

# 사회경제적 취약계층의 아동비만: 경로모형을 이용한 부모 양육행동과 관련 요인규명

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## Childhood Obesity among Socioeconomically Vulnerable Families: A Path Model Using Parenting Behavior and Its Associates

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**Background:** Using path analysis, we aimed to examine whether parenting self-efficacy and parenting styles would be significant associates with parenting behavior, and the parenting behavior would be significantly associated with the obesity status of children from socioeconomically vulnerable families.

**Methods:** A cross-sectional study was conducted with 61 parents and their children enrolled in public welfare systems in a community in Seoul, South Korea. Parenting behavior was defined as encouraging a child's healthy eating habits and was measured using the Child Feeding Questionnaire.

**Results:** In the path model, higher levels of parenting self-efficacy and lower levels of authoritarian parenting were significantly associated with a higher level of parenting behavior, which was significantly associated with lower child body mass index z-scores.

**Conclusions:** Community health nurses need to provide intervention strategies for increasing parenting self-efficacy and decreasing authoritarian parenting styles to promote parenting behaviors and childhood obesity prevention among socioeconomically vulnerable families.

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**Keywords:** Parenting, Self efficacy, Childhood obesity, Vulnerable populations

## INTRODUCTION

Childhood obesity is a major health problem faced by low-, middle-, and high-income sectors.<sup>1)</sup> The prevalence of obesity among school-aged children and adolescents aged 5-19 has risen more than 10-fold over the last 40 years.<sup>2)</sup> In developed countries, children with low socioeconomic status are at a higher risk of being overweight than those with middle/high socioeconomic status.<sup>3)</sup> In South Korea, the prevalence of overweight/obesity was more than twice that of overweight/obesity (26.7%) of the general child group

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(11.4%).<sup>4)</sup>

Childhood obesity has multiple physiological, behavioral, and socio-environmental determinants.<sup>5)</sup> In the absence of resolution of these causes, it lasts into adulthood and is linked to the development of chronic diseases.<sup>6)</sup> In this context, identifying antecedent determinants of childhood obesity is critical, which may lead to the prevention and management of obesity in childhood, subsequently leading to the prevention of chronic diseases in adulthood.<sup>2)</sup>

Childhood obesity is mainly affected by parents, who are major agents who execute their parenting behaviors.<sup>7)</sup> Promoting parenting behaviors may be an essential behavioral strategy for controlling a child's obesity status. Parenting behavior such as stimulating children's healthy food intake and taking responsibility for them was associated with lower levels of body mass index (BMI) among children, while parenting behaviors such as parents' concern and restriction about their child's food intake were related to higher levels of BMI among children.<sup>8)</sup>

Childhood obesity may be indirectly influenced by parental behavioral determinants, such as parenting self-efficacy and parenting style through parenting behavior.<sup>9)</sup> Reportedly, parents of obese children are less likely to have confidence in managing children's lifestyle behaviors and more likely to execute permissive and authoritarian parenting styles than parents of healthy-weight children.<sup>10)</sup> Parents with low socioeconomic status have little opportunity and time to learn healthy parenting practices because of their busy work schedules,<sup>11)</sup> so they are more likely to have poor levels of parenting behavior in preventing or managing their children's obesity status.<sup>11)</sup> In this regard, parental behavioral determinants as exogenous factors of obesity-specific parenting behavior should be identified in socioeconomically vulnerable families so that children's obesity status can be effectively prevented and managed based on their cultural background.

