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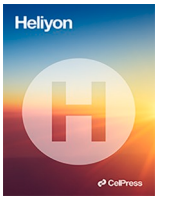

Research article

Parents' practices, feelings, and support needs surrounding the development of food allergy literacy (FAL) in children before their transition to school

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ABSTRACT

Children's knowledge of food allergy and risk prevention, coined as food allergy literacy (FAL), can bolster their safety in schools. Addressing research gaps on this topic, especially, parents' role, the aim of this study was to investigate Australian parents' practices, feelings, and support needs relating to building children's FAL before their transition to school. Questionnaire data from 159 parents were analysed statistically to characterise the sample and explore the association between children's FAL, parent anxiety, and parent confidence in their child's ability to stay safe at school. Results indicated that parents supported children's knowledge of food allergy and risk prevention using age and developmentally appropriate pedagogies. However, they focused less on building children's skills to read food labels, communicate symptoms, and seek help. Furthermore, the association between children's FAL and parents' feelings about children's safety in school was weak. However, the association between the child's FAL and parents' confidence in the child's ability to stay safe at school was moderate-to-strong. The implications of these findings for educators are discussed.

1. Introduction

The prevalence of food allergy in young children, along with their attendance in early childhood and school settings is on the rise globally [1–5]. Generally, schools are fraught with increased risks of food allergy via, for example, food temptations from peers, sharing cutlery, and learning activities involving foods [6]. Yet not all educators have the knowledge, skills, and self-efficacy to effectively manage children's food allergy in schools [7]. Added to these, adult supervision diminishes in schools, especially at meal times and in playgrounds (citation-removed-for-blind review). Furthermore, parents can find it hard to trust their young child's ability to resist food temptations in schools. Above all, allergic reactions are frequently reported on school grounds, estimated to be approximately 20 % in some schools [8,9], highlighting various risks of allergy in these settings. For these reasons, parents were found to be highly anxious about their child's safety and their capacity to stay safe in school when children are beginning school (citation

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removed-for-blind review).

Schools endeavour to promote children's safety via their food allergy policy or guidelines and staff training in anaphylaxis [10]. Nonetheless, it is equally important that children are equipped to take some responsibility for their safety and self-management of allergy when attending school (citation removed-for-blind review). There is also a need to promote children's capacities to self-manage their chronic health condition for improved health outcomes [11]. It is therefore imperative that children have the knowledge and skills about allergy and allergy causing foods – specifically, it is important that they can choose safe foods, resist those that are not, recognise symptoms, inform others when unwell, and access treatment when required. These skills are collectively defined as food allergy literacy (FAL) (citation removed-for-blind review). This paper based on Socioecological models [12] provides insight into how parents or family support young children's learning of FAL in early childhood years (ages 3–5) and the need for support from educators and communities in building children's FAL before their transition to school.

1.1. Theoretical and empirical bases

Parents or family are an 'important contributor to the cultural conditions that support health' [13] Their role as promoters of children's health is highly emphasised in various theories [13–15]. For example, Bronfenbrenner's [12] ecological theory asserts that parents provide contexts and environments for children's development, which also includes their health. Similarly, the theories of planned behaviour [16] and social learning [17] outline that they provide mechanisms, such as routines, habits, and modelling for health promotion. Control theories, on the other hand, indicate that parents influence children's health attitudes and behaviours by rewarding and/or imposing restrictions on children's choices and behaviours. This might involve taking charge of meals served to prevent obesity [18]. Additionally, Vygotsky's [19] cultural-historical theory emphasises parents' guidance in supportive environments via interactions to promote their knowledge or schemas and self-guidance. Drawing on the theorised notion that parents are important health promoters, this paper argues that parents are well-placed to build children's FAL and to transfer healthcare responsibility to children and promote their self-management of allergy [20,21].

Parents have plenty of opportunities to support children's FAL from a young age. This can involve discussions about food allergy, grocery shopping, meal preparations, normalising food allergy, modelling risk prevention and allergy management and safety behaviours through their daily management of allergy, and actively engaging with (rather than avoiding) events that involve food, such as birthday parties, cultural festivals, and dining out. Other useful strategies include explaining, encouraging positive behaviours with rewards, and communicating how and why healthy food choices are made [22–25] (citation removed for blind review). However, building young children's FAL is complex for parents to achieve alone. From an ecological perspective [12], educators and communities are important stakeholders in promoting children's developmental outcomes, including health. Their support to families in building children's FAL, is therefore, invaluable.

