# Family-based mobile application needs in childhood obesity management in South Korea: a qualitative study

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**Purpose:** It is essential to investigate the users' needs in developing user-centered, family-based applications (apps) for managing childhood obesity. **Methods:** This study conducted focus group interviews with ten parents, ten children, and four app developers to investigate the need to develop a family-based mobile app for childhood obesity. The interview period was from July 17 to August 30, 2023. The data were analyzed using thematic analysis. **Results:** The results highlighted 31 key themes critical to family-based app development, including the need for comprehensive content promoting healthy lifestyle habits, tailored expert support, and motivational factors for app engagement, which were categorized as intrinsic, extrinsic, and social motivations and technological features. Participants also highlighted potential challenges, such as app usability issues and the need for a user-friendly interface. The pivotal role of parents in guiding and supporting their children's health behaviors was emphasized, particularly in creating a supportive environment that encourages sustained engagement with the app. **Conclusion:** These findings provide a comprehensive understanding of the needs and preferences of parents, children, and app developers in managing childhood obesity. Emphasis on integrating healthy lifestyle content, providing expert support, and incorporating motivational strategies is crucial for the app's success. Additionally, addressing potential difficulties and recognizing the pivotal role of parents are essential considerations. These insights will inform the design and development of a user-centered mobile app that supports families in managing childhood obesity.

**Keywords:** Child; Focus groups; Mobile applications; Obesity management; Parenting

## INTRODUCTION

Over the past 30 years, the prevalence of childhood obesity has nearly doubled, and it is one of the most grievous public health issues of the 21st century [1]. One in five children and adolescents in Korea is obese, and over the past 10 years, the prevalence of obesity among children and adolescents has more than doubled from 9.7% in 2012 to 19.3% in 2021 [2].

Childhood obesity is associated with cardiovascular dis-eases and is also closely linked to adult obesity [3,4]. Considering the significant role of family dynamics in shaping children's health behaviors [5], Exploring family-centered approaches to manage and prevent childhood obesity effectively is essential.

Family-based interventions are particularly effective at addressing childhood obesity, as parents play a pivotal role in influencing their children's dietary habits and physical activities [6]. "Parent-for-Child Health Behaviors" refers to par-

ents' role in shaping and influencing their children's health behaviors [7]. "Parent-for-Child Health Behaviors" emphasizes parents' crucial role in influencing, guiding, and supporting their children's health behaviors. By actively engaging in positive health practices and creating a supportive environment, parents can contribute significantly to their children's health and well-being.

"Family-based intervention for child health behavior" refers to structured programs or strategies that involve the entire family in promoting and supporting healthy behaviors among children [8]. These interventions recognize the influence of family dynamics, environment, and interactions in shaping a child's health habits. Family-based approaches include teaching parents about self-monitoring, goal-setting for meals and physical activity, problem-solving, behavior contracts, and relapse prevention for their children [8]. Such approaches combine nutrition, physical activity education, and behavioral therapy techniques to address childhood obesity, and parental monitoring practices positively affect weight loss [9-12]. However, more than 90% of family interventions for improving childhood obesity are in the United States, Europe, and Australia, and the development of comprehensive and tailored interventions may be limited due to diverse population groups and a limited number of interventions [13].

Traditionally, obesity management interventions have mainly focused on face-to-face counseling. However, recently, researchers have been actively studying application (app)-based interventions. App-based interventions can be utilized without environmental constraints [14] and offer advantages such as promoting participant engagement, providing health education, self-monitoring, data collection, communication, and real-time feedback, thereby facilitating the continuous engagement of healthy behaviors [15]. Even though the number of 'weight loss apps' has rapidly increased in recent years, there is little evidence regarding the quality and effectiveness of these apps [16]. Evidence of weight loss and increased physical activity through apps remains lacking. However, users still have high demands and expectations for mobile apps that utilize cutting-edge technology [17]. Recent research indicates a lack of studies on the critical role of parents in managing children's weight and a lack of evidence related to behavioral change theories necessary to promote healthy lifestyle habits [18].

It is essential to develop user-centered apps by investigating the needs of parents and children to manage and im-

prove childhood obesity [18]. User-centeredness can enhance the effectiveness and user-friendliness of apps and can offer solutions for improving childhood obesity [19]. Therefore, when developing a user-centered, family-based app for childhood obesity management, It would be the starting point for app development to understand the perspectives of parents, children, and developers.