Among parenting behavioral determinants, parenting self-efficacy may promote obesity-specific parenting behaviors. Self-efficacy is a well-known function of behavioral change based on Bandura's social cognitive theory.<sup>12)</sup> Parenting self-efficacy is defined as the belief that parents can overcome or solve specific parenting problems,<sup>13)</sup> which has been reported to be associated with successful general parenting behavior. Meanwhile, parenting styles characterized as general parenting behavior may empirically fulfill the path to

specific parenting behavior, that is, obesity-specific parenting behavior.<sup>14)</sup> Basically, parenting styles were identified by interaction frequencies manifested between parent and child and specifically categorized by two characteristics of responsive (i.e., nurturing and warmth) and demanding (i.e., control such as establishing and enforcing boundaries) by Baumrind.<sup>15)</sup> The authoritative style was characterized by responsive and demanding; the authoritarian style by unresponsive and demanding; and the permissive style by responsive and undemanding.<sup>15)</sup> Reportedly, the authoritative parenting style is related to parenting behaviors with a high level of monitoring and responsibility for children's dietary intake,<sup>16)</sup> while authoritarian and permissive parenting styles are related to parenting behaviors with a low level of monitoring and a high level of restriction of children's eating.<sup>16)</sup> However, little is known about whether each parenting style is associated with obesity-specific parenting behaviors in socioeconomically vulnerable families.

In the above context, no previous studies have yet reported an integrated conceptual pathway of "parenting self-efficacy," "parenting styles," "obesity-specific parenting behavior," and "child obesity status." This study assumed that "parenting self-efficacy" and "parenting styles" might be parental behavioral determinants for obesity-specific parenting behavior. It tested hypotheses of 1) whether the two determinants would be significantly associated with obesity-specific parenting behaviors and 2) whether the obesity-specific parenting behavior would be significantly associated with a child's obesity status among socioeconomically vulnerable children.

## METHODS

### 1. Study design

A secondary analysis was conducted based on a cross-sectional correlation study design using baseline data from a parent study. The parent study examined the effects of the Healthy Children, Healthy Families, and Healthy Communities Program for obesity prevention, tailoring socioeconomically vulnerable children to improve their healthy lifestyle behaviors and obesity status.<sup>17)</sup>

## 2. Hypotheses

The hypotheses of this study are as follows. First, parenting self-efficacy would be significantly associated with obesity-specific parenting behavior (hypothesis 1). Second, each parenting style would be significantly associated with obesity-specific parenting behavior (hypothesis 2), authoritative parenting style would be significantly associated with obesity-specific parenting behavior (hypothesis 2-1), authoritarian parenting style would be significantly associated with obesity-specific parenting behavior (hypothesis 2-2), and permissive parenting style would be significantly associated with obesity-specific parenting behavior (hypothesis 2-3). Third, obesity-specific parenting behavior would be significantly associated with children's obesity status (hypothesis 3).

## 3. Participants & setting

Parent study participants were 61 parents and 107 children, of which 61 parents and 61 paired children were included for the secondary analysis of the present study. Parent study participants were recruited from eight community child centers in Seongbuk-gu Municipal County, Seoul, South Korea. The inclusion criteria for the present study were: 1) children in elementary school grades (3rd-6th grades), 2) children who were enrolled in the public welfare system of community child centers in Seongbuk-gu, and 3) children who were living with parents or legal representatives. The exclusion criteria for the present study were: 1) children with mental and physical disabilities and 2) children who had either parents or legal representatives who could not understand the Korean language. Among the children recruited for the parent study, 61 were eligible for the present study. The minimum sample size in this study was 50 participants, considering the five independent variables. According to Kline,<sup>18)</sup> the appropriate sample size should always be 10 times the number of parameters in path analysis. The 61 participants in this study met the minimum sample size based on this evidence.

## 4. Measurements

The data were collected by trained researchers using questionnaire surveys and physical measurements from June 12-28, 2017.

### 1) General characteristics of children and their parents

Children's demographic characteristics (i.e., age and sex) were self-reported. Parents' age, sex, household income, educational status, and employment status were self-reported. The average monthly household income was classified as less than 2 million won (approximately \$1,630) versus more than 2 million won.<sup>19)</sup> Education status was classified as less than college-educated versus greater college-educated. Parents' employment status was classified as currently employed versus unemployed. Parental BMI ( $\text{kg}/\text{m}^2$ ) was calculated using self-reported height (cm) and weight (kg).