FAL helps children to be empowered with knowledge of allergy, to be more confident and less fearful about allergy, and advocate for their safety in schools [26]. Furthermore, it can ease parent anxiety by promoting their confidence in the child's ability to stay safe in schools. Importantly, it can prevent avoidable allergies that strain families and public health systems [27,28]. Research on the importance food allergy education for school aged children is gaining momentum [29–31]. However, there are no studies or interventions to build preschool-aged children's FAL (citation removed for blind review). Furthermore, there is no research on parents' role in building children's FAL before their transition to school, or role of FAL in easing parent anxiety and promoting parent confidence. Addressing this knowledge gap, this paper investigated Australian parents' practices, feelings, and support needs surrounding the development of children's FAL prior to their transition to the first year of primary school (known as kindergarten, preparatory, reception, and pre-primary in various Australian states). It is part of a study that also aimed to investigate children's views of FAL and to co-design FAL curricular activities and art-based resources collectively with children, parents, and educators.

2. Methods

The study involved an embedded mixed method design 'in which one [qualitative] data set provides a supportive, secondary role in a study based primarily on the other [quantitative] data type' [32]. Specifically, a questionnaire was used to concurrently collect quantitative and qualitative data, whereby 'one type of data provides a supportive role for the other dataset' [33]. This design was

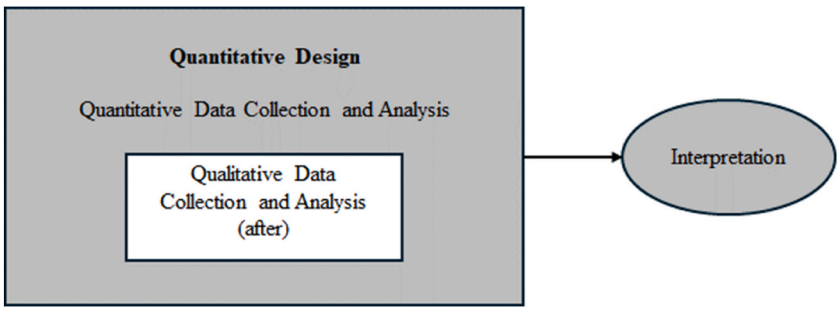

Fig. 1. Embedded mixed method design.

appropriate because it serves to 'collect … analyz[e] … and mix … both quantitative and qualitative data in a single study … [to] provide … a better understanding of research problems than either approach alone'. While the quantitative data largely focused on children's food allergies, as well as parent practices, awareness, and confidence, the qualitative data largely helped to explicate parent feelings about their child's transition to school and parent support needs (see Fig. 1).

Parents were eligible to participate if they had a child aged three to five years, inclusive, who had been diagnosed with a food allergy, was at risk of anaphylaxis and resided in Australia. They were recruited through food allergy support and parenting organisations. Prospective participants were invited to complete an online questionnaire hosted on the Qualtrics site. Of the 170 prospective participants who accessed the questionnaire, 159 indicated their consent and completed the questionnaire.

In the absence of published instruments to determine parents' practices, feelings, and support needs relating to building children's FAL before their transition to school, a questionnaire was created for this study. It included 46 closed and open-ended questions to collect quantitative and qualitative data with binary, multiple choice, and open-ended questions [34]. Questionnaire topics included: parent and child demographics; daily management of food allergy; parent knowledge and practices relating to children's FAL; sentiments about their child's transition to school and confidence in the child's capacity to stay safe at school; parent knowledge of educators' FAL practices in early childhood settings; and educator support that parents need to build FAL in preparation for their child's transition to school. The questionnaire's reliability and validity were not established statistically. However, face-validity was established by ensuring that the questionnaire was fit-for-purpose. Further, questions were written in plain English and were organised logically to reduce measurement and response biases and errors [35]. The relevance and alignment of the questions [36] were also cross-checked by an experienced researcher and the questionnaire was pilot-tested with a staff member and parent volunteer from

Table 1
Participant characteristics ($n = 159$)[a].

