A Journey into School Lunchbox Decision-Making: A Qualitative Exploration of Australian Parents

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Due to the confidential nature of qualitative data collection the data for this study is not publicly available, but can be sought on request by the lead author.

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Abstract

Issue Adressed: This study aims to understand parents' decision-making process when packing their child's lunchbox, investigating barriers and facilitators of seeking nutrition information for food choices. **Methods:** An online survey with Likert and open-ended questions conducted via Facebook. Quantitative data analysis of frequencies, means, standard deviation, and correlations and thematic analysis for qualitative responses. **Results:** Of 52 parent participants, 78% considered nutritional information when packing lunchboxes, relying mainly on food labelling (32%) and the Australian Nutrition Food Guide (12%). Most parents (64%) felt confident preparing healthy lunchboxes, focusing on fresh, high-fiber foods and avoiding preservatives. While 60% felt they didn't need additional information, 40% were open to more guidance. Key themes included informed food choices, balancing nutrition with preferences, managing information overload, and practical approaches. **Conclusions:** Parents demonstrated knowledge of healthy eating guidelines but faced challenges in balancing nutritious choices with children's preferences, cost, and providing a balanced diet. **Implications for Practice:** Practitioners should provide clear, accessible guidance on healthy lunchbox preparation, promote comprehensive food labelling, offer strategies for balancing nutrition with preferences, address cost challenges, and develop interventions to overcome barriers in food knowledge and availability.

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The food consumed at home and in educational settings sets a child up for life (Schwartz et al., 2011). The quality of food and how well-nourished the child is influences the child's long-term health outcomes (Lane et al., 2024), wellbeing, academic performance, and concentration on tasks (Lombardi, 2013; Mujcic & Oswald, 2016; Neri, et al. 2022).

Parents are the key decision-makers in children's food choices, and as the child ages, adolescents are more likely to make their own food choices (Australian Institute of Health and Welfare, 2020). Food information is accessible to parents from many sources. Many parents have access to the internet, enabling them to search for health information online (Yardi et al., 2018). Other sources include printed resources (books, recipes, research articles, health magazines, booklets); internet-based resources (websites, online parenting forums, blogs); professional support (nurses, dietitians, childcare staff); informal support networks (parent's groups, family, friends, other parents; Nagler, 2014) and personal knowledge (common sense, personal experience, cultural traditions; Hart et al., 2015). However, parents may be unsure whether the information they find is trustworthy. Parents may find it difficult to access and evaluate food information, making food choices difficult and complex. This may be due to unclear health information.

With concerns about adverse health outcomes associated with increased levels of food processing (Juul et al., 2018; Srour et al., 2019), the parent's responsibility for the provision of food goes

beyond the home into the school or early childhood setting. Parents are likely to have either a positive or negative impact on the child's health. In some countries, such as England, a gap in parents' nutrition knowledge about healthy eating and unhealthy nutritional habits contributes to child ill health (Lombardi, 2013). Consequently, school lunches have improved in England because of a focus on provision of healthy food especially being led by attention from celebrities, the media attention, and government policy (Pearce et al., 2013). There have been various programs introduced related to healthy eating and lunch box preparation for children in Australia, such as *Munch & Move* (New South Wales Government, 2020), *Reclaim the Lunchbox* (Nutrition Australia, 2021) and *Healthy Lunchbox* (Cancer Council, 2019). However, there is still limited research regarding how parents make sense of the information available to make informed decisions about healthy eating. Specifically, there is little research focused on parents' lunchbox packing habits and attitudes that influence decisions on healthy eating choices (O'Rourke et al., 2020). Knowing how parents make lunchbox decisions will help inform programs such as *Munch & Move* to provide children with nutritious food and help parents determine the 'healthiness' of food when purchasing. Crowe (2020) indicates that parents usually classify food as either 'healthy' or 'unhealthy' based on whether the food is processed or not. However, parents need to understand the dietary knowledge of food, which includes synthesizing a range of data; which is also influenced by health literacy.