Focus Group Interviews (FGIs) can gather opinions from various stakeholders to develop program strategies. FGI offers a valuable method for collecting qualitative data by facilitating interactive discussions among participants. The strengths of FGIs are their ability to generate rich and diverse insights, foster group interaction, adapt to emerging themes, and provide cost-effective and time-efficient data collection methods [20].

Therefore, this study aimed to investigate the user needs for developing a family-based app for parents and children to improve childhood obesity using FGIs.

## METHODS

**Ethical statements:** The research methodology and procedures concerning ethical considerations were approved by the Institutional Review Board (IRB) of Daejin University (IRB No. 1040656-202306-HR-01-04). Before the interviews commenced, all participants were informed about the study and included after they had provided informed consent.

### 1. Study Design

This study adopted the qualitative method of FGI, including parents, children, and app developers, to investigate the requirements for developing a family-based mobile app for managing childhood obesity. The reporting of this study was based on the methodology of the "Consolidated criteria for reporting qualitative studies (COREQ)" [21].

### 2. Participants

We recruited parent and child participants from 12 community children's centers, one elementary school, and developer participants through an online recruitment notice. Purposive sampling was employed to select participants with shared common characteristics relevant to the research question. Ten parents, ten children, and four app developers were

recruited. The participants understood the purpose of the study and voluntarily expressed their intention to participate. The inclusion criteria were as follows: parents who are the primary caregivers of obese or overweight children in grades 3–6 of elementary school and are interested in improving their children's health behaviors, children of parent participants in grades 3–6 of elementary school and currently obese or overweight, and app developers with experience or degrees in app development and information technology fields, who are capable of designing, developing, testing, and maintaining health-related apps, and have experience in designing and developing user-centered apps. Table 1 summarizes the demographic characteristics of the participants.

The focus groups were carefully structured to include two parent groups, two child groups, and one developer group, each comprising 4–6 participants. We organized the group according to the participants' available dates.

## 3. Data Collection

The interview period was from July 17 to August 30, 2023. The interview participants received an explanation of the research topic and completed a consent form before the interview began. Each group participated in one interview session, each lasting 70–90 minutes. Interviews were conducted in a conference room, with only the participants and research team present. Interviews were recorded as audio files and notes and were conducted using a semi-structured questionnaire. The semi-structured questions were as follows. "When developing a family-based child obesity management app, what should be included in the app content?" "What should be considered when developing a family-based childhood obesity management app?" The participants discussed the

topic in a free atmosphere in which they could share their opinions in detail. Every session had time for the participants to share their thoughts in depth. The facilitator summarized the focus group session and provided comments to aid understanding when necessary. Following the interviews, transcripts were returned to the participants for comments or corrections to ensure their statements' accuracy and verify that the transcribed data accurately reflected their perspectives.

The authors, female professors with PhDs and extensive experience in qualitative research, conducted the interview. The researcher's interest in childhood obesity management stemmed from prior work on healthy lifestyle modification interventions. Potential biases were acknowledged, and efforts were made to maintain objectivity by allowing participants to share their views freely.

## 4. Data Analysis

The data were analyzed using an inductive approach for thematic analysis. The research team thoroughly reviewed the transcripts and audio recordings to become familiar with the data. Two researchers independently identified meaningful units and completed the open coding. Based on the open coding, similar codes were grouped into broader categories. The coding tree was iteratively developed as categories emerged naturally from the data through several rounds of discussion among the research team. These categories were further refined using thematic analysis, which involved identifying, analyzing, and reporting themes within the data. The researchers discussed and revised the tentative categorization until they reached a consensus, ensuring that the derived themes accurately represented the data. Finally, these themes