### 2) Child's obesity status

The child's obesity status was assessed using the value of BMI z-scores, indicating standardized BMI scores adjusted for the child's age and sex at a population level calculated using the World Health Organization AnthroPlus.<sup>20)</sup> Children's body weight (kg) and height (cm) were measured with no shoes or wear using an electronic weight/body fat scale (HBF-212; Omron, Kyoto, Japan) and a standing height scale (Seca 213; Seca GmbH & Co. KG., Hamburg, Germany). Before anthropometric measurements, children fasted for eight hours and emptied their bladders.<sup>17)</sup>

### 3) Parenting self-efficacy

Parenting self-efficacy was measured by a five-point Likert scale developed by Dumka et al.<sup>21)</sup> Three Korean nursing scholars translated the English version of parenting self-efficacy, and the three Korean versions were discussed, confirmed, and consolidated into a single Korean version. The Korean version was back-translated by a native English speaker. The back-translated English version was again confirmed by nursing scholars who translated it into Korean. The scale consists of five items that evaluate confidence levels in successfully performing a parental role<sup>21)</sup> and reports the mean score of the five-item responses. The higher the mean parenting self-efficacy score, the higher the level of parenting self-efficacy. Cronbach's alpha coefficient was 0.80 in a previous study<sup>21)</sup> and 0.87 in this study.

### 4) Parenting styles

The parenting styles were measured by a five-point Likert scale, that is, the Parenting Styles and Dimension Questionnaire-short version developed by Robinson et al.<sup>22)</sup> This scale was also developed using translation and back-translation proc-

esses, as previously described in detail. Parenting styles consist of 32 items and three typologies based on Baumrind's conceptualization: authoritative, authoritarian, and permissive parenting styles.<sup>22)</sup> The 32 items can be classified into three types and seven dimensions of parenting.<sup>22)</sup> Parents should be informed of how often they use the specific behavior described for each item. The authoritative parenting is divided into 15 items into three dimensions: support/affection, regulation, and autonomy.<sup>22)</sup> The authoritarian style consists of 12 items and consists of three dimensions: physical coercion, verbal hostility, and punishment.<sup>22)</sup> The permissive style consist of one dimension such as indulgence.<sup>22)</sup> Therefore, the score for each parenting style ranges from 1 to 5, with higher scores indicating more frequent use of each parenting style. Cronbach's alpha coefficients were 0.64-0.86 in a previous study<sup>22)</sup> and 0.52-0.90 in this study.

#### 5) Obesity-specific parenting behavior

The obesity-specific parenting behavior was defined in this study as encouraging a child's healthy eating habits. It was measured using the Child Feeding Questionnaire (CFQ), a five-point Likert scale developed by Birch et al.<sup>23)</sup> This scale was also developed using translation and back-translation processes, as previously described in detail. This scale consists of 21 items with five subscales comprising perceived responsibility (three items), monitoring (three items), concern about the child's weight (three items), restriction of children's eating (eight items), and pressure to eat (four items).<sup>23)</sup> The CFQ scores report the total score after reversing the subscale scores of concerns about children's weight, pressure to eat, and restriction of children's eating. A higher total CFQ score indicates a higher level of obesity-specific parenting behaviors. Cronbach's alpha coefficients in the previous study were in the ranges of 0.70-0.93<sup>23)</sup> and the ranges of 0.61-0.96 in this study.

#### 5. Data analysis

All statistical analyses were performed using SPSS 26.0 (IBM, Chicago, IL, USA) and AMOS 27.0. (IBM, Chicago, IL, USA) Statistical significance was set at  $P < 0.05$ . The participants' sociodemographic characteristics were analyzed using frequency, percentage, mean, and standard deviation. Pearson correlation coefficients were used to examine the

correlations of the main study variables (i.e., parenting self-efficacy, parenting styles, obesity-specific parenting behavior, and children's obesity status). We performed path analysis using maximum likelihood estimation and bootstrapping to test our hypothetical path model. Based on the hypothetical path model, we calculated standardized estimates (beta) of the direct, indirect, and total effects of exogenous variables (i.e., parenting self-efficacy and parenting styles) on endogenous variables (i.e., obesity-specific parenting behavior and the child's obesity status). Finally, the validity and fit of the path model in the present study were evaluated using statistical values from chi-square, the goodness-of-fit index (GFI), adjusted goodness-of-fit index (AGFI), and root mean square error of approximation (RMSEA) and reported by squared multiple correlations (SMC), indicating an  $R^2$  value for the explanatory power of exogenous variables.