Factors that influence parents' food choices for the childcare lunchbox have been found to be complex and emotionally charged (Boyd, 2015). Parents reported being influenced by time availability, the cost of food, concerns for food nutrition, a desire to please their child, knowledge of their child's likes/dislikes, children exercising democratic rights, and, at times, parental guilt owing to leaving their child in care (Lombardi, 2013). Yet nutritional choices are key

determinants of a child's growth, learning, and development. Parents' perceptions of food for their children have not been substantially explored despite parents' key role as decision-makers and providers of household nutrition in formulating, motivating, and inspiring their children's eating patterns (Lombardi, 2013). The process of choosing food can also be influenced by emotions, with children enacting agency for foods they desire, for example, by refusing to eat food provided and influence parents' decision-making (Boyd, 2015). Parents may be anxious about the quality and quantity of what their child eats and prioritize the child's food preferences over being healthy. Information for choosing food and understanding how parents interpret that information will assist in providing consistent and comprehensive information for the general public. Parents health and nutrition literacy also influences decisions about food selection for their child's lunch box.

Health and Nutrition Literacy

Health literacy is related to a person's ability to acquire, process, and understand health-related information and services to promote and maintain good health (Trauman et al., 2020). Health literacy is linked to education, culture, income, and employment. However, nutritional literacy is complex. Nutrition literacy reflects the ability to access, interpret, and apply nutrition information to food choices, purchases, and consumption (Gibbs et al., 2018). Parents with higher health and nutritional literacy levels can better understand and use the information to make informed decisions about what food to buy, prepare, and eat (Gibbs et al., 2018; Lombardi, 2013). There is evidence of parents' having health literacy (Gibbs et al., 2018; Lombardi, 2013); however, having nutritional literacy, which concerns parents' current knowledge, self-efficacy, and attitudes related to healthy eating, is sparse.

A "healthy" diet rich in fresh fruit and vegetables, whole grains, nuts and seeds, legumes, spices, herbs and fermented plant foods (Walsh et al.,

2023) promotes health and is preventive for chronic lifestyle illnesses including 32 health issues such as diabetes, depression (Lee et al. 2023a), and obesity, (Lane et al., 2024). Attention is warranted to parents' food decisions (Lea et al., 2019; Lombardi, 2013). It is clear that health literacy and self-efficacy enhance food choices, enhance food label critique, and support quality dietary choices (Cha et al., 2014). Given the complex food choices parents are presented with and the broader social, economic, and structural determinants that influence healthy eating practices, practical strategies are needed to support parents in making "healthy" decisions (Lee et al., 2023b).

Children's food literacy is a vital health literacy component and is associated with a parent's education. Cha et al. (2014) found that children with highly educated parents were motivated to develop healthy lifestyle behavior's, including healthy eating. For children to develop food literacy, they need to have informed parents making their food decisions and for parents to share their decision-making with their children. Hence, support and education are required for all parents to access the correct information, empowering them to make healthy food choices. This project aims to explore parents' decision-making for food choices in their child's lunch box, including nutrition information-seeking behavior, attitudes, barriers, and facilitators and identify parents' sources of food information for their child's growth and development. Research has identified that parents often choose foods that do not have the healthiest outcomes for the child despite their motivation to provide nutritious meals (Boyd, 2015).

The theoretical framework underpinning this study is Bronfenbrenner's ecological systems theory (1979). At the individual level, the microsystem, the parent makes food decisions for their child. This microsystem interacts with the surrounding systems the mesosystem, including the parent's socioeconomic status. Beyond the mesosystem is the exosystem, which includes healthcare professionals, who may impact health literacy/nutrition literacy, and the neighborhood where the food is

purchased. At the macro level, government policies, food industries, internet sources, and society's culture influence the knowledge of food available by parents. The socio-ecological framework within Bronfenbrenner's ecological systems theory aligns well with the study in relation to the following factors:

1. Parents' sources of nutritional information, current knowledge, self-efficacy, and attitudes on food choices.
2. Parents' interpretation of nutrition information about food.
3. The barriers and facilitators of nutrition information seeking on food choices.
4. The foods parents consider healthy and unhealthy for children's lunchboxes.

Method

The research team was keen to understand parents' decision-making for lunch box food decisions. Parents were invited to participate from the Facebook social media pages of the research team.

Data Collection Materials

The authors constructed an online survey to measure parental decision-making of lunchbox choices for their children. The questions included in the survey were identified from the literature and expert opinion. The survey items were refined through group consensus and advice from expert colleagues acting as critical friends. The survey consisted of open-ended and Likert scale questions on a three-, five-, or seven-point scale and was divided into six sections. These sections included participant demographics, children demographics, factors influencing decision-making, nutritional information sources and consideration, nutritional information interpretation, and parent's lunchbox food choices. For full details of the six survey sections, please see supplementary material.