**Table 1.** General Characteristics of the Participants

| Parents | Gender | Age (year) | Job | Children | Gender | Age (year) | Obesity status | App developers | Gender | Age (year) | Career (year) |
|---------|--------|------------|-----|----------|--------|------------|----------------|----------------|--------|------------|---------------|
| P1 | Women | 43 | Sales manager | C1 | Boy | 11 | Overweight | D1 | Men | 43 | 10 |
| P2 | Women | 48 | Housewife | C2 | Girl | 11 | Overweight | D2 | Women | 46 | 20 |
| P3 | Women | 51 | Housewife | C3 | Girl | 11 | Overweight | D3 | Men | 41 | 17 |
| P4 | Women | 54 | Housewife | C4 | Boy | 12 | Overweight | D4 | Women | 30 | 7 |
| P5 | Women | 38 | Housewife | C5 | Boy | 11 | Obese | | | | |
| P6 | Women | 43 | Production staff | C6 | Boy | 11 | Obese | | | | |
| P7 | Men | 66 | Agriculture | C7 | Boy | 10 | Obese | | | | |
| P8 | Men | 49 | Engineering | C8 | Boy | 9 | Obese | | | | |
| P9 | Men | 52 | Driver | C9 | Girl | 11 | Obese | | | | |
| P10 | Men | 50 | CEO | C10 | Boy | 12 | Obese | | | | |

were named and integrated into the study findings. Data saturation was achieved after the final focus group session when no new themes emerged from the analysis. To accurately reflect the participants' perspectives, the research team ensured accuracy by conducting thorough internal data reviews and cross-checking the findings with the field notes and audio recordings instead of the participant feedback.

## 5. Methodological Rigor

This study applied a methodology based on the "COREQ" [21]. We tried to ensure the rigor of the research to increase credibility, fitness, auditability, and confirmability. To ensure reliability, we selected experienced participants who could express themselves well. We shared the analysis results with participants to ensure the accuracy of reflections on their experiences. To ensure suitability and auditability, we conducted all the research processes according to the FGI procedure reported by Krueger and Casey [22] and the analytical steps reported by Elo and Kyngäs [23]. The reliability of the study was verified through evaluation by external experts. To ensure confirmability, we tried to minimize the researcher's assumptions and subjectivity during the research process, maintaining neutrality and accurately reflecting participants' opinions.

# RESULTS

Table 1 shows the demographic and background characteristics of the study participants. The parent group consisted of ten participants, with a mix of genders (six women and four men) and ages ranging from 38 to 66 years. The parent occupations varied widely, including housewives, sales managers, and CEOs. Each parent participant was associated with a child participant. There were ten children in total, comprising seven boys and three girls aged 9–12 years, classified as overweight or obese. The app developer group included four participants with extensive experience, ranging from 7 to 20 years in the app development field (Table 1).

The results highlight thirty-one key themes and insights into motivations, challenges, and strategies for fostering a healthy lifestyle among children through an app designed for childhood obesity management. These themes can be categorized into contents for healthy lifestyle formation, expert supports, motivation, difficulties in app use, and the role of parents in supporting child health behaviors. We summarized these findings as a figure (Figure 1).

## 1. Contents for a Healthy Lifestyle Formation

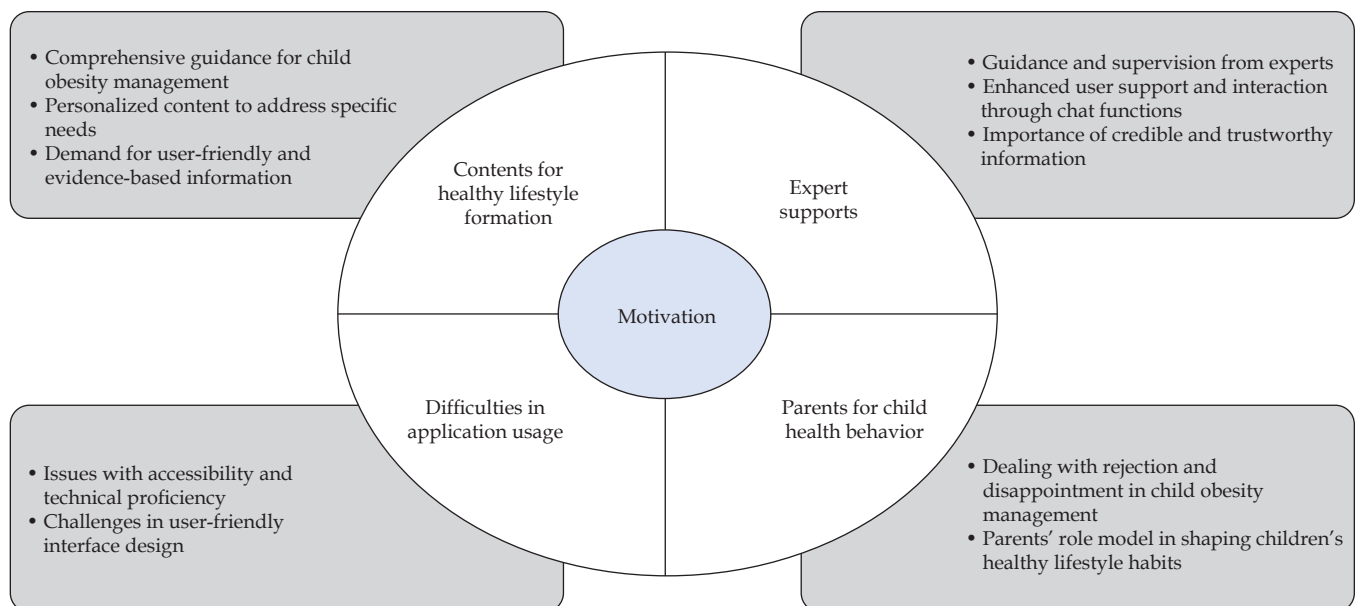Participants emphasized the importance of including healthy habits such as nutritious eating and regular exercise.



