacts on sleep, or reflect its enhanced relevance during the lockdown period due to children's increased screen time for school and social purposes.²⁵ 'Healthy eating on a budget' appeared the least relevant, likely due to the high proportion of participants living in socioeconomically advantaged areas and low proportion identifying it as an issue at baseline.

Our findings contribute further evidence that parents may prefer online interventions of longer duration (up to 12 weeks) and with more time between sessions,^{6,11} to allow time to put learning into practice. This was particularly important given the unique context meant most participants were mothers who were more time poor than usual due to additional home-schooling duties and increased screen time (for work and social purposes) during the COVID-19 stay-at-home orders. Our metrics data indicate parental engagement may have decreased over the intervention period, which is consistent with other online healthy lifestyle interventions,^{15,16} and may also reflect topic preferences or screen fatigue. Sustained parental engagement has been recognised as a key factor constraining these interventions' effectiveness.^{15,16} Future evaluations of online healthy lifestyle interventions targeting parents may contribute further knowledge on the optimal intervention dose and intensity required to maintain engagement and produce positive impacts.

The key limitations of this study are the small sample sizes at post-intervention and follow-up despite measures to enhance survey participation, which meant the pilot study had relatively little power to detect statistically meaningful impacts. This reflects typical challenges in parent recruitment and retention experienced by similar interventions^{9,11,15} exacerbated due to the unique context of the COVID-19 pandemic stay-at-home orders in NSW. This study is strengthened by its exploration of parent views and experiences, which add a deeper appreciation of factors that may enhance or inhibit intervention engagement and impact. This knowledge may support translation of our findings into practice, but the views of participants who had low or no engagement with any of the intervention components may not be represented. Focus group data collection and analysis were conducted by an external research company for pragmatic reasons, which may have limited our ability to detect latent level meanings. Research team members engaged with the company in data familiarisation to ensure themes captured were close to the data. Our findings are limited to self-reported parent behaviours, which are susceptible to social desirability bias and participants' long-term maintenance of these impacts is unknown.

5 | CONCLUSION

Our findings contribute important insight on the acceptability of online health-related interventions for parents within the unique context of COVID-19 lock down, whilst also reflecting the more general demands of domestic and work responsibilities experienced by parents. They add further evidence that an online parent intervention addressing children's healthy lifestyles was acceptable amongst mothers who were higher-educated, more advantaged and spoke English at home. Barriers and facilitators to parent engagement in online interventions are highlighted, which may inform future online interventions. Exploring whether and how online interventions can reach parents from priority populations, and optimal intervention intensity and duration will be important for future interventions.

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

Research data are not shared.

ETHICS STATEMENT

This study was approved by the SESLHD Human Research Ethics Committee (2021/ETH00430).

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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