Procedure

Fifty-two participants were recruited via the social media platform Facebook, inviting parents to complete an anonymous online survey. The survey was advertised on the authors' social media sites and the Faculty of Education social media site from the lead author's university. Participants were given a brief overview of the study and were invited to follow the provided link if they were willing to participate. The link led participants to the online participant information sheet survey. Participants were excluded if they were under 18 or their child did not take lunch from home to school. The survey took approximately 10-15 minutes to complete. Ethics clearance was received from Southern Cross University Ethics approval number 2022/080 before commencing the study.

Data Analysis

Descriptive statistics, including frequencies, means, standard deviation, and correlations, were used to analyze the quantitative data from the survey using SPSS. Thematic analysis (Braun & Clarke, 2006) was used to analyze the qualitative data from the open-ended responses, including identifying codes, categories, sub-themes, and themes. One author first undertook the qualitative data analysis, which was then discussed with a consensus reached by the remaining authors.

Results

Participant Demographics

The 52 participants in this study consisted of 50 (96%) females, mostly employed (87%) professionals (58%), with an undergraduate degree (44%). Nearly half of the participants (49%) had two children in school and eight (15%) indicated their children had intolerances or allergies.

Table 1

Participant Characteristics (N = 52)

	n	%
Gender		
Female	50	96
Male	2	4
Annual Household Income (net)	22	42
$45,001 - $120,000		
$120,001 - $180,000	16	31
> $180,000	10	19
Highest Education Level		
High School/TAFE	10	19
Undergraduate	23	44
Postgraduate	19	35
Employment Status		
Homemaker/Student	7	14
Part-time	25	48
Full-time	20	39
Occupation	30	
Professional		58
Manager	5	10
Service/Sales	4	8
Clerical	3	6
Technician	1	2
Trade	1	2
Other	1	2

Using Braun and Clarke's (2006) thematic analysis approach four main interconnected themes emerged from the qualitative analysis of open-ended questions about decision-making sources for food information. The themes identified were (i) making informed food choices; (ii) balancing nutrition with personal preferences; (iii) managing information overload and external pressures; and (iv) employing empowering strategies for practical lunchbox preparation. These themes highlight the complexity and variety of factors that individuals consider when gathering information and making decisions about food.

Theme 1: Informed Food Choices

Theme 1, "Informed Food Choices," showed how parents navigate various information sources, such as food labels and dietary guidelines, to make well-informed decisions for their children's lunchboxes. They prioritize nutritional value, focusing on natural ingredients and minimal additives, ensuring that the lunches provide essential nutrients. Additionally, lunchboxes are thoughtfully adapted to cater to any allergies, intolerances, or specific dietary requirements the child might have. Parents also employ strategies to limit ultra-processed options, aiming to reduce the inclusion of highly processed snacks, sugary drinks, and unhealthy fats, while still considering factors like budget and convenience.

Most participants (n=36; 78%) considered nutritional information when packing lunch boxes (M=3.08; SD=1.04). The primary sources of information used for lunchbox preparation were food labelling (32% always, 9% sometimes), followed by the Australian Nutrition Food Guide (Nutrition Australia, 2022) (12% always, 24% sometimes), and peer-reviewed journals (6% always, 17% sometimes). Friends, family, social media, magazines, public health messages, books, parent groups, blogs, and TV were found to have minimal roles in the participants' nutritional information. Less than half of the parents read the food labels when shopping (M=2.42; SD=1.07). However, of those who read the labels, the key indicators these parents considered when interpreting food labels were based on the amount of sugar and the additives/preservatives on the ingredients list. Some parents considered the details regarding the fat amount, food serving size, salt, the health star rating, allergy information, protein portion, sodium amount, nutritional rating, fiber amount, and/or carbohydrates. The following four parent responses highlight this decision-making. “*When I buy packet food, I want to know exactly what’s in it. I look for fewer ingredients and no additives or preservatives.*”; “*I look at the ingredients list. I look for where sugar sits in the list and don’t buy anything that has sugar in the top 3*

ingredients"; "(I) look to see how much processing the food has passed its original natural state"; "I use the star rating as a general guide to narrow down choices then look at the ingredients to narrow it down."