Characteristic		N° and %
Parent sex	Male	5 [3]
	Female	154 (97)
Parent age (years)		
	26–34	43 [27]
	35–45	108 [68]
	Over 45	7 [4]
Parent highest qualification		
	Year 12	7 [4]
	Vocational education or diploma	31 [20]
	Undergraduate degree	58 [36]
	Postgraduate degree	63 [40]
State or territory	New South Wales	48 [30]
	Victoria	38 [24]
	Queensland	26 [16]
	South Australia	14 [9]
	Western Australia	26 [16]
Geographical area	Metropolitan	113 (71)
	Regional	43 [27]
Main language spoken at home	English	153 (96)
	Language other than English	6 [4]
Cultural background		
	Culturally and linguistically diverse	25 [16]
	Anglo-Australian	132 (84)
Child sex	Male	103 [65]
	Female	55 [35]
Child age (years)	3	54 [34]
	4	57 [36]
	5	47 [30]
Age at diagnosis (years)		
	At 0.5	82 [52]
	1	59 [37]
	2	6 [4]
	3	6 [4]
Has current EpiPen®	Yes	148 (94)
	No	10 [6]
Has current plan for anaphylaxis developed by the Australasian Society of Clinical Immunology and Allergy [42]	Yes	156 (99)
Attends early childcare setting	Yes	147 (95)
	No	8 [5]
Childcare setting attended	Long daycare	88 [51]
	Preschool	76 [44]
	Playgroup	5 [3]
Child starting school next year	Yes	77 [50]
	No	76 [50]

[a] Categories for which there were fewer than 5 participants were not reported.

Allergy & Anaphylaxis Australia (a national support organisation for people with allergies). The study commenced following clearance from the relevant human research ethics committee (registration number: H14425). Parents were asked to consent digitally on the questionnaire before participating. Only eligible parents who consented could complete the questionnaire.

The quantitative data were analysed using SPSS 25.0. This involved calculating percentages to characterise the sample and conducting Chi-square and Fischer's exact tests to determine whether there is a significant association between: children's FAL and parent sentiments about their child's transition to school; as well as children's FAL and parent confidence in their child's ability to avoid risks and stay safe (2×2 tables with an expected number of cases <5). The strength of the association between variables that had two or more values in each category was measured using Cramér's V tests [37]. The significance of the relationship was indicated with values ranging from 0 to 1, with values $p < 0.3$ representing a weak association, 0.3 to 0.5, a moderate association, and $p > 0.5$, a strong association [38].

The qualitative data collected via the open-ended items were analysed using qualitative content analysis [39,40] – an approach that serves to 'classify … text into an efficient number of categories that represent similar meanings' [41]. Specifically, conventional content analysis was used to 'describe a phenomenon' – namely, FAL among children – given that 'existing theory or research literature on [this] … phenomenon is limited'. This involved (re)reading the data, ascertaining patterns by identifying excerpts that were topically similar and dissimilar, and inductively constructing categories that reflected these.

3. Results

3.1. Participants

The demographic characteristics of the 159 parents and their children are presented in Table 1.

Children were exposed to many risks of food allergy in their daily lives at homes, educational and community settings. They had relatively more allergic reactions in community settings (33 %), followed by homes (24 %), and early education and care settings (14 %). Most children had an EpiPen® (94 %) and an emergency response plan titled, action plan for anaphylaxis (99 %), developed by the Australasian Society of Clinical Immunology and Allergy [42] (see Table 1). The cause of an allergic reaction at home was the child's accidental ingestion of an allergic food, whereas human error or adults inadvertently feeding a child the wrong food was the most common cause of allergy in both childcare and community settings. Children were treated with an adrenaline auto-injector for a severe allergic that occurred at homes. However, parents tended to administer antihistamines for a severe reaction that occurred in community settings than in other settings.

3.2. Parent practices relating to their child's school transition

Parents reported that they helped their child to understand their food allergy and risk prevention in many ways. Specifically, they helped their child to: refuse foods from others not checked by adults (21 %); recognise foods they were allergic to (18 %); wash their hands before and after eating (18 %); recognise symptoms (14 %); and seek help when unwell (17 %). However, they placed less emphasis on teaching their child to recognise food labels or pictures of allergy causing foods (6 %). Furthermore, parents reported building their child's FAL using age or developmentally appropriate pedagogies and resources. Predominately, they mentioned helping children to learn about FAL using questions (34 %) and grocery shopping (22 %), followed by reading storybooks (17 %). They also

Table 2
Parent practices to prepare children for school ($n = 159$).

FAL Components	Nº	%
Recognise allergic foods	93	18
Read food labels	33	6
Not accept foods from peers without first checking with their parent/educator	114	22
Wash hands before and after eating	93	18
Recognise symptoms of a food allergic reaction	71	14
Ask for help if unwell	87	17
Others	20	4
Unsure	8	1
Total	**519**	**100**
Strategies and Resources Used	**Nº**	**%**
Reading storybooks about food allergy	47	17
Asking questions	94	34
Discussion using pamphlets	12	4
Visits to grocery shops (e.g., showing allergic foods and reading food labels)	60	21
Watching videos on how to stay safe	20	7
Teaching using digital apps	6	2
Other	16	6
None	25	9
Total	**280**	**100**

watched videos, used social scripts with cartoon characters, and created social stories to teach children about allergy. About 10 % of parents did not mention any strategy (see Table 2).