#### 6. Ethical considerations

All participants provided written informed consent after receiving an explanation of the study's purpose. Children and parents provided consent to participate, and parents provided consent for their own participation or that of their children. This study was approved by the Institutional Review Board of Korea University (No. 1040548-KU-IRB-17-82-A-2).

## RESULTS

The average age of the children was 10.0 years (range, 8.0-12.0 years), with a mean BMI z-score of 0.9, with 13.1% being obese and 16.4% being overweight. Of the children, 52.5% were female (Table 1).

The average age of the parents was 45.8 years, ranging from 27.0 to 62.0 years (Table 1). Of the parents, 86.9% were females, 34.4%'s monthly household income was less than 2 million won (approximately \$1,630), 59.0% were not college-educated, and 85.2% were employed. The parents had a mean BMI of 22.6 kg/m<sup>2</sup>. The parenting self-efficacy had a mean of 3.7 scores (range, 1.4-5.0). The authoritative, authoritarian, and permissive parenting styles had means of 3.6 (range, 2.0-5.0), 1.9 (range, 1.1-3.8), and 2.5 (range, 1.4-4.2) scores, respectively. The obesity-specific parenting behavior had a mean score of 16.1 (range, 7.9-20.9).

**Table 1.** Participants' general characteristics (n=61)

Variables	Value
Children	
Age, y	10.0±1.28 (8.0 to 12.0)
Sex	
Male	29 (47.5)
Female	32 (52.5)
Obesity status, BMI z-score	0.9±1.24 (-2.5 to 3.5)
Obese	8 (13.1)
Overweight	10 (16.4)
Normal-weight	43 (70.5)
Parents	
Age, y	45.8±5.52 (27.0 to 62.0)
Sex	
Male	8 (13.1)
Female	53 (86.9)
Household income	
≥2,000,000	40 (65.6)
<2,000,000	21 (34.4)
Education	
≥College-educated	25 (41.0)
<College-educated	36 (59.0)
Employed	
Yes	52 (85.2)
No	9 (14.8)
BMI (kg/m <sup>2</sup> )	22.6±3.60 (16.0 to 37.3)
Obese	2 (3.3)
Overweight	10 (16.4)
Normal-weight	49 (80.3)
Parenting self-efficacy	3.7±0.77 (1.4 to 5.0)
Parenting styles	
Authoritative	3.6±6.48 (2.0 to 5.0)
Authoritarian	1.9±0.55 (1.1 to 3.8)
Permissive	2.5±0.61 (1.4 to 4.2)
Obesity-specific parenting behavior	16.1±2.67 (7.9 to 20.9)

Values are presented as mean±standard deviation (range) or number (%).

Abbreviation: BMI, body mass index.

## 1. Correlations among the study variables

Parenting self-efficacy significantly correlated with obesity-specific parenting behavior ( $r=0.49$ ,  $P<0.001$ ) but not with the child's obesity status (Table 2). Among the parenting styles, the authoritative ( $r=0.38$ ,  $P=0.003$ ) and authoritarian styles ( $r=-0.42$ ,  $P=0.001$ ) significantly correlated with the obesity-specific parenting behavior but not with the

child's obesity status; however, the permissive style was not significantly correlated with obesity-specific parenting behavior and the child's obesity status. Furthermore, obesity-specific parenting behavior significantly correlated with the child's obesity status ( $r=-0.37$ ,  $P=0.003$ ).

