

## Research Article



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# Parental perceptions and expectations of children's snacking behaviors and snack packages

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## ABSTRACT

**Purpose:** Excessive snacking is a major factor affecting weight gain in children, while parental influence is significant in shaping children's snacking patterns. This study examined parents' perceptions and expectations about their children's snacking behaviors and snack packages.

**Methods:** Data was collected through a combination of 4-day snack diaries and semi-structured interviews. Convenience sampling was used to recruit 30 mothers of children aged 6–12 years in South Korea. Mothers completed snack diaries in which they observed their children's snacking behaviors for four days. They then participated in semi-structured interviews to provide insights into the maternal perceptions and aspirations regarding snack packages and their children's snacking behaviors.

**Results:** The results showed that children consumed confectionaries most frequently and tended to eat them alone at home. The specific ingredients (e.g., chocolate) and tastes (e.g., sweetness) were the most repeatedly mentioned reasons for consuming the target foods by children. Although the mothers in this study described natural or homemade foods as healthy snacks, approximately four-fifths of the snacks eaten by their children consisted of prepackaged snacks. Regarding the strategies used when serving snacks to children, the mothers relied mainly on the sizes and units of snack packages as guides for controlling the children's portion sizes and snacking frequency. In terms of their demands related to snack packages, the need for snack packages based on age-appropriate portions was apparent.

**Conclusion:** Mothers and children need education and support to help them make informed choices regarding healthy snacks. Moreover, innovative package solutions may be beneficial in supporting the mothers' strategies to ensure their children's healthy snack consumption.

**Keywords:** pediatric obesity; parenting; snacking; packaging; snacks

## INTRODUCTION

The number of overweight and obese children has risen worldwide. According to the World Health Organization (WHO) [1], about 4% of the world's child population were obese in 1975, but the rate increased more than 4-fold to 18% in 2016. Specifically, about two-fifths of children and adolescents between 2 and 19 years in the United States [2] and about one-third of children between 10 and 11 years in the United Kingdom [3] are overweight or obese.

According to obesity fact sheets reported in 2021, in South Korea, one in every 4 children between 6 and 12 years are overweight or obese [4]. Obesity is considered a disease itself, and childhood overweight is related to a higher chance of adulthood obesity and diseases, including heart disease and certain cancers [5].

Although snacks are an integral part of children's diets [6], their excessive intake are a major factor affecting weight gain in children [7,8]. Furthermore, children generally tend to prefer energy-dense and low-nutrient snacks [9]. For instance, research has shown that children usually consume snacks, such as confectionaries, savory snacks, and sweetened beverages [10]. These snacks typically contain high levels of fat, salt, and sugar, and the amounts consumed have been positively associated with a higher body mass index [11]. Furthermore, these snacks tend to offer low nutrients, which can cause dietary imbalances [6]. Specifically, the WHO recommends that children's saturated fat and sugar intake should be limited to less than 10% of one's total energy intake [12]. However, a recent study has reported that children consume more than these guidelines [13]. At the same time, the frequency of snacking among children is increasing [14]. Given that children's eating habits are not yet fully established, behavioral changes can be made relatively easily [15,16]. Thus, early support and intervention are critical to encourage healthy snacking behaviors among children [17].

Parents play a key role in shaping their children's overall eating behaviors [18,19]. In the literature, parents' feeding styles have been linked to their children's eating behaviors [20,21], food portion size [22], food types [23], and weight status [24,25]. Although many studies on food parenting have been conducted, those investigating snack-specific food parenting practices are rare [8,26]. Moreover, few studies have examined mothers' snack portion size strategies [6]. In South Korea, academic research on parental purposes and meanings associated with the snacking behaviors of children has yet to be conducted. Arguably, snack packages can be a useful tool to support parents' strategies for their children's healthy snack consumption [27]. However, little attention has been paid to parents' expectations of children's snack packages. A better understanding of various stakeholders (parents of children of different ages and cultural groups) and the external environments (snack packages and parents' strategies) associated with excessive snack consumption may help provide more important implications for promoting healthy snacking among children.