3.3. Parent awareness of their child's FAL

Almost all parents (99 %) indicated that their child knew about their food allergy. Specifically, they mentioned that their child: had knowledge of allergy triggers (88 %); knew not to accept foods from others (82 %) or share drink bottles or cutlery (62 %); understood the consequences of eating the wrong foods (72 %); and could seek help when unwell (64 %). However, parents were not confident about whether their child could clearly communicate allergy symptoms (27 %) and read food labels (24 %) according to their developmental levels (see Table 3).

3.4. Parent feelings about their child's transition to school

Over half of the parents (56 %) reported feeling anxious about their child's transition from preschool to school. Of those remaining, 33 % had mixed feelings, 9 % were positive, and 2 % were unsure about their feelings ($n = 139$).

Following the qualitative content analysis, parents' anxiety was attributable to: the limited availability of adult supervision; limited confidence in who might manage risk and ensure their child's safety; and the exclusion of their child from school activities. Specifically, parents reported feeling anxious due to reduced adult supervision in schools compared to childcare settings. They also noted a limited confidence in the ability of school staff members to assume responsibility for their child's safety, and manage food related emergencies with, for example, the timely administration of an adrenaline auto-injector:

> It is quite scary the thought of my son starting school where food is not so tightly watched as it is in childcare and kindergarten settings.
>
> To give another person full care of a child with life threatening food allergies can cause extreme anxiety and is a constant worry.
>
> It is always my concern that staff are overwhelmed or not educated and help is not given [to my child] when needed.

Relatedly, some parents were anxious about trusting their young child's ability to self-manage their food allergy while at school, lack of self-control and risk-taking behaviours as noted in these quotes below:

> It is completely overwhelming thinking about my little girl having to manage allergies on her own in a school or social environment. I am slowly trying to prepare her, but I am so worried about when she starts [*sic*] school.
>
> She is so little; I worry about her impulse control when away from me; He is at the stage of wanting to push limits and has been very interested in allergen foods which is concerning; [My child] sharing food is my main concern.

Noting that schools are not 'nut free' environments, some parents were concerned that their child would be excluded from school activities because of their allergies:

> I still get anxious for the future [starting school] when she won't be in a nut free school.

3.5. Parent confidence in child's food allergy related safety

Close to half of the parents (44 %) were confident that their child can stay safe resisting food temptations from peers. Of the rest, 32 % of parents were not confident and 25 % were unsure if their child knows how to stay safe at school resisting peer pressure (n = 139). Further, 44 % of parents were also confident that their child can stay safe at school avoiding many other risks. This involved eating their own lunch and washing their hands before and after eating meals. Of the remaining, 30 % were not confident and 26 % were unsure if their child could stay safe at school, avoiding food allergy risks ($n = 139$).

Table 3
Parent Awareness of their Child's FAL ($n = 140$).

FAL Components	Responses					
	Yes		No		Unsure	
	Nº	%	Nº	%	Nº	%
Knows about the allergy and its severe risks	139	99.29 %	0	0	1	0.71
Has knowledge of allergy triggers	123	88	6	4	11	8
Knows the consequences of eating allergic foods	101	72	12	9	17	19
Can communicate symptoms to others	38	27	53	38	49	35
Knows not to accept foods from others	114	82	10	7	16	11
Knows not to share drink bottles/cutlery	86	61	26	19	28	20
Can recognise pictures or words of allergic foods on food packets	33	24	74	53	33	23
Can ask for help when unwell	89	64	11	9	40	24

3.6. Child FAL and parent feelings about transition to school

The Chi-square tests indicated a significant positive relationship between parent feelings about their child's transition to school and their child's ability to communicate food allergy symptoms to others (χ^2 6.143[a]; p: 046; $df = 2$). This suggests that parent feelings, especially anxiety, could be addressed by building the child's capacity to communicate their symptoms to receive assistance to treat allergic reactions. However, a contingency table analysis of parent sentiment about their child's FAL indicated a weak and non-significant association between these two variables. None of the Cramér's V values were significant for all components of FAL (see Table 4). This suggests a weak association between parent feelings of anxiety and their child's FAL.