## 2. Evaluation of the path model

Our hypothetical path model was consolidated based on 1) the associations of parenting self-efficacy and parenting styles with obesity-specific parenting behavior and 2) the association of obesity-specific parenting behavior with the child's obesity status (Figure 1). The model contains four exogenous variables (i.e., parenting self-efficacy and three parenting styles) and two endogenous variables (i.e., obesity-specific behavior and childhood obesity). Regarding testing model validity and fitness, our hypothetical path model manifested a saturated model, which indicates a perfect fit to the data based on the results of the chi-square test and the ( $\chi^2=1.22$ ,  $GFI=0.993$ ), and satisfying other goodness-of-fit indices: root mean square residual (RMR)=0.016, normed fit index (NFI)=0.988, and comparative fit index (CFI)=1.000.

## 3. Hypothesis testing

According to the path model indicated in Figure 1, parenting self-efficacy was significantly and positively associated with obesity-specific parenting behavior ( $\beta=0.40$ ,  $P=0.007$ ). Authoritarian parenting, but not authoritative or permissive parenting, was significantly and inversely associated with obesity-specific parenting behavior ( $\beta=-0.39$ ,  $P=0.032$ ). Moreover, obesity-specific parenting behavior was significantly and inversely associated with the child's obesity status ( $\beta=-0.37$ ,  $P=0.001$ ). The fitness of the model (with authoritarian style, not with either authoritative or permissive style) indicated a perfect fit to the data based on the results ( $\chi^2=1.22$ , degree of freedom=4,  $RMR=0.016$ ,  $RMSEA<0.001$ ,  $GFI=0.993$ ,  $AGFI=0.965$ ,  $NFI=0.988$ ,  $CFI=1.00$ ) (Figure 1). Hypothesis 1 was supported for the path of parenting self-efficacy→obesity-specific parenting behaviors ( $\beta=0.40$ ,  $P=0.007$ ). (Table 3, Figure 1). Thus, hypothesis 2 is partially supported. Hypothesis 2-1 was not supported for the path of authoritative parenting→obesity-specific parenting behaviors ( $\beta=0.03$ ,  $P=0.844$ ). Hypothesis 2-2 was met for the path of author-

itarian parenting→obesity-specific parenting behaviors ( $\beta=-0.385$ ,  $P=0.032$ ). Hypothesis 2-3 was not met ( $\beta=0.18$ ,  $P=0.202$ ), as expected from the results obtained in the correlation analysis (Table 1). Hypothesis 3 was supported for the path of obesity-specific parenting→child obesity ( $\beta=-0.37$ ,  $P=0.001$ ). Finally, based on SMC ( $R^2$ ) values, parenting self-efficacy and authoritarian parenting style explained 33% of the total variance in obesity-specific parenting behavior. Parenting self-efficacy, authoritarian parenting style, and obesity-specific parenting behavior explained 14% of the total variance in childhood obesity.