A review of the literature reveals significant empirical work on parental influence on children's food intake [18,19]. However, there appears to be a dearth of work regarding parental experiences and requirements regarding snack packages and children's snacking behaviors. Thus, the aim of the current study is to investigate Korean parents' perceptions of their children's snack intake and their expectations for snack packages. To provide insights into maternal perceptions and aspirations, a mixed methods approach was adopted, including 2 types of data collection procedures (4-day snack diaries and semi-structured interviews). This research enhances existing knowledge about how parents influence their children's snack choices and provides insights into packaging design characteristics that can help parents promote healthier snacking habits in their children.

## METHODS

For the present study, a mixed methods approach was adopted, including 2 types of data collection procedures [28] conducted in 2 phases: 4-day snack diaries and semi-structured

interviews. In the first phase, mothers of children aged 6–12 years completed snack diaries, in which they observed their children's snacking behaviors for 4 days, including one day on the weekend. The aim of the diary study was to explore children's snacking patterns and to make mothers clearly recognize them for the subsequent interview study. In the second phase, the mothers who completed the snack diaries were asked to participate in the semi-structured interviews, which were carried out to seek an in-depth understanding of maternal perceptions and aspirations regarding their snack packages in general and their children's snacking behaviors in particular. In this study, snack packages include paper boxes, plastic bottles, and plastic bags, all of which have product ingredients and labeling indicated on them. This study was approved by the Ethics Committee of Kyonggi University in South Korea (Reference No. KGU-20210820-HR-076-02).

### Participants

Convenience sampling was used to recruit 30 mothers of children aged 6–12 years in South Korea. The recruitment of participants involved placing posters around residential areas and posting advertisements on online communities for mothers. Guidelines for determining adequate sample sizes in qualitative studies suggest the point of thematic saturation [29,30]. Moreover, according to evidence-based recommendations for nonprobabilistic sample sizes, it is suggested that 8–30 interviews are considered appropriate [18,31,32]. Thematic saturation occurs in qualitative research when no new themes or patterns are observed in the data [33]. In this study, saturation was reached after twenty-five interviews. Therefore, the author considered 30 interviewees to be an adequate sample size for this research. The descriptions of the participants' characteristics are presented in **Table 1** [34–36]. A total of 30 mothers of 30 children aged 6–12 years participated in the study.

### Procedures

The mothers recruited for the study received an information sheet, an informed consent form, a snack diary, and a family profile questionnaire (parental age, education, employment, income, sex, and child's age, height, and weight) in the mail. After completing the snack diaries, the participants were asked to participate in in-depth semi-structured interviews that lasted for 40–60 minutes. All interviews were recorded with their permission. During the interviews, the mothers were asked 33 identical questions. However, additional questions were asked and noted by the researcher, depending on their responses. Interview questions and criteria from previous studies [6,15,16] were the main sources used for the current study's interviews. For instance, Blake et al. [6] asked parents how they decide on the type, amount, and time of snacks they provide to their children. Nekitsing et al.'s study [15] included questions regarding parents' experiences with their children's eating habits and the strategies employed to encourage vegetable consumption. The interview questions from Merritt et al. [16] focused on dietary practices and physical activity behaviors. Based on the questions from these previous studies, this research revised the questionnaire to focus on children's snack consumption and packages. Before starting the main data collection, a pilot study with 2 students was carried out to test how long the interview would take and to improve the clarity and order of the questions. The final interview questions consisted of 5 sections: mothers' perceptions of their child's snacking behaviors and snack consumption, snack-specific food parenting practices, stages of behavioral change, and snack packages. The participants were given supermarket gift vouchers (about \$24) as compensation for their participation. No one withdrew from the study.

**Table 1.** Participants' characteristics

Characteristics	No. (%)
<b>Mothers</b>	
Age (yrs)	
20–29	2 (7)
30–39	8 (27)
40–49	19 (63)
50–59	1 (3)
Education	
High school graduate	4 (13)
Undergraduate degree	22 (73)
Postgraduate degree (Master/PhD)	4 (13)
Employment status	
Working	8 (27)
Not working	22 (73)
Income <sup>1)</sup>	
Below average	9 (30)
Above average	18 (60)
Not specified	3 (10)
<b>Child</b>	
Sex	
Male	9 (30)
Female	21 (70)
Age (yrs)	
6	8 (27)
7–9	15 (50)
10–12	7 (23)
Weight status <sup>2)</sup>	
Underweight	2 (7)
Normal weight	22 (73)
Overweight	1 (3)
Obese	5 (17)

<sup>1)</sup>Based on average household incomes in South Korea [34].

