



Children's Obesity Among Low Income Families in Korea: Status, Implications and Policy Options

Hye-Ryun Kim



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Implications and Policy Options

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Contents

CHAPTER 1

Introduction 3

1. Background and Objectives of Study 3
2. Methodology 5

CHAPTER 2

Status of Children's Obesity in Low Income Families ... 11

1. Obesity and Underweight 11
2. Children's Obesity by Socioeconomic Characteristics 22
3. Factors Related to Children's Obesity in Low Income Families ... 28
4. Discussions on Study Results 43

CHAPTER 3

Policy Options for Prevention and Management of Children's Obesity in Low Income Families 49

1. Basic Directions 49
2. Policy Options 50

References 63

Contents

List of Tables

- 〈Chart 1〉 Average height and weight of children in low income families by sex and age 12
- 〈Chart 2〉 Average height and weight of children in low income families by school year 12
- 〈Chart 3〉 Overweight/obesity distribution of children in low income families by sex 17
- 〈Chart 4〉 Classification of weight conditions for children in low income families by age (KCDC standards) 18
- 〈Chart 5〉 Classification of weight conditions for children in low income families by age (IOTF standards) 19
- 〈Chart 6〉 Underweight and obesity of children in low income families by household characteristics 22
- 〈Chart 7〉 Proportion of underweight and obese children by educational background of parents 26
- 〈Chart 8〉 Occupation of fathers and proportion of underweight and obese children 27
- 〈Chart 9〉 Employment status of fathers and proportion of underweight and obese children 27
- 〈Chart 10〉 Correlation between children's weight conditions and physique distribution of their fathers 28
- 〈Chart 11〉 Correlation between children's weight conditions and physique distribution of their mothers ... 28

Contents

〈Chart 12〉	Physique perception by sex	29
〈Chart 13〉	Distorted perception of body image for children in low income families by age	30
〈Chart 14〉	Weight control attempts by weight status	31
〈Chart 15〉	Proportion of children choosing inadequate weight control methods (%)	32
〈Chart 16〉	Exercise Practicing rates of children in low income families	33
〈Chart 17〉	Time spent in physical exercise activities by children in low income families	33
〈Chart 18〉	Daily average walking time for children	34
〈Chart 19〉	Sedentary time for children during weekdays and weekends	34
〈Chart 20〉	Major activities performed by children when staying home alone	35
〈Chart 21〉	Children's weight conditions and perceived health levels	36
〈Chart 22〉	Weight conditions of children by sex and sleeping time	37
〈Chart 23〉	Obesity and stress perception levels of children ·	38
〈Chart 24〉	Stress factors by weight conditions of children	38
〈Chart 25〉	Depression experiences of children in low income families by weight condition	39

Contents

〈Chart 26〉 Children's self-esteem by sex and obesity level	40
〈Chart 27〉 Body image and self-esteem	40
〈Chart 28〉 Children's body esteem by weight condition	41
〈Chart 29〉 Body image and body esteem of children in low income families	42
〈Chart 30〉 Distorted physical perception of children in low income families by obesity level	42
〈Chart 31〉 Body image and distorted physical perception of children in low income families	42

List of Figures

[Figure 1] Comparison of height between children in low income families and children in general families (Male) ..	13
[Figure 2] Comparison of height between children in low income families and children in general families (Female)	14
[Figure 3] Comparison of weight between children in low income families and children in general families (Male) ..	15
[Figure 4] Comparison of weight between children in low income families and children in general families (Female) ..	15
[Figure 5] Distribution of underweight, normal-weight, overweight and obese children by obesity classification criteria	17

Contents

[Figure 6] Comparison of weight distribution between children in low income families and children in general families, Male	20
[Figure 7] Comparison of weight distribution between children in low income families and children in general families, Female	21
[Figure 8] Distribution of weight status for children in low income families by household characteristics (All)	23
[Figure 9] Distribution of weight status for children in low income families by household characteristics (Male)	24
[Figure 10] Distribution of weight status for children in low income families by household characteristics (Female) ..	24
[Figure 11] Healthcare scheme for children in low income families (Suggestion)	53



Chapter

01

Introduction



Chapter 1

Introduction

1. Background and Objectives of Study

Many studies have suggested the correlation between the socioeconomic status during childhood and the health, underweight and obesity of children.