**Figure 1.** The motivations, challenges, and strategies for fostering a healthy lifestyle among children through an application designed for childhood obesity management.

They strongly preferred daily guidance on physical activities, exercises tailored to children's age and weight, and comprehensive dietary recommendations.

> *"If I enter body type…hmm, body type, weight, height, and lifestyle habits…When I enter information, it would be good if it tell me the recommended exercise, exercise time, which food, and how much food." (C5)*
>
> *"Diet…The diet is hmm…adjusted to the child's age and weight accordingly. What menu would be suitable for a particular age? How can I feed a child who likes only meat? Should I give a child a mixture of vegetables, for example? I want to know such information." (P7)*
>
> *"By providing personalized guidance based on the child's age, obesity level, amount of food, exercise, and comorbidities, we will be able to increase the need for and dependence on the app. I think the content that cannot be provided other than the app is the critical component that makes people find the app. Transparent sources and evidence are essential rather than technology. Also, guide documents and expert feedback that are difficult to find through web searches will be helpful." (D3)*

The need for detailed monthly menus with recipes and expert-supported information highlighted the demand for accessible, evidence-based content. Visual aids, such as emoticons and images, were suggested to enhance understanding and engagement, particularly for exercises. The desire for user-friendly content that parents could easily follow was evident, focusing on making the information appealing and engaging for children.

> *"Then, there is something like exercising. There are also ways to exercise that can be shown using emoticons or something like that. I wish it was something that would provide a visual effect…Users can easily understand an exercise method by looking at the picture." (P6)*
>
> *"Including content that parents can easily follow rather than a tricky guide document would be better—for example, 'My child eats carrots well too!' as a menu composition, cooking recipes that can attract the attention of children who are interested in instant food and fatty foods or exercise methods that children who are obsessed with cell phones, television, and game consoles can do together with their parents." (D3)*

## 2. Expert Support

Participants underscored the need for expert advice within

the app. They suggested including videos or guides in which experts directly demonstrated exercises and the availability of one-on-one inquiries through chat functions for personalized advice. This feature would enhance the credibility and usability of the app by providing accurate and trustworthy guidance and fostering a supportive environment for both parents and children.

> *"It would be nice if there were videos or guides provided where experts directly demonstrate and guide exercises." (P8)*
>
> *"One-on-one inquiries. There are many things like consultation chats within apps these days. Since there is an open chat on KakaoTalk or something like that, there is an administrator, so wouldn't it be okay to ask questions one-on-one with the person or something like that? I think there needs to be communication. It would be better for an expert to leave a comment. I think so." (P1)*
>
> *"Regarding advice, it is a good idea to conduct 1:1 matching between childhood obesity management experts and users and have the experts answer questions." (D4)*

## 3. Motivation

Motivating children to engage with the app was a significant concern. Participants recommended incorporating various motivational elements, classified as intrinsic, extrinsic, and social motivations and technological features.

Participants emphasized the importance of intrinsic factors, such as interest or excitement from variety, engagement, self-achievement, and goal setting, in maintaining user interest and encouraging long-term app use. The participants noted that the children were more likely to remain engaged with the app if it offered a variety of programs and activities that changed regularly.