Most participants rated their confidence as high (on a scale of 1-5, where 5 was high) in providing a healthy lunch box for their children (n=33; 64%). Their confidence in choosing healthy foods was related to avoiding preservatives and highly processed foods, choosing fresh foods, and including food with high amounts of fiber, such as vegetables. All participants (n=52) stated they were familiar with five food groups that comprise the Australian Guide to Healthy Eating (Nutrition Australia, 2022). Parents' decision-making indicated that they considered the five food groups in their child's lunch box as they shared that they took a balanced approach as the following quotes indicate. *"I normally try to include a variety of foods with a minimum of 3 foods from the 5 food groups"; "I just try to make sure one of each group is covered".*

In addition, parents paid attention to the food allergy and safety. *"What can sustain sitting in a lunchbox and doesn't need refrigerating or cooling".* As well as using the guidelines to choose the food, they also reported using other sources, such as naturopaths, and their intuition. *"However, rather than taking recommendations from the Australian Guide to Healthy Eating, I prefer to take advice from my naturopath regarding healthy food for my children"; "It's a feeling I get. I like balance and if it doesn't feel right, I'll take something out or add another."*

Parents were also asked to rate 1) how healthy they would rate a series of nine lunchbox items from 1 (extremely unhealthy) to 10 (extremely healthy) and 2) How likely they would be to include the item in their child's lunchbox from 1 (extremely unlikely) to 10 (extremely likely). They ranked fresh foods including fruits, vegetables, and whole meal as the higher priorities, with processed foods such as Muffin, Original Flavored, Chips, and Coca-Cola soft ranked the lowest.

Theme 2: Balancing Nutrition and Preferences

The second theme focuses on the challenge of balancing nutrition with children's preferences in their lunchboxes. Parents make considerable efforts to accommodate their children's tastes while maintaining a commitment to healthy eating principles, although this is often challenging. To make the meals more enticing, they ensure that the presentation is visually appealing and suitable for the child's age, focusing on appealing taste and texture. Parents also encourage variety by rotating the menus and including a diverse range of healthy options to keep the children interested and prevent boredom. Moreover, they emphasize the importance of building a balanced lunchbox, incorporating essential components such as fruits, vegetables, whole grains, and protein sources to ensure a well-rounded meal.

Overall, parents identified that it was challenging to balance healthy options based on their knowledge about healthy foods, the availability of fresh versus ultra-processed foods, the time limitation, and what their children like to eat. The participants indicated that the following indicators impacted their preparation of a healthy lunch box for their children: the child's preferences, good balance, healthy food, convenience, food knowledge, avoiding preservatives, including a variety, (un)processed foods, guidelines, and the cost of living. Parents may be frustrated if their children do not consume the foods they have thoughtfully provided, and that the food may be wasted. Hence, the parents reported providing variety while being mindful of their child's food preferences. *"I try to go as healthy as possible within the limits of what my daughter will eat. I would rather she ate SOMETHING than provide only healthy options that she will leave to waste."*

Parents reported trying their best to enhance their basic knowledge about healthy eating and avoid highly processed foods, as they felt surrounded by a lot of ultra-processed foods with adverse impacts on health and wellbeing. *"I try my hardest to and am aware of preservatives in our foods to I am for little to none in their lunches. "; "There are too*

many snack-type items that are processed.”; and “I think I know the basics, although it is not always easy to achieve.”

Parents also found that the time they had to prepare their child’s lunchbox was a barrier to preparing a fresh, healthy lunch. *“I wish I could do better, but I don't always have the time or ingredients to make them a salad wrap instead of a homemade ham and cheese scroll, for example”.*

Theme 3: Information Overload and External Pressures

Theme 3 addresses the challenges of information overload and external pressures that parents face regarding lunchbox choices for their children. Parents often experience information fatigue as they are bombarded with advice from various sources, including schools, daycare centers, and social media platforms, which can lead to feelings of overwhelm and confusion. Additionally, social influences such as cultural norms and peer comparisons can exacerbate feelings of judgment and uncertainty about their choices. To combat these pressures, parents discuss and employ strategies to confidently assert their individual values and preferences while managing external expectations and influences. They also work on managing information overload by filtering through the abundance of information to identify and rely on sources that best align with their personal values and the specific needs of their family.