3.7. Child FAL and parent confidence in child's food allergy related safety

Fisher's exact tests were conducted to determine if parent confidence was independent of their knowledge of their child's FAL. The results indicated a significant association between parent confidence and: their child's perceived knowledge of allergy triggers ($p = 0.019$); and the consequences of consuming allergic causing foods ($p = 0.018$). Furthermore, the results indicated a significant association between parent confidence and their child's perceived ability to: refuse foods from others ($p=<0.001$); avoid sharing drink bottles ($p=<0.001$); communicate symptoms ($p = 0.004$); recognise foods they were allergic to ($p = 0.033$); and seek help when unwell ($p = 0.022$). However, the contingency table analysis showed a moderate association between parent confidence and their perceptions of their child's: knowledge of consequences (Cramér's V = 0.011; $df = 1$); ability to refuse foods they were allergic to (Cramér's V=<0.001; $df = 1$); ability to communicate symptoms (Cramér's V=<0.003; $df = 1$); ability to recognise allergy causing foods (Cramér's V=<0.002; $df = 1$); and ability to seek help when unwell (Cramér's V = 0.001; $df = 1$). Inexplicably, a strong, significant association was noted between parent confidence in their child's ability to prevent risks and the child's ability to avoid sharing drink bottles (Cramér's V=<0.001; $df = 1$, see Table 5).

No statistics are computed for the first component of FAL because -does your child know about their severe food allergies and/or the risk of getting very sick (anaphylaxis) is a constant.

3.8. Parent support needs

Parents were asked to report on how their child's educators currently support them in preparing their child for school with FAL before asking them to indicate the additional support they need in this respect. Most (80 %) said that educators helped their child to

Table 4
Association between Child FAL and Parent Sentiments about their Child's Transition to School ($n = 139$).

Child FAL	Parent sentiment						Chi-square values and degrees of freedom	Chi-square significance	Cramér's V values	V significance
	Excited		Mixed feelings		Anxious					
	Yes	No	Yes	No	Yes	No				
Does your child know about their severe food allergies and/or the risk of getting very sick (anaphylaxis)?	12	–	45	–	78	–	–		–	–
Does your child understand what triggers their food allergies?	12	0	39	3	69	3	1.181[a] ($df = 2$)	0.554	0.097	0.554
Does your child know what happens if they eat the wrong foods?	9	0	35	2	55	9	3.041[a] ($df = 2$)	0.219	0.166	0.219
Does your child know that they cannot accept foods from other children or people they do not know well?	12	0	38	2	62	6	1.544[a] ($df = 2$)	0.462	0.113	0.462
Does your child know that they cannot share drink bottles or cutlery with other children?	9	1	27	6	47	18	2.184[a] ($df = 2$)	0.336	0.142	0.336
Can your child clearly communicate the symptoms of a food allergic reaction to an adult, including people they do not know that well?	3	1	15	11	19	38	6.143[a] ($df = 2$)	0.046*	0.226	0.046
Can your child recognise pictures of an allergen or the words of what they allergic to on the processed food packets?	2	8	14	20	17	44	2.464[a] ($df = 2$)	0.292	0.153	0.292
Does your child know how to ask for help if they are feeling unwell?	11	0	34	2	42	8	3.895[a] ($df = 2$)	0.143	0.200	0.143

* Chi-Square/Fisher's Exact test indicated a significant association between the variables.
V values < [0.1,0.3]: Weak strength of association; V < [0.4,0.5]:* medium strength of association; V > 0.5: **strong strength of association.
Note: No statistics were computed for the first component of FAL because 'Does your child know about their severe food allergies and/or the risk of getting very sick (anaphylaxis)' is a constant.

Table 5
Association between Child FAL and Parent Confidence in their Child's Ability to Avoid Risks and Stay Safe ($n = 139$).

Child FAL		Parent confidence		Fischer's exact test (2-sided)	Cramér's V values	Cramér's V significance
		Yes	No			
Does your child know about their severe food allergies and/or the risk of getting very sick (anaphylaxis)?	Yes	61	41	–	–	–
	No	–	–	–	–	–
Does your child understand what triggers their food allergies?	Yes	60	28	0.019*	0.264	0.011
	No	1	5			
Does your child know what happens if they eat the wrong foods?	Yes	53	23	0.018*	0.276	0.011*
	No	2	6			
Does your child know that they cannot accept foods from other children or people they do not know well?	Yes	61	22	<0.001*	0.462	<0.001*
	No	0	9			
Does your child know that they cannot share drink bottles or cutlery with other children?	Yes	52	12	<0.001*	0.593	<0.001**
	No	3	17			
Can your child clearly communicate the symptoms of a food allergic reaction to an adult, including people they do not know that well?	Yes	23	9	0.004*	0.351	<0.003*
	No	15	26			
Can your child recognise pictures of an allergen or the words of what they allergic to on the processed food packets?	Yes	21	5	0.033*	0.343	<0.002*
	No	24	30			
Does your child know how to ask for help if they are feeling unwell?	Yes	49	17	0.022*	0.390	0.001*
	No	2	8			