The loss of parents and the worsening of the socioeconomic environment during childhood jeopardize children's growth throughout their childhood and may negatively affect their health. Children in low income families tend to suffer more negative impacts on their physical growth and development, health and sentiments than those in higher income families and face greater risks of obesity and chronic illnesses even in their adulthood.

The weight of children is one of the key barometers indicating healthy growth. In Korea, the number of underweight children has consistently declined, while childhood obesity has grown for the last 10 years though the pace of growth recently slowed down slightly.

There have so far been conflicting research findings as to whether obesity is prevalent among children in low income families in Korea and whether underweight has declined to the extent that it no longer is a problem. Any increase in obesity or a high proportion of underweight among children in a certain demographic group may pose a serious social problem, hence

the need for preemptive policy measures.

Korea's child poverty rate of over 10% is relatively high among OECD member states. The absolute poverty rate of children under 18 stood at 9.6% (around one million persons) in 2009 and has not decreased since the early 2000s. The number of children aged 6-17 in low income families requiring social caring—including those neglected due to an increase in single-parent and double-breadwinner families in addition to financial distress—was estimated at 1.1 million as of December 2008.

As this will highly likely result in an inter-generational poverty cycle and health inequality, addressing health issues for children in low income families is seen as a major challenge in health policies to ensure the sound health of future generation, especially in an era of low childbirth.

Korea has ratified the UN Convention on the Rights of the Child (CRC). One of the Convention's eight basic elements, "basic health and welfare," recommends that mediations and projects for child health (e.g. healthcare, medical support, sufficient supply of nourishing food, and education on health and nutrition) be provided to children in low income families. Korea's healthcare systems and projects to defend the rights to health of these children still have much room for improvement compared to other areas of welfare service. Reinforcing health services for children in low income families is an urgent challenge to enhance social unity and health equity in today's era of low childbirth.

Nowadays, after-school caring projects for children in low income families have been pursued sporadically by many government agencies in Korea. Efforts to defend the health rights

of children in low income families lack profile compared to other welfare rights of children.

In order to clearly identify the obesity patterns of children in low income families, this study conducts sample surveys and analyzes their obesity levels and relevant factors.

Focusing on overweight and obesity among health issues with children in low income families, this study seeks to present policy options to establish health service support systems and expand relevant programs.

Below are the specific objectives of this study:

- (a) Analyze the obesity patterns of children in low income families;
- (b) Examine socioeconomic factors surrounding child obesity in low income families;
- (c) Identify the current status of health services related to the prevention and management of obesity among children in low income families; and
- (d) Suggest policy options to alleviate obesity issues among children in low income families.

2. Methodology

- Examine previous domestic and foreign studies and review related policy data
- Visit community after-school child care centers and

interview working-level officials

- Conduct surveys and anthropometry measurement at community after-school child care centers and after-school youth academies
 - Develop three survey questionnaire: Questionnaire for children, teachers and institutions
 - Perform pilot surveys on children at community after-school child care centers
 - Conduct surveys and weight/height measurement on children and teenagers (from those in their third year at elementary school to those in their third year at middle school) at 25 local child care centers and six after-school youth academies located in Seoul
 - Survey period: June 2011 - July 2011
 - Compare children in low income families surveyed with general children
 - Use the results from the 2009 Seoul Metropolitan Student Health Examination as data for ordinary children
 - Classify obesity levels
 - Classify based on the sex- and age-specific criteria in 2007 standard child growth chart from Korea Centers for Disease Control and Prevention (KCDC) and the Korean Pediatrics Association
 - Utilize the criteria from Cole (2000) as international standards used by IOTF for child obesity classification

① Classification by KCDC

Underweight: Less than 5th percentiles in body mass index (BMI, kg/m²)

Normal: Less than 85th percentiles in BMI

Overweight: 85~94th percentiles and less than 25 in BMI

Obese: Over 95th percentiles or over 25 in BMI

② CDC classification of child/teenager obesity

Underweight and normal: Same as ①

Overweight: 85~94th percentiles in BMI

Obese: Over 95th percentiles in BMI

③ Age- and sex-specific criteria are applied based on Cole (2000) as the International Obesity Task Force's (IOTF) child obesity standards. The IOTF criteria do not have underweight standards, so underweight children are classified as normal.