Participants were asked whether they wanted more information about preparing their child’s lunch boxes. Over half (n=31; 60%) of the participants suggested they do not require further information on preparing lunch boxes, while 21 (40%) would welcome further information. “*I don’t want to receive any information. Parents are bombarded with healthy lunchbox ideas. Personally, daycare/preschools/ schools judge families too much about what food they provide for their children.”*

Theme 4: Empowering Approaches for Practical Lunchboxes

Theme four explores empowering approaches that assist parents in creating practical and sustainable lunchboxes for their children. Parents often find themselves overwhelmed by the need to balance various factors such as health, enjoyment, cost, preparation time, innovation, and variety. They actively seek supportive resources that provide practical tips and a judgment-free environment, enabling them to make well-informed decisions about lunchboxes. This need is driven by the desire to meet all these requirements without spending excessive time or resources, allowing them to focus on other daily responsibilities.

Confronted with the considerable task of ensuring that lunchboxes are not only healthy and enjoyable but also quick to prepare, cost-efficient, and offer a variety of options to keep their children interested, parents face significant challenges. The demand for meals that maintain their quality over time adds to the complexity, requiring strategies that accommodate freshness and prevent food from becoming soggy.

Parents aim to create lunchboxes that will be consumed and enjoyed, which involves finding a balance between nutritious and desirable food options. Additionally, there is a pressure to provide meals that are both appealing and quick to prepare, reflecting the need to efficiently manage time while ensuring that children have satisfying meals. Ultimately, this theme captures the ongoing struggle that parents face in balancing the multiple demands of preparing children’s lunchboxes, which are seen as a significant part of their daily routine. The challenge is not just about feeding their children but doing so in a way that supports their health, enjoyment, and development, all within the constraints of a busy family life.

Parents highlighted the need for varied and innovative meal ideas to cater to diverse preferences "*Ideas! sometimes I get a little bored and put the same old things in. My child doesn't eat sandwiches*,". They wanted strategies to build parents' confidence, encouraging them to trust

in their capability to prepare a balance of healthy and yet enjoyable meals for their children. "*I want to find food he enjoys and will eat, that is healthy*". They also highlighted budget-friendly, and time-efficient food ideas, which can also be prepared in advance. "*Tips on stuff that's cheap, healthy, and can be prepared ahead of time, and that doesn't go soggy in their lunchbox*". Additionally, significant attention is given to food safety and preservation techniques to ensure that the lunchbox contents remain fresh, safe to eat, and appealing throughout the day. "*Quick recipes for lunch boxes which children love to eat*". They also prefer the foods that make children feel fuller for longer. *“What is going to keep them going and give them the energy they need to sustain themselves through the day”.*

Discussion

This study aimed to explore parents’ decision-making on food choices for their child’s lunch box, including nutrition information-seeking behavior, attitudes, barriers, and facilitators. Over three-quarters of the parents in this study used nutrition information when preparing their child’s lunch box. This is unsurprising as the 42 participants (81%) were educated with at least a bachelor’s degree and 98% were mothers, aligning with Cha et al.’s (2014) study that highly educated mothers were motivated to focus on healthy eating compared to less educated women.

Reading food labels was the key factor in seeking nutrition information among participants compared to other sources such as TV, social media, guidelines, and peer-reviewed papers. This highlights the importance of clear food labelling around nutrition knowledge and provides opportunities for food companies to enhance the parents' knowledge about food. As food labelling was identified as playing a significant role in food decision-making, it would be beneficial for food manufacturers to provide clear product labels so that consumers can compare and make informed decisions about the products they consume. The manufacturers

decide on the serving size, the information, and the ingredients listed on the packaging. Sometimes, this can be manipulated to meet health criteria, such as the Health Star Rating System (Australian Government Department of Health and Ageing, 2024), or to fulfil health claims. As an example, it is suggested that 0.5 grams of trans fat per serving can be labelled as 0, and anything with half a gram of sugar per serving can be called sugar-free (Australian Government Department of Health and Ageing, 2024). Of course, this depends on the serving eaten; therefore, it can be deceiving. Many natural foods do not use the Health Star Rating, as they don’t have nutrition information panels. These complexities can make it challenging for parents to understand how healthy the food is. Although food labels exist to protect public health and safety, the number of labels and manipulation of labels and ingredients can result in complexities for consumers when deciding about the healthiness of the products. For example, sugar has 54 names, making it challenging, even for highly educated people. The closer food is to nature, the less likely it will have a label, such as fresh fruits/vegetables and meat. Having fewer ingredients listed in labelling can also be a key indicator of minimally processed food.