* Fisher's exact test: * indicates significance of association between the variables.
V values < [0.1,0.3]: Weak strength of association; V < [0.4,0.5]:* medium strength of association; V > 0.5: **strong strength of association.

understand risk prevention, focusing on hand washing (27 %), not to accept foods from others without first checking them (22 %), and to seek help when unwell (15 %). But nearly 20 % of parents did not know how their child's educators supported their child's FAL in early education and care settings. More than half (56 %) also did not know about educators' strategies to teach their child about FAL. Those who were aware mentioned that educators' predominantly read storybooks (13 %) or played games and role-played scenarios to teach about allergy and safety (13 %). According to the parents, educators focussed less on teaching children to recognise pictures or words of foods or read food labels and food content (see Table 6).

The qualitative content analysis suggested that parents required different forms of support from educators to build their child's FAL before transitioning to school. These included: food allergy education for the concerned child, as well as for peers, and school community; the prevention or minimisation of food allergy risks; educator knowledge, confidence, and efficacy in managing allergies; practices that optimised inclusiveness; parent-educator communication; as well as FAL curriculum and resources. These are addressed in turn.

Many parents wanted educators to teach their child about allergic foods, risks, symptoms, risk minimisation through not sharing foods, handwashing, and so forth and how to seek adult help when needed via play-based approaches. Further, parents wanted peer education on food allergy offered by an allergist. A few parents also recommended inclusion of peer education on food allergy in all learning activities in the early childhood settings

Table 6
Educator support to build Children's FAL ($n = 159$).

FAL Components	Nº	%
Recognise allergic foods	24	8
Read food labels	8	3
Teaching children to not accept foods from peers without first checking with their parent/educator	67	22
Wash hands before and after eating	79	26
Recognise symptoms of a food allergic reaction	18	6
Ask for help if unwell	45	15
Other	5	2
Not sure	55	18
Total	**301**	**100**
Strategies and Resources Used		
Reading storybooks about food allergy	23	13
Discussion using digital apps	3	2
Discussion using pamphlets	14	8
Watching videos on how to stay safe	4	2
Playing games and/or roleplaying scenarios of safety	22	13
Teaching through arts and crafts activities	3	2
Other	7	4
Unsure	95	56
Total	**171**	**100**

> I think it is essential not only for the child who has allergies but also for their peers to be aware about food allergy and their symptoms.

> Allergists running peer-play-based learning workshops for kids would be great.

Also, parents highlighted the need for all educators to be aware of food allergy, have relevant knowledge and skills required to manage food allergy, and role model safe practices to children. A few parents also mentioned the need to improve the daily management of food allergy, and the consistent implementation of food allergy policies and guidelines:

> Ensuring that kids are not sharing foods and that they are washing hands after mealtimes. Also, normalising allergies so good allergic children don't feel stigmatised or bullied for having an allergy.

Parents also wanted educators to develop FAL resources, such as books or a tip sheet on preparing the child with food allergy for school:

> A tip sheet/pamphlet or other resource about preparing our child for school would be really helpful well ahead of the start of the year.

> In relation to preventing or minimising food allergy risks, parents wanted educators to ensure that all children learn to wash hands before and after eating, check food labels, provide non-food treats, keep spaces nut free and teach them to not share food with others.

> Teach not to share food, [and] wash hands.

Importantly, parents wanted both extended family educators to ensure that their child is included in all curricular and non-curricular activities and that they are not excluded from participating in school activities because of their allergy. Additionally, parents wanted to have clear communication with educators surrounding the management of food allergy to promote children's safety in schools.

> Normalising allergies so good allergic children don't feel stigmatised or bullied for having an allergy.

4. Discussion

To the authors' knowledge, this is the first article to present a study that examined parents' practices, feelings, and support needs surrounding the development of children's FAL before their transition to school. Results suggest that children were exposed to various allergy risks, reinforcing the need to build young children's FAL for their safety and transferring the responsibility for food allergy management to them in developmentally or age-appropriate ways.