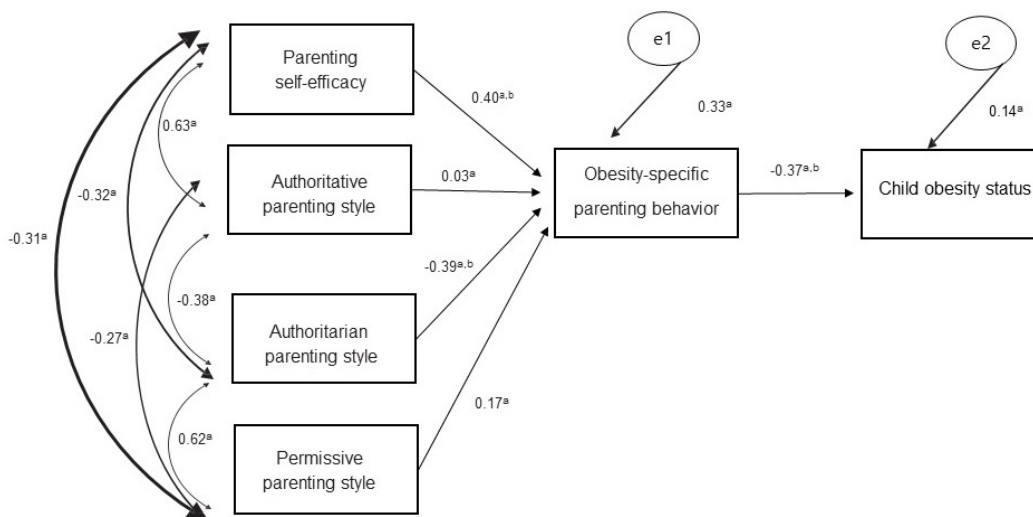
## DISCUSSION

This is the first study to integrate conceptual relationships into a path model: lower levels of parenting self-efficacy and higher levels of authoritarian parenting were significantly associated with a lower level of obesity-specific parenting behavior defined as encouraging a child’s healthy lifestyle, which was subsequently and significantly associated with a lower child’s obesity status among socioeconomically vulnerable families. However, the paths from authoritative or permissive parenting styles to obesity-specific parenting be-

**Table 2.** Correlations among the study variables (n=61)

Variable	<i>r</i> ( <i>P</i> )					
	Parenting self-efficacy	Authoritative parenting style	Authoritarian parenting style	Permissive parenting style	Obesity-specific parenting behavior	Child obesity status
Parenting self-efficacy	1.00					
Authoritative parenting style	0.63 (<0.001)	1.00				
Authoritarian parenting style	-0.32 (0.011)	-0.38 (0.003)	1.00			
Permissive parenting style	-0.31 (0.016)	-0.27 (0.037)	0.62 (<0.001)	1.00		
Obesity-specific parenting behavior	0.49 (<0.001)	0.38 (0.003)	-0.42 (0.001)	-0.19 (0.135)	1.00	
Child obesity status	-0.19 (0.135)	-0.23 (0.075)	0.12 (0.370)	0.07 (0.578)	-0.37 (0.003)	1.00

*r*=Pearson correlation coefficient.



**Figure 1.** The path model in this study (n=61). The model’s fit showed a perfect fit to the data based on the results ( $\chi^2=1.22$ ,  $df=4$ ,  $RMR=0.016$ ,  $RMSEA\leq 0.001$ ,  $GFI=0.993$ ,  $AGFI=0.965$ ,  $NFI=0.988$ ,  $CFI=1.00$ ). The model’s fit showed a perfect fit to the data based on the results ( $\chi^2=1.22$ ,  $df=4$ ,  $RMR=0.016$ ,  $RMSEA\leq 0.001$ ,  $GFI=0.993$ ,  $AGFI=0.965$ ,  $NFI=0.988$ ,  $CFI=1.00$ ). *df*, degree of freedom; *RMR*, root mean square residual; *RMSEA*, root mean square error of approximation; *GFI*, goodness-of-fit index; *AGFI*, adjusted goodness-of-fit index; *NFI*, normed fit index; *CFI*, comparative fit index; *AMOS*, analysis of moment structures. <sup>a</sup>All values indicate standardized coefficients using *AMOS* with maximum likelihood estimation obtained by the path analysis. <sup>b</sup> $P<0.05$ .

**Table 3.** Hypothesis testing: direct, indirect, and total effects among the study variables (n=61)

Endogenous variable	Exogenous variable	$\beta$ (P)			SMC
		Direct effect	Indirect effect	Total effect	
Obesity-specific parenting behavior	Parenting self-efficacy	0.40 (0.007)		0.40 (0.007)	0.33
	Authoritative parenting style	0.03 (0.844)		0.03 (0.844)	
	Authoritarian parenting style	-0.39 (0.032)		-0.39 (0.032)	
	Permissive parenting style	0.18 (0.202)		0.18 (0.202)	
Child obesity status	Parenting self-efficacy		-0.15 (0.008)	-0.15 (0.008)	0.14
	Authoritative parenting style		-0.01 (0.844)	-0.01 (0.844)	
	Authoritarian parenting style		0.14 (0.034)	0.14 (0.034)	
	Permissive parenting style		-0.07 (0.203)	-0.07 (0.203)	
	Obesity-specific parenting behavior	-0.37 (0.001)		-0.37 (0.001)	

$\beta$  (P) obtained from the path analysis using AMOS employing maximum likelihood estimation and bootstrap.  
 $\beta$ =standardized coefficient.