The role of other nutrition information sources such as TV, media, and evidence-based information was identified as being used by parents in this study. Noting that this study cohort was highly educated and that 80% read the food labelling. Overall, there is an observable link between the educational level of parents and the type of foods packed, with higher education levels somewhat correlating with healthier lunchbox contents (Pearson et al., 2021). For parents who may not have such literacy levels, for example, they may have English as a second language. It is suggested that the nutrition information be more visual and able to be understood by non-English speaking people.

Parents expressed a desire for flexible, holistic, and comprehensive lunch ideas that are healthy, easy, and convenient. The parents reported feeling judged for the food they provided, suggesting that food decisions

are value laden. Parents have to deal with this challenge and meet their child's food preferences, even if it means providing something 'less than healthy' so long as the child eats. Parents are enmeshed in the tension of being responsible for ensuring their child eats healthy food and it is judged as healthy and enjoyed by the child. Parents expressed annoyance at having healthy food information 'shoved down my neck' highlighting the difficulties in packing an 'acceptable lunch box'. This can be challenging for parents who have busy lives, and who seek easy, minimally time-consuming solutions to packing their child/ren's lunch boxes. Overall, parents strive to balance nutrition and child preferences against the backdrop of guidelines, societal judgments, and financial limitations (Sutherland et al., 2020).

The barriers and facilitators of nutritious and healthy eating were viewed in an ecological way that does not operate in isolation. There are individual-level factors in the microsystem: the parents' education, their understanding of healthy food, and the labelling of food. Within this system, the child has agency over the parent influencing food decisions while the parent aims to provide long-lasting nutritious food for a school day. It is recommended that children are educated to acquire health literacy- this can be done in the first five years of life as children learn to discriminate between healthy foods and understand rules for eating (Boyd, 2015). As consumed food impacts the quality of a child's life, not only when they are young but throughout their lifespan, it is recommended that children are educated early about food and its impact on their lives. Thus, including health and nutrition literacy within the school curriculum is a step forward for preventing disease. This curriculum change may well influence the livelihoods of many people, reducing obesity and improving lifestyle. There is a need to develop strategies that boost children's acceptance and consumption of a diverse array of nutrient-dense foods through empowering approaches.

We have some key recommendations for improving the lunchboxes for children. First, a collaborative and integrated approach to sustainable

food box preparations is required. This can include parents/guardians, children, schools and educators, nutritionists/dietitians, food manufacturers, health organizations, government bodies and policymakers, and parent-teacher associations. For example, there can be collaborative regular workshops, including representatives from each group mentioned above for various reasons, including enhancing health and nutrition literacy, as well as practical approaches for making a healthy sustainable lunch box. The potential for school-based interventions to promote healthier eating habits among children is crucial, given that dietary habits formed in childhood often persist into adulthood. Involving children in the preparation or choice of their meals may enhance the acceptance and nutritional quality of school lunches (Rongen et al., 2023). This can include cooking classes and demonstrations, including children learning how to engage in making healthy foods to make the process enjoyable. In addition, there can be initiatives such as community gardening initiatives by making local farmer-school connections. These initiatives assist in understanding food processing from farm to table appreciation of healthy foods and not wasting food as well.

There is a pressing need for targeted public health strategies and comprehensive interventions within schools to improve the nutritional quality of children's lunchboxes, focusing on substituting discretionary items with healthier and nutrient dense alternatives. Such efforts should involve parents, teachers, and policymakers collaboratively to support and educate on healthier lunchbox preparation and enforce school policies that promote nutritious eating habits. Additionally, ongoing research and policy reforms are essential to monitor and enhance the dietary impacts of school lunchbox contents, including regulatory measures that encourage the production of healthier, well-portioned food options for children (Sutherland et al., 2020).