> *"If there are various programs, they will change frequently, so it won't get boring. If the program changes with various exercise methods and recipes, children will follow along without getting bored. A diet plan must be shared with children, and exercise methods must also be provided." (P5)*

A Sense of accomplishment was identified as a crucial motivator. Children feel encouraged when they complete tasks and see tangible results, such as completing an action list or receiving positive feedback from the app.

*"It's easy to use, but the kids said I'm going to do it like this, and they kept it only on the first day. When I finished the entire action list, it wasn't a game like the game app here, but it exploded like this and I achieved it...In this way, I think it would be good to give children that joy so they can feel that 'I did it' feeling." (P3)*

Setting daily exercise and dietary goals and self-monitoring progress were highlighted as vital factors for sustaining motivation.

*"In fact, when we go on a diet, it is about how much we eat and exercise. When we start exercise, we just set a goal for each day, set the desired amount of exercise, and then ask ourselves if we performed well that day, right? So that parents can check it themselves...in just a few minutes. Also, if I control my eating well, I control my eating well that day, and if I do that, the statistics show that if I do that today, then a few days later, I couldn't do it in a few days this month. So, I need to work harder next month. I think that will provide more motivation." (P9)*

Extrinsic motivators, including rewards and incentives, were highlighted as necessary for encouraging children to engage with the app. Participants recommended using rewards, such as praise stickers or small prizes, to positively reinforce children's health behaviors.

*"When a child records their health behavior, the parents check it and give a praise sticker. An event is held where a certain number of praise stickers can be exchanged for prizes. If exchanging prizes through praise stickers is difficult, parents can check their children's records and comment on them." (D4)*

*"It would be best to reward your child with something he or she likes. Finding out what your child likes and rewarding him for it is a good idea. I think the same thing. That's all a concern...I think the most important thing is whether he can continue doing this. After doing this for a week, I think I can't do it because I'm bored and can't because it's hard. This is what I'm most worried about." (P5)*

Social interaction and community features were identified as critical for fostering a sense of belonging and encouraging users to engage with the app actively.

Including community features, such as leaderboards, "like" buttons, and comment sections, was considered beneficial for creating a supportive environment where users could share their progress, compete with others, and receive encouragement.

*"So that I can compete with other people, you can create a leaderboard to see how many calories I have burned and Which level I get to. Or I may do it with a friend. You can make a together mission or something like that." (C1)*

*"After doing the program, this is what changed...We shared some of these things with each other, so we did the program provided by this app, but I also did this part separately...I exercised by running 10 laps around the playground with the child...and things like this. You can now add various community features to enable sharing. You can also press the 'Like' button and use detailed functions. I'm talking about community functions, such as leaving comments. Also, you need to get a benefit for your efforts, saying, 'My child has improved so much'...That's why you need to encourage them to keep practicing good health behavior." (D2)*

Highlighting the success stories of other children who had successfully improved their health using the app was suggested as a powerful motivator.

*"Among them, another child became good at exercising and lost weight like this...It's a success story." (P4)*

Participants emphasized the importance of specific technological features such as progress tracking and feedback, reminders, and notifications to support and enhance user engagement. Tracking progress and receiving real-time feedback were indicated as essential for maintaining motivation.

*"The app shows you how many weeks and days it has been since you started it...so you can immediately see how long I've been doing it and how I've improved." (C10)*

*"There is a plan to calculate how many minutes you exercise, so if it continues for a week, it will be accumulated like this every week. I think the frequency of use will increase if we make it so that we can check something and press it, rather than just because we can see it." (P6)*

Automated reminders and notifications were highlighted as essential tools for keeping users engaged. These features would help users remember to use the app regularly and stay on track with their health routines. The participants suggested that reminders, quizzes, or attendance points could effectively sustain daily use of the app.

*"So that you can keep doing it without forgetting...It's an alarm. If an app had that function, I could keep doing it." (C7)*

*"I'm worried that it might fail, and if it fails, it's important to use it well at first and then increase the frequency of using the app daily. The biggest problem is the fear of lack of use. I'm afraid interest will drop...I think it would be good to provide some support so that students can continue to participate in quizzes, such as giving points for answering quizzes or giving points for attendance, etc." (P6)*

## 4. Difficulties in the Use of an Application

Participants anticipated potential challenges in using the app, including difficulties with installation and understanding complex terms or operations. They suggested simplifying the app's interface and explaining the complex terms to mitigate these issues.