Abbreviations: AMOS, analysis of moment structures; SMC, squared multiple correlations.

havior were insignificant.

First, we found that a higher level of obesity-specific parenting behavior was significantly associated with lower BMI z-scores. Shelton et al.<sup>24)</sup> found that children's BMI was improved by providing parents of overweight children with a 4-week parent-focused group education program as a parental strategy for dealing with behavioral problems associated with children's food intake and physical activity.<sup>24)</sup> These findings support the importance of the parental role in promoting healthy eating and activity behaviors in preventing and managing childhood obesity. For future research, a child obesity prevention and management program should be parent-focused by designing interventional strategies to increase obesity-specific parenting behaviors targeting children's healthy lifestyles. It must be recognized that such a parent-focused intervention may effectively reduce childhood obesity among socioeconomically vulnerable families.

We also found that higher levels of parenting self-efficacy were significantly associated with a higher level of obesity-specific parenting behavior. Dumka et al.<sup>21)</sup> reported consistent findings among 90 middle-income white mothers and 94 low-income Mexican immigrant mothers. Furthermore, Shumow and Lomax<sup>25)</sup> reported that a higher level of parenting self-efficacy significantly predicted higher parental involvement, parental monitoring, and parent-child communication among 929 North American parents. Based on these findings, we suggest conducting clinical trials to determine whether an approach to enhance parenting self-efficacy would increase obesity-specific parenting behavior among socioeconomically vulnerable families.

We found that a higher level of authoritarian parenting style was significantly associated with a lower level of obesity-specific parenting behavior. A systematic review conducted by Collins et al.<sup>26)</sup> elucidated that an authoritarian parenting style was significantly related to poor obesity-specific parenting behavior, such as pressuring a child to eat or having restrictive feeding behaviors. Children of authoritarian parents from low-income families are more likely to manifest higher emotional overeating.<sup>27)</sup> Meanwhile, our study showed that the paths between authoritative/permissive parenting styles and obesity-specific parenting behavior were not significant. Bornstein and Bradley<sup>28)</sup> and Hoff and Laursen<sup>29)</sup> have reported that parents with low socioeconomic status were more likely to use an "authoritarian" parenting style than those with high socioeconomic status. Although the authoritarian parenting style in the present study scored as not higher than that of other parenting styles, its impact on parenting behaviors might be larger than those of other parenting styles. Therefore, these findings may address the importance of understanding discrepancies in the levels of parenting styles in different socio-cultural and economic contexts.

Our findings showed that lower levels of parenting self-efficacy and higher levels of authoritarian parenting style were significantly associated with a lower level of obesity-specific parenting behavior, which was subsequently and significantly associated with increased children's obesity status. West et al.<sup>30)</sup> conducted a parent-centered intervention to improve parenting skills and confidence in parents to improve their child's healthy behaviors for 12 weeks.<sup>30)</sup> Therefore,

parents increased their confidence levels in managing their children's weight-related behaviors, decreased the levels of inconsistent or authoritarian parenting behaviors, and reduced their BMI z-scores.<sup>30)</sup> Therefore, we suggest that focusing on both conceptual constructs of parenting self-efficacy and authoritarian parenting style is necessary when community health nurses design obesity-specific parent-focused programs for socioeconomically vulnerable families in a community setting.