Early childhood is a crucial period for enhancing health and nutrition literacy in children. Cultural heritage, personal beliefs, and life

experiences shape how knowledge is transmitted. Enhancing the school curriculum and introducing nourishing, fresh food alternatives (rather than UPFs in line with current canteen directives) can effectively complement parental roles. A striking example is seen in Niteroi, Brazil, where recent legislative measures have successfully banned the sale, marketing, and distribution of unhealthy foods in schools, including all ultra-processed foods. Practical steps like cultivating home/school/community gardens, participating in local food enthusiast groups, and creating homemade 'treats' alongside children can foster a sustainable method of ingraining healthy eating habits and actively making wholesome choices right from childhood.

The second recommendation is to encourage parents to consider the level of processing food has undergone to get to its final stage. One example is the 'NOVA food classification' which is a categorization of food according to their level of processing and aims ‘to improve shelf life and simplify meal preparation’ (Braesco et al, 2022). This may assist in understanding the nutritional value of food, which in turn has a significant impact on ultra-processed foods on metabolic health, as well as chronic diseases.

Healthcare providers, including doctors and dietitians/nutritionists, have a crucial role in enhancing health and nutrition literacy. For example, doctors are the primary contacts for each individual and can play a significant role in improving both parent's and children's awareness of the importance of healthy eating and the exclusion of ultra-processed foods (Elizabeth et al., 2020). It is important to consider a personalized approach to lunchbox preparation when having advice from the care providers and other partners based on the individuals’ belief system, heritage, religion, lifestyle, fitness level, health status, living cost, as well as a social network.

Ultra-processed foods can be quite addictive, particularly in the younger population with adverse impacts on their physical as well as psycho-

social wellbeing. Hence, the third key recommendation is that changes need to happen at a more macro level, by changing the policies, and regulations about food preparation. Dietary consumption is intricately shaped by the prevailing food environments, substantively steered by governmental regulations. These environments encompass multifaceted aspects including sociocultural dynamics, economic factors, and regulatory frameworks that collectively dictate the availability, accessibility, and quality of food. The key elements at this macro level that require regulations can include the food supply chain, nutritional information, food advertising, price structures, retail contexts, nutrition labelling standards, food claim regulations, nutrition standards for schools and other public institutions, tax policies, and subsidies, advertisement and marketing/media regulations. the production and consumption of ultra-processed foods can vary across different areas, such as urban and rural areas. Children and young populations may be more exposed to ultra-processed foods in urban areas (Calixto Andrade et al., 2021). For instance, low socioeconomic areas as well as areas with younger populations, including children may be more targeted for food corporations (Fagerberg et al., 2019). In countries such as the USA, Australia, and New Zealand more marketing and advertisements have been observed on trains and areas close to schools (Fagerberg et al, 2019) Across diverse nations, an escalating array of policies is being implemented to bolster food environments and champion healthful eating habits. Such measures encompass various strategies such as informative food labelling, curbing marketing aimed at children, fiscal mechanisms like levies on sugar-sweetened beverages, and the advancement of optimized dietary paradigms. Some other strategies can be sponsorship of children’s sports by healthier food brands or public health nutrition campaigns could help promote healthier food choices among parents (Scully et al., 2020). Governments and policymakers have a big role in regulating the current ultra-processed food marketing that targets young people. A policy banning marketing tactics for unhealthy foods on packaged lunch box snacks would significantly reduce both child-directed

and parent-directed marketing. Eliminating child-directed marketing could aid parents in making healthier purchasing decisions and reduce children's consumption of discretionary foods at school. Therefore, regulating child-directed marketing on packaging is essential for comprehensive efforts to protect children from the marketing of unhealthy foods (Watson et al., 2024).

Furthermore, at the macro level, besides improving children’s dietary habits, it is paramount to reduce food and packaging waste. Integrating environmental considerations with dietary behavior’s is vital to enhancing both health outcomes and environmental awareness among schoolchildren. It is recommended to consider a more holistic approach that incorporates socio-ecological influences and emphasizes the empowerment of children as agents of change in eating healthy and, at the same time, taking care of the environment. Future research should focus on developing and testing interventions that address both health and environmental sustainability to create more effective educational and behavioral strategies in educational food environments.

Limitations

This study has some limitations, including a small sample size in the quantitative phase, which has been complemented by the qualitative phase of the study (e.g., open ended questions). The participants were well-educated parents and were very interested to provide a healthy lunch box for their children. Hence, the work cannot be generalized to the whole population.

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