*"Because I'm not good at installing apps...I'm clumsy." (P7)*

*"Difficult words may come out. It would be helpful if the word's meaning were written next to it in a speech bubble." (C4)*

*"I am worried if an error occurred due to touching the app incorrectly." (C5)*

Ensuring the app is user-friendly and accessible to all users, regardless of their technical proficiency, is essential for its widespread adoption and sustained use.

## 5. Parents for Child Health Behavior

This study highlighted the crucial role of parents in managing obesity in their children. Parents expressed feelings of burden and concern about their children's reactions and the effectiveness of obesity management efforts.

*"First of all, I got tired of constantly reacting to rejection.... Mom, do I have to do this today, too? He may also be having a hard time because of his schedule, but when he shows some resistance, I think the biggest problem is whether he should continue with it or not." (P6)*

*"I put it into practice, but I'm worried that it won't work out. I'm afraid the kids will be disappointed if it brings less benefit." (P10)*

They emphasized the importance of setting an excellent example through healthy lifestyle habits children could follow.

Encouraging parents to engage in healthy behaviors alongside their children could foster a supportive environment

and promote the formation of healthy habits in children.

*"If children eat it, adults should eat it, too. If parents do a good job, children can watch and follow suit." (P10)*

*"Since mothers have to make their kids exercise, we have to do it together, but other than that, the kids have to make it a part of their daily routine. Now, we need to make it so that it becomes a natural part of our lives. So, I think we need to make it a habit to diet and exercise as much as possible, rather than just doing high intensity from the beginning. It's up to moms and dads...I'm not old enough to understand anymore, so I think I can think about it and follow along to some extent even if I don't understand it 100%." (P3)*

## DISCUSSION

This qualitative study investigating the development of a family-based mobile app for managing childhood obesity provided valuable insights into the needs and preferences of parents, children, and app developers. The FGIs revealed 31 key themes organized into five categories that should be considered in the design and functionality of the proposed app.

Health apps can provide various features to facilitate healthy lifestyles. The participant desired the app to provide comprehensive and evidence-based guidance on nutrition and physical activities suitable for children. These guidelines include healthy daily habits, detailed exercise recommendations based on age, and tailored dietary advice considering age, weight, and lifestyle factors. The emphasis on transparent sourcing and expert-backed content reflected the need for credibility and reliability in the provided information. Recent studies have emphasized the importance of nutrition and activity at home and have reported that managing these and providing information are essential in managing obesity in children [24]. Similarly, Karmali et al. [25] reported that focusing on improving physical activity and nutrition, providing benefits and guidelines for physical activity, and developing ideas for increasing physical activity in the daily lives of parents and children are essential. Additionally, educational information, including accurate height and weight measurements, can help understand a child's growth rate, help parents accurately monitor growth, and determine their child's nutritional status [26].

The need for expert support was a recurring theme, with participants requesting accurate guidance, comments, and answers to questions from professionals. Expert involvement is vital for providing credible advice and maintaining user

trust [27]. The preference for personalized guidance and expert feedback underscores the importance of tailored support to manage childhood obesity effectively.

This study highlights four main categories of motivation—intrinsic, extrinsic, social, and technological—each of which plays a significant role in user engagement.

The emphasis on interest or excitement from variety and engagement as intrinsic motivators aligns with the existing literature, suggesting that maintaining user interest through varied and dynamic content is critical to sustaining engagement in health apps [28]. The finding that self-achievement and goal-setting are critical motivators supports the notion that personal satisfaction and progress monitoring are essential for long-term adherence to health behaviors. This suggests that the app should incorporate features allowing users to set personalized goals and track their progress over time, fostering a sense of accomplishment and encouraging continued use.

The role of extrinsic rewards, such as praise stickers and incentives, is consistent with behavioral theories that highlight the effectiveness of positive reinforcement in modifying behavior [29]. However, it is vital to ensure that these rewards do not become the sole motivators for using the app, as they could diminish the impact of intrinsic motivators over time. Future research should explore the balance between intrinsic and extrinsic motivation to determine the optimal mix for sustaining long-term engagement.