<sup>2)</sup>Weight status is based on body mass index centile from the Korean National Growth Charts for children and adolescents [35] and classified as underweight: < 5th centile, normal weight: between ≥ 5th and < 85th centiles, overweight: between ≥ 85th and < 95th centiles, and obese: ≥ 95th centile [36].

### Data analysis

For the analysis of the 4-day snack diaries, a descriptive analysis, including information on the frequencies and percentages of children's snack consumption provided by mothers, was carried out based on previous snack/food diary studies. Based on classifications of previously published studies [27,37], locations were classified as 'home' (all places within the home), 'school' (e.g., kindergarten), 'on the go' (on the streets and inside the car), 'leisure places and food outlets' (e.g., public parks, cafes, and restaurants), and 'others' (e.g., friends or relatives). Behaviors related to snacking were categorized as 'watching TV' (e.g., games, mobile phones, and iPads), 'homework' (e.g., reading books and online classes), and 'other' (e.g., singing, drawing, talking, and playing with friends or family). If no specific action was reported while eating a snack, it was classified as 'not specified'. About whom children ate snacks with, they were classified as 'alone', 'with family', and 'with friends'. Snack time was categorized as '6:00–12:00', '12:00–18:00', and '18:00–24:00'. Snacks prepared by mothers at home were classified as 'homemade' and 'natural' (e.g., fruits and vegetables) and 'prepackaged' (e.g., packaged, processed, and precooked foods).

For the analysis of the semi-structured interviews, thematic analysis was adopted, a qualitative method used to identify patterns or themes within a dataset. NVivo 2024 software (Release 1.7.2) developed by QSR International Pty Ltd. was used to transcribe and analyze the interview

data. In this study, the collected responses from interviews were analyzed based on the 5 steps suggested by Braun and Clarke [38]. The 5 sequential steps for the thematic analysis are as follows. Step 1): becoming familiar with the data by reading it repeatedly. Step 2): creating preliminary codes based on key issues, words, and sentences. Step 3): organizing the various codes into possible themes. Step 4): examining all the extracts for each theme and forming a cohesive pattern. Step 5): determining the core meaning and refining themes.

## RESULTS

### Children's snacking patterns

Mothers of 30 children aged 6–12 years completed snack diaries to provide information on all snacks consumed by their children for 4 days, including one weekend day. **Table 2** presents the frequency of snacking occasions (and percentages of the total) that each snack was consumed, along with the location, time period, what they were doing, and who they were with for each instance. The children's snacking patterns were based on classifications of previously published studies [27,37]. The results revealed that the 30 children monitored in this study consumed snacks 493 times over 4 days. Of these, confectionaries were eaten most frequently (140 times, 28.4%), and sweetened beverages were the least consumed (35 times, 7%). Out of the total snacking occasions, 1.2% of the snacks were homemade, 19.7% were fruits and vegetables, and 79.1% were prepackaged snacks. Most of the snacks were consumed at home (88.6% of savory snacks, 76.4% of confectionaries, 74.1% of ice cream, 86.6% of fruits and vegetables, 71.4% of sweetened beverages, 90.8% of dairy products, and 67.2% of others), and 40.7% of the ice cream consumed was eaten in front of the TV. Approximately

**Table 2.** Frequency of snacking events (and their percentages of the total) for each snack consumed in each location and time, the related behaviors, and whether they were eaten alone (derived from the 4-day snack diaries)