Parents reported more incidences of children's severe allergic reactions in the community than at home or in educational settings where they had limited or no control over risk prevention [43]. While the reasons for this were beyond the scope of this study, this might suggest that parents found it difficult to communicate with some staff members about their child's needs, who might have had limited knowledge about food allergy [44]. Moreover, despite access to the EpiPen® and an action plan for anaphylaxis, which are critical for child safety [45], parents only administered the EpiPen® for severe allergic reactions that occurred at home, but not when they occurred beyond the home. The reasons for this, which appear to contravene the action plan for anaphylaxis [46,47], are unclear from the questionnaire responses. However, it is possible that – like many other Australian parents – those who participated in this study might have had difficulties comprehending the severity of the allergic reactions and hesitated to administer the EpiPen® [48] when away from home.

Given the importance of EpiPens® and emergency response plans to child safety [45], a noteworthy finding was the high proportion of children who were reported to have had an EpiPen® (94 %) and an emergency response plan titled (99 %). While the reasons for this were beyond the scope of this study, two reasons might partly explain this. First, in Australia, a parent or guardian who declares their child has food allergy to a childcare facility are recommended to provide a prescribed adrenaline injector and an action plan for anaphylaxis [49]. Second, adrenaline injectors are heavily subsidised by the Australian Government whereby the general payment charge for two injectors is $31.60, relative to $160.17, which is the dispensed price for maximum quantity [50]. These and perhaps additional factors might encourage the use of EpiPens® and action plans for anaphylaxis.

Most of the parents' children were diagnosed with food allergy before their first birthday, reflecting global research [51]. They started teaching their children about food allergy from preschool years (3–5 years of age), consistent with the ages that highly-educated, middle class mothers of similar ages in Ireland deemed appropriate to teach children about food allergy [52]. However, in contrast with the allergist opinion – that 12–14 years of age was the ideal time for adults to share the responsibility for food allergy with their children [53] – mothers in this study who were highly-educated taught their young children about food allergy. This finding reflects that of mothers in Ireland who taught their young children about food allergy and risk avoidance [52].

In building children's FAL, parents used various, everyday opportunities, such as grocery shopping and reading stories. They focussed on promoting their child's knowledge of food allergy and risk prevention, relative to developing their child's ability to read food labels pictorially, seek help, and explain symptoms, clearly and age appropriately. Given that food labels can be difficult to decipher, even for adults, parents might have assumed their child was too young to read food labels. The meaning of food labels can be obscured by disclaimers such as, 'may contain' or 'made in the same factory or on the same processing line as other foods on packaged foods' [54,55]. Nonetheless, it is important to familiarise children with food labels to enable them to recognise pictorially, promoting

their print awareness, semantic, and phonemic knowledge for words associated with allergy causing foods.

The parents who participated in this study reported using child-centred pedagogies to teach their children about FAL. For example, they asked questions, read storybooks, and used grocery shopping. Their child's educators used similar strategies, but focused predominantly on handwashing and play-based learning, reflecting their routines and curricular focus in educational settings. This finding suggests the importance of choosing age or developmentally appropriate pedagogies to promote children's FAL. However, over half of the parents were unsure about educators' strategies to build FAL in early childhood centres. There is a need for increased communication and collaboration between parents and educators to promote children's FAL.

Parents knew that their preschool-aged child understood their allergy, its triggers, consequences, and how to prevent risks, for example, by refusing others' foods and/or drink bottles. Young Australian children, under eight years of age, reported similar knowledge of allergy and risk prevention; for instance, they knew they had to cross-check food safety with adult carers before consumption [25]. Yet, most parents who participated in this study were not confident in their child's ability to explain their symptoms to others, read labels to screen foods, or resist food temptations from peers. While it difficult to account for these findings from the dataset, parents' limited confidence might be partly because they, identified the child's allergic reactions before their child could articulate a need for help. Thus, they might not have had opportunities to determine if their child could seek others' help. It is important to build young children's capacities to articulate their symptoms and/or need for help in a timely manner. This might involve using simple scripts and rehearsals, especially with children who have limited language and/or proficiency in English [56]. Also, to transfer the responsibility of food allergy management, it is important for children to be able to describe their allergy symptoms in the preschool years before they progress to knowing when and how to administer the EpiPen® in their school years [57].