The importance of social interaction and community features reflects the growing recognition of the role of social support in health behavior change. This study suggests incorporating leaderboards, community challenges, and peer success stories could enhance user engagement by fostering a sense of belonging and mutual encouragement. This aligns with previous research indicating that social features in health apps can improve adherence by providing users with a support network and a sense of accountability [30].

Technological features like progress tracking and automated reminders were highlighted as critical for keeping users engaged with their health goals. These findings suggest that the app should incorporate user-friendly interfaces and tools that provide real-time feedback and reminders to sustain user engagement. Integrating these technological features can enhance the overall user experience, making the app more effective in promoting healthy behaviors.

While this study provides valuable insights into motivational factors, several challenges remain unsolved. For instance, ensuring the app content remains fresh and engaging over time requires continuous updates and potentially significant resources. Moreover, balancing extrinsic and intrinsic motivation is crucial for avoiding over-reliance on rewards. Future research should thus explore how these motivational strategies can be optimized for different user demographics and how they impact long-term behavioral changes.

Moreover, this study confirmed that users face difficulties using the app, including a lack of ability, technical challenges, and burdens. User education and support are essential for resolving these difficulties and enabling users to utilize the app more easily. Additionally, it is crucial to design a simple and intuitive interface so that users can easily learn it. Complex functions or terminology should be minimized and structured so that users can easily access and understand them.

This study also suggests the need for support in terms of behavioral skills to relieve the burden of children's rejection reactions and manage expectations regarding the outcomes of obesity management. Therefore, parents need to learn how to appropriately deal with their children's rejection reactions and manage their expectations regarding the outcomes of obesity management. Strengthening communication with children is thus vital to increasing their understanding of healthy habits and achieving obesity management goals through cooperation with parents.

This study confirmed the importance of programs and motivations for parents to become good role models in promoting healthy behavioral habits in their children. Therefore, it is vital to encourage parents to practice healthy lifestyle habits and engage in exemplary behavior. Parents can provide good examples of healthy behavior and naturally promote it in their children [31]. These results were consistent with those of Thomas et al. [32] and Karssen et al. [33]. They argued for a deeper understanding of user behavior and decision-making processes and emphasized that parental roles are significant for managing childhood obesity. Parental roles are also essential for developing energy balance-related behavior, and their parenting practices are crucial in managing childhood obesity [33]. Karssen et al. [33] assessed the determinants of parenting-related energy balance, especially habitual behaviors, in an app-based program that could help establish practices such as a healthy diet, sufficient sleep, limited screen time, and sufficient physical activity. In this regard, parents can play a significant role in creating a healthy family environment by monitoring children's diets and moti-

vating them to engage in physical activity [34].

Parents play an essential role in practicing healthy lifestyle habits to manage obesity in children. However, little research has been conducted on developing apps for parents to manage obesity in children. Moreover, this study recruited diverse participants, including parents, children, and app developers, ensuring multiple perspectives on developing a family-based mobile app for managing childhood obesity. This study demonstrates several strengths in its comprehensive approach, rigorous methodology, and in-depth data collection and analysis. However, it also faces limitations related to generalizability, potential biases, and the inherent challenges of qualitative research. Balancing these strengths and limitations is crucial for interpreting the findings and considering their app in developing a family-based mobile app for managing childhood obesity.

## CONCLUSION

The findings of this study provide a comprehensive understanding of the needs and preferences of parents, children, and app developers for managing childhood obesity through a mobile app. The emphasis on integrating healthy lifestyle content, providing expert support, and incorporating motivational strategies is crucial for an app's success. Additionally, addressing potential difficulties and recognizing the pivotal role of parents are essential considerations. These insights will inform the designing and developing of a user-centered, practical, and engaging mobile app to support families managing childhood obesity. Future research should focus on testing and refining the app based on these findings to ensure it effectively meets users' needs.

## ARTICLE INFORMATION

### Authors' contribution

Conceptualization: all authors; Data collection: Hwa-Mi Yang; Formal analysis: all authors; Writing-original draft: all authors; Writing-review and editing: all authors; Final approval of published version: all authors.

### Conflict of interest

No existing or potential conflict of interest relevant to this article was reported.

### Data availability

Please contact the corresponding author for data availability.

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