Characteristics	Crisps and savory snacks	Confectionaries	Ice cream	Fruits and vegetables	Soda and sweetened beverages	Dairy products	Other
<b>Locations</b>							
Home	31 (88.6)	107 (76.4)	40 (74.1)	84 (86.6)	25 (71.4)	59 (90.8)	45 (67.2)
School	0 (0)	6 (4.3)	0 (0)	8 (8.2)	1 (2.9)	3 (4.6)	8 (11.9)
On the go	1 (2.9)	12 (8.6)	3 (5.6)	1 (1)	3 (8.6)	1 (1.5)	5 (7.5)
Leisure places and food outlets	1 (2.9)	12 (8.6)	7 (13)	1 (1)	5 (14.3)	2 (3.1)	6 (9)
Other	2 (5.7)	3 (2.1)	4 (7.4)	3 (3.1)	1 (2.9)	0 (0)	3 (4.5)
<b>Behaviors</b>							
Watching TV	9 (25.7)	27 (19.3)	22 (40.7)	25 (25.8)	10 (28.6)	18 (27.7)	15 (22.4)
Homework	9 (25.7)	14 (10)	5 (9.3)	12 (12.4)	2 (5.7)	12 (18.5)	7 (10.4)
Other	7 (20)	27 (19.3)	13 (24.1)	24 (24.7)	3 (8.6)	3 (4.6)	19 (28.4)
<b>While eating a snack</b>							
Not specified	10 (28.6)	72 (51.4)	14 (25.9)	36 (37.1)	20 (57.1)	32 (49.2)	26 (38.8)
<b>Ate snacks with</b>							
Alone	21 (60)	81 (57.9)	22 (40.7)	47 (48.5)	20 (57.1)	32 (49.2)	28 (41.8)
With family	13 (37.1)	49 (35)	28 (51.9)	41 (42.3)	11 (31.4)	28 (43.1)	29 (43.3)
With friend	1 (2.9)	10 (7.1)	4 (7.4)	9 (9.3)	4 (11.4)	5 (7.7)	10 (14.9)
<b>Snack time</b>							
6:00–12:00	9 (25.7)	24 (17.1)	8 (14.8)	30 (30.9)	9 (25.7)	25 (38.5)	18 (26.9)
12:00–18:00	14 (40)	68 (48.6)	22 (40.7)	28 (28.9)	16 (45.7)	25 (38.5)	21 (31.3)
18:00–24:00	12 (34.3)	48 (34.3)	24 (44.4)	39 (40.2)	10 (28.6)	15 (23.1)	28 (41.8)
<b>Snacks prepared by mothers at home</b>							
Homemade	0 (0)	0 (0)	2 (3.7)	0 (0)	2 (5.7)	0 (0)	2 (3)
Natural	0 (0)	0 (0)	0 (0)	97 (100)	0 (0)	0 (0)	0 (0)
Prepackaged	35 (100)	140 (100)	52 (96.3)	0 (0)	33 (94.3)	65 (100)	65 (97)

Values are presented as number (%). Percentages were calculated based on the total number of snack foods and drinks consumed by children.

three-fifths of the salty snacks, confectionaries, and sweetened beverages were consumed when children were alone. Regarding snack time, dairy products (38.5%) were usually consumed between 6:00 and 18:00; salty snacks (40%), confectionaries (48.6%), and sweetened drinks (45.7%) were consumed between 12:00 and 18:00; and ice cream (44.4%), fruits and vegetables (40.2%), and others (41.8%) were consumed between 18:00 and 24:00.

### Mothers' perceptions of children's snacking behaviors

To obtain a deeper understanding of maternal experiences and requirements regarding snack packages and children's snack intake, semi-structured interviews were conducted with 30 mothers who completed the 4-day snack diaries. The interview data were demonstrated according to the results of the thematic analysis. As the interview study employed a qualitative approach, rarely mentioned responses were also considered significant [39].

#### *Definitions of healthy and unhealthy snacks*

Most mothers (24/30) described natural or homemade foods as healthy snacks for their children. Regarding unhealthy snacks for children, the most frequently mentioned responses (20/30) were confectionaries and savory snacks, which generally contained high levels of sugar, fat, salt, and food additives. Furthermore, packaged snacks were perceived as unhealthy (7/30).

#### *Types of snacks preferred by children*

On the one hand, the most popular snacks among children were sugar confectionaries (22/30). The reasons cited by the mothers as to why their children liked them involved a certain ingredient (e.g., chocolate) or a specific taste (e.g., sweet). On the other hand, half of the mothers reported that their children did not like fruits, vegetables, and nuts.