While children's FAL was related to parent confidence in their child's ability to stay safe at school, it was not associated with parent sentiments or anxiety about their child's transition to school. Parent anxiety might be unsurprising, given that food allergy can be unpredictable, have dire consequences, and require the immediate administration of adrenaline to save lives [58]. Moreover, parents were concerned about trusting and giving the responsibility of their child's welfare to educators, fearing they might not have the knowledge and capacity to effectively manage children's food allergy. These concerns are understandable given that some Australian educators' have limited knowledge on food allergy management [59]. Parents were also concerned about diminished supervision, increased risks and safety issues in schools along with transferring the responsibility of food allergy management to their young children – this reflects research with Australian parents [60]. Such anxiety can affect parent ability to manage their child's health [61] and promote children's FAL.

As the results indicated, to alleviate anxiety, parents wanted educators and the school community to make schools safe their children – this might involve making schools nut free, communicating with parents, and school raising awareness about food allergy risks. While parents might feel at ease if schools adopted a nut free policy, this is unlikely to reduce the use of epinephrine for allergic reactions, nor does it address other types of food allergy [62].

Educator support might ease parent anxiety and build children's FAL, potentially easing children's safe transition to school. As parents who participated in this study suggested, education on food allergy for the affected child, their peers, and the school community is needed to prevent or minimise risks, address bullying, and promote inclusive education – similarly, food allergy training for educators is required to effectively manage food allergy and role model safe practices to children. Food allergy education for children with and without allergy can create safe learning environments in educational settings [30,63], address food-related bullying [64], and include children in curricular and non-curricular activities [65,66]. Parents who participated in this study also wanted resources to teach children FAL, similarly identified in previous research [67].

Overall, this study demonstrated that, with the support of educators, parents can empower children to self-manage their food allergy by adopting various child-centred practices. This finding reflects literature and ecological theories that generally recognised parents and family members as important stakeholders in child health [13,15]. Importantly, it supports Christensen's [68] notion of building 'children's' capacities as health-promoting actors' – this can involve enabling children's involvement in food allergy management and helping them to recognise and choose safe foods. However, it can be difficult for parents to build their child's FAL without community support. To this end, educators can support families by devising FAL interventions collaboratively with families, children, and other healthcare providers. Furthermore, they can support children and families by keeping FAL at the forefront of their school readiness and transition-to-school programs. As this study indicated, the various messages that could be incorporated into school readiness or transition to school programs include: how to resist food temptations; communicate symptoms; read pictures and words on food labels; and seek help when experiencing allergy symptoms. Additionally, as role models, educators can help children and families by equipping themselves with the knowledge and skills required to diligently prevent food allergy risks and manage food allergies – including the capacity to administer an EpiPen®.

Despite the benefits of this study, five methodological limitations warrant mention. First, the study was limited to parents – as such, the perceptions and experiences of other stakeholders, including children, educators, and healthcare providers, could not be established. Second, given the sample was skewed towards highly-educated, English-speaking parents who were chiefly mothers, and given the cross-sectional nature of data collection, there is no claim the findings are generalisable, further afield. Third, although the online questionnaire extended study reach, it might have limited the engagement of parents with poor digital literacy or limited access to technology. Fourth, the study was limited to parents' subjective reports. Fifth, the questionnaire's reliability and validity were not established, statistically, as this was beyond the scope of this study.

Notwithstanding the aforesaid methodological limitation, the findings presented in this study offer a strong foundation for further research. Specifically, further research is required to: validate the questionnaire; determine how parents scaffold education to promote their child's FAL; as well as co-design, implement, and evaluate interventions to promote FAL in young children, involving multiple stakeholders, particularly children, for whom it matters most.

5. Conclusion

This is the first article to present a study on parents' feelings, practices, and support needs relating to the development of children's FAL before they transition to school. The study established the importance of promoting FAL among preschool-aged children. Furthermore, it highlighted the need for educational settings to bring FAL to the forefront of their school readiness, transition-to-school, and health education programs. Children's FAL will help to ensure they are not overwhelmed by the seriousness of food allergy and feel equipped to manage it in a developmentally appropriate manner when they are transitioning to school.

CRediT authorship contribution statement

Prathyusha Sanagavarapu: Writing – review & editing, Writing – original draft, Supervision, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Ann Dadich:** Writing – review & editing, Methodology, Investigation, Data curation, Conceptualization. **Maria Said:** Writing – review & editing, Methodology, Investigation, Conceptualization.

Data availability statement

Data will be made available upon reasonable request.

Declaration of competing interest

The first and third author have no conflicts of interest to declare.
The second author serves as an Associate Editor for Heliyon.

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