This study has several strengths and limitations. This study may provide a theoretical framework for designing a family-focused intervention for reducing childhood obesity and emphasize a parent-focused behavioral approach by modifying parenting determinants and behaviors. This study also has some limitations. First, caution should be exercised when interpreting the results of this study in light of the potential causality issue. Future research using a randomized controlled trial design is needed to guarantee causality among the study variables. Second, the outcome variable of this study was child obesity status. Of 61 children of the participants, 70.5% fell into the category of normal weight; this finding may limit the interpretation of the study results. Third, the obesity-specific behavior may be influenced by various family-related variables (e.g., mother vs. father or child's gender) and parental anthropometric data (e.g., BMI) that were not able to be included in the path model. Parental BMI, not but other variables, was significantly associated with obesity-specific behavior in the present study ( $\beta=-0.24$ ,  $P=0.010$ ) (data not shown). In this regard, next studies need to identify parental variables associated with parenting behaviors thoroughly, and adjust them in the other statistical models that might be able to be included. Moreover, a small sample size ( $n=61$ ) may give biased interpretation of the present findings, possibly attributable to the low scale reliability of the permissive parenting style (Cronbach's  $\alpha=0.52$ ). However, the present study may have some advantage to reveal a potential conceptual link of parenting behavior and its associates. Finally, the results of this sample could apply to Korean socioeconomically vulnerable families with school-aged children and may not be generalizable to other ethnic and high-income population groups. Thus, a study with larger and more diverse sample size is needed for future replication. This study explained obesity-specific behavior by 33% of socioeconomically vulnerable families with parenting self-efficacy and author-

itarian styles. Future studies may be needed to identify more antecedent parenting determinants rather than self-efficacy and parenting styles than those used in the present study, which may explain parenting behaviors with a greater magnitude.

Among socioeconomically vulnerable families, we revealed a conceptual framework of parenting self-efficacy and authoritarian parenting styles with obesity-specific parenting behaviors directly associated with children's obesity status. For future research, a childhood obesity prevention and management program targeting socioeconomically vulnerable families should include behavioral strategies to improve parenting behaviors by increasing parenting self-efficacy and alleviating authoritarian parenting styles.

## 요 약

**연구배경:** 선진국에서는 사회경제적 지위가 낮은 아동이 사회경제적 지위가 중·상급인 아동보다 비만의 위험이 더 높다고 알려져 있다. 아동비만은 주로 양육행동을 실천하는 주체인 부모의 양육행동을 통한 양육 자기효능감 및 양육방식과 같은 부모행동 결정요인에 의해 영향을 받을 수 있다. 이에, 경로 분석을 이용하여 사회경제적 취약계층 아동집단의 비만 수준에 영향을 미치는 부모 양육행동과 관련 요인을 파악하고자 하였다.

**방법:** 양육 자기효능감은 Dumka et al.에 의해 개발된 5점 Likert 척도로 측정하였다. 양육방식은 Robinson et al.의 총 32개 항목의 3가지 유형(민주적, 권위적, 허용적 양육방식)으로 구성된 5점 Likert 척도로 측정하였다. 비만특정 양육행동은 아동의 건강한 식습관을 장려하는 것으로 정의하였다. 이는 Birch et al.이 개발한 5점 Likert 척도인 Child Feeding Questionnaire를 사용하여 측정하였다. 아동의 비만 수준은 아동의 연령과 성별에 맞게 조정된 표준화된 체질량지수(BMI) 점수를 나타내는 BMI z-score 값을 사용하여 평가하였다.

**결과:** 경로모형에서 양육 자기효능감이 높을수록( $\beta=0.40$ ,  $P=0.007$ ), 권위주의적 양육방식이 낮을수록( $\beta=-0.385$ ,  $P=0.032$ ) 비만특정 양육행동이 높은 것과 유의한 연관이 있었다. 연이어, 비만특정 양육행동이 높을수록 아동의 BMI z-score가 낮은 것과 유의한 연관성이 있었다( $\beta=-0.37$ ,  $P=0.001$ ).

**결론:** 사회경제적으로 취약한 아동의 비만 예방을 위해서는 비만특정 양육행동 개선 및 양육 자기효능감을 높이고, 권위주의적 양육방식을 감소시키기 위한 중재전략을 제공할 필요가 있겠다.



중심 단어: 양육, 자기효능감, 아동비만, 취약계층

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