#### *Mothers' strategies for children's healthy snacking*

The participants detailed the 6 main strategies they used for children's healthy snacking: (1) using the sizes and the units of snack packages as guides, (2) limiting snack time, (3) subdividing the snacks into amounts appropriate for children as snack packaging is usually designed for adults, (4) using snacks for negotiation, (5) using snack bowls, and (6) allowing children to decide the snack portion sizes.

#### *Mothers' difficulties*

When providing snacks to their children, the mothers reported having difficulties in 3 cases: when their children wanted only palatable snacks, such as sweets or chocolates (15/30); when they insisted on having larger portions (9/30); and when they could not avoid marketing environments where children were often exposed to energy-dense snacks (4/30).

### Mothers' expectations for children's snack packages

#### *Mothers' general impressions for snack packages*

The mothers in this study were asked about their general opinions on snack packages, and their perceptions involved mixed opinions. Positive comments from mothers (19/30) included snack packages being generally pretty and designed to easily recognize the different tastes of snacks being packaged. Negative responses from mothers (22/30) were also reported. The most concerning issue for them was the overpackaging of snacks, which were wrapped in multiple unnecessary layers.

#### *Different considerations between mothers and children*

The participants were asked what attributes of snack packages the mothers and their

children considered important when they purchased them in supermarkets or convenience stores. Most mothers (28/30) perceived the informational aspects (i.e., nutritional value and ingredients) of packages as a major influencing factor in their snack purchasing decisions. On the other hand, most mothers stated that their children valued the visual aspects of snack packages, such as the characters and pictures shown on them.

#### *Mothers' requirements regarding snack packages*

Most mothers (24/30) stated that snack packages influenced their children's snack consumption and purchases. Nine themes on mothers' requirements for snack packages emerged from the interviews: (1) making child-oriented snack packages, (2) improving packages' informational elements, (3) avoiding overpackaging, (4) removing appealing elements to children, (5) using educational packages for children, (6) making healthy snack packages more child friendly, (7) using a reward system with stamps, games, or diaries, (8) including aids for portion control, and (9) using images and messages based on threat appeals.

## DISCUSSION

The current study found that confectionaries were the most frequently consumed snacks by children aged 6–12 years. Specific ingredients (e.g., chocolate) and tastes (e.g., sweetness) were identified as the main reasons for consuming the target foods. In terms of location, the children in the current study mainly ate snacks at home, and similar results have been reported in the United Kingdom [27] and Northern Ireland [40]. The types of related behaviors while eating snacks varied. For example, 19.3% and 10% of confectionaries were consumed while watching TV and doing homework, respectively, whereas 19.3% were consumed while singing, drawing, playing, or talking with friends or family. This finding was similar to that of Parvanta et al. [41], who reported that TV use was not significantly associated with snacking in children. Regarding the definition of healthy snacks, most of the mothers who participated in this study described them as natural or homemade foods; however, about four-fifths of the snacks eaten by their children consisted of prepackaged foods. This tendency may be explained by certain features, such as the convenience and affordability of prepackaged products. An additional finding in this analysis was that about three-fifths of confectionaries, savory snacks, and sweetened beverages were consumed by children when they were alone. This group may be more susceptible, as children tend to lack the knowledge to interpret health and nutritional information indicated on snack packages. This suggests that more education and support are needed to guide children's healthier snacking choices and to improve their ability to understand the nutritional benefits and health implications of the snacks they are eating.

The participating mothers in this study reported 6 strategies to encourage children's healthy snacking: using package sizes and units as guides (to set limits on snack portion sizes and snacking frequency), limiting snack time (to encourage greater consumption at meals rather than snacks), subdividing large portions into child-size portions, using snacks for negotiation (to encourage healthy behaviors), using snack bowls (to adjust portions), and allowing children to decide the snack portion size on their own. Of these, most mothers relied on the sizes and units of snack packages as guides to control the frequency and portion sizes of the snacks consumed by their children per day. This implies that packages of specific sizes and units play a significant role in determining child portion sizes when mothers serve snacks to their children. However, the provision of guidance regarding age-appropriate

portion sizes through the current packaging system appears insufficient. Thus, policy considerations and improvements in package sizes and units may be beneficial in supporting mothers' strategies for children's healthy snack consumption.

In terms of their snack-related decision-making, most mothers considered a diverse set of factors, including the visual, informational, and structural aspects of packages, whereas children mainly considered the visual elements of packages. For example, the results of interviews with mothers indicated that most mothers recognized the nutritional value and ingredients listed on snack product packages as important, while children were more interested in the characters and pictures depicted on the packages. Given the vulnerability of children and the difficulties faced by mothers, this situation could provide an opportunity for the food industry to consider their social responsibility as food manufacturers and re-evaluate what can be considered appropriate packaging to promote children's healthy snacking. This approach may change the prevailing negative perceptions that packaged snack foods are bad for the health into positive perceptions.

In exploring mothers' requirements for snack packages, 9 main themes emerged: making child-oriented packages; improving informational elements; avoiding overpackaging; removing appealing elements to children; using educational packages; making healthy snack packages more child friendly rather than luxurious; using a rewards system with stamps, games, or diaries; including aids for portion control; and using threat appeals similar to those used in cigarette packages. Of these, the need for snack packages based on age-appropriate portions was apparent.

Regarding children's healthy snacking, government guidelines and previous studies have proposed various recommendations. For instance, Public Health England [42] recommends that parents provide their children with a maximum of 100-calorie snacks twice a day. Hetherington et al. [43] have suggested a downsizing strategy that recommended smaller-sized snacks for children, as serving large portions of foods encouraged increased intake. More and Emmett [44] have proposed the use of evidence-based adequate portion size ranges across 164 core and noncore foods. In South Korea, the 'Special Act on the Safety Management of Children's Dietary Habits' recommends the use of a traffic light food labeling based on nutritional content [45]. This legislation includes standards and methods for nutrition labeling and packaging of children's snack foods. For instance, snacks such as cookies and candies should be marked with a 'red' label indicating high levels if they exceed 17 g of sugars, 9 g of fats, 4 g of saturated fats, or 300 mg of sodium per serving. Although this recommendation has been in effect since 2009, no snack packages currently adhere to this guideline. In contrast, in the UK, most major snack retailers and brands use the traffic light food labeling to assist consumers in making healthier snack choices [46]. The various guidelines on children's snack consumption can confuse consumers about which is appropriate. Additionally, mandating traffic light food labeling on packages would help Korean consumers make more informed and healthier snack choices.

The findings of this study highlight the need for education on healthy snack consumption and the development of healthy packaging. These insights into promoting healthy snack consumption are considered to have the following social, economic, and industrial effects. First, encouraging healthy snack consumption may help to reduce obesity rates and chronic diseases among children. This would improve overall public health and decrease the social burden related to health issues. Second, if consumers' health improves through healthy snack



consumption behavior, it may alleviate the financial burden on both the healthcare system and individuals. Third, as consumer needs for healthy snack products grow, snack manufacturers and companies may develop new products, which could lead to growth in the snack industry.

## SUMMARY

The findings of the current study provide an in-depth understanding of mother's experiences, strategies, and requirements regarding snack packages and children's snacking behaviors. The findings of this study showed that children preferred palatable and energy-dense snacks and that they mostly ate them alone at home. Mothers predominantly relied on the sizes and units of snack packages as guides for controlling child portion sizes and snacking frequency. Furthermore, the visual elements of packages influenced children's snack choices, and mothers had difficulties and negative perceptions about the current snack packaging environment. Overall, both mothers and children need greater support to make informed and healthy snack choices. Thus, further investigations on snack package designs are required, as package elements have been found to influence the snack intake and purchasing decisions of both mothers and children. Related to this, policies regulating snack package information and innovative designs could provide effective solutions and support by responding to consumers' packaging needs to enable easier adjustment of snack portions and better understanding of nutritional information indicated on the packages. This study is limited in that only parents participated in examining children's snack consumption and perceptions of packages. Although parents provided meaningful information as their children's representatives, in the upper grades of elementary school, children often purchase snacks on their own. Therefore, future research will need to investigate children's snacking behavior and perception of packages. Additionally, while this study is meaningful in examining specific foods such as snacks, future research should present data on snack consumption patterns and types based on a larger sample size.

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