- Hold policy discussions to collect opinions from experts and working-level workers.
 - Listen to social welfare teachers and relevant officials in 31 facilities used by children in low income families to obtain their views on obesity, underweight and health issues with these children
 - Hear from experts and related government officials



Chapter

02

Status of Children's Obesity in Low Income Families



Chapter 2

Status of Children's Obesity in Low Income Families

1. Obesity and Underweight

A. Height and weight distribution

Weight is an important index that comprehensively represents the physical development of children. Indicating the nutrition and health conditions that affect their physical development, weight is the most widely used and accurate tools of body measurement. The combination of weight and height is often used as various indicators.

Height refers to the general size of body and the length of physique. It is a crucial index for identifying illnesses or long-term malnutrition and for determining weight conditions.

The average height and weight of children in low income families by sex, age and school year are shown in Chart 1 and Chart 2.

〈Chart 1〉 Average height and weight of children in low income families by sex and age

Age	(N)		Height (cm) Average (S.E.)				Weight (kg) Average (S.E.)			
	Male	Female	Male		Female		Male		Female	
8	(7)	(6)	129.1	(1.54)	131.2	(0.92)	29.1	(1.66)	28.7	(2.98)
9	(24)	(34)	133.6	(1.43)	134.6	(1.15)	32.5	(1.55)	33.6	(1.20)
10	(66)	(70)	139.5	(0.87)	139.8	(0.86)	38.7	(1.40)	37.3	(0.96)
11	(67)	(68)	144.7	(1.03)	146.0	(0.76)	40.1	(1.27)	40.7	(0.91)
12	(42)	(59)	149.3	(1.39)	151.7	(0.89)	46.0	(2.01)	44.1	(1.18)
13	(23)	(27)	160.0	(1.93)	155.9	(1.05)	52.6	(2.74)	51.8	(1.61)
14	(21)	(15)	165.9	(1.39)	155.1	(1.25)	59.1	(2.52)	50.2	(1.97)
15	(10)	(6)	167.5	(2.81)	153.4	(2.12)	60.2	(4.16)	48.4	(1.74)
Total	(260)	(285)	146.6	(0.82)	145.5	(0.58)	43.1	(0.87)	41.2	(0.58)

〈Chart 2〉 Average height and weight of children in low income families by school year

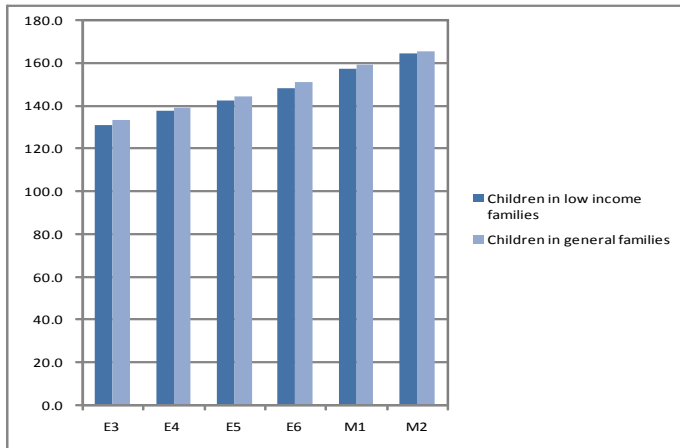
Grade	(N)		Height (cm) Average (S.E.)				Weight (kg) Average (S.E.)			
	Male	Female	Male		Female		Male		Female	
E3	(28)	(29)	131.4	(1.24)	132.2	(1.30)	32.6	(1.68)	31.4	(1.27)
E4	(40)	(61)	138.0	(0.87)	138.8	(0.80)	36.8	(1.37)	35.9	(0.89)
E5	(71)	(68)	142.4	(0.80)	143.8	(0.83)	40.0	(1.49)	40.2	(1.03)
E6	(64)	(64)	148.5	(1.19)	150.3	(0.76)	43.8	(1.55)	42.5	(0.95)
M1	(21)	(32)	157.3	(1.80)	155.4	(1.08)	51.6	(2.09)	49.4	(1.48)
M2	(19)	(24)	164.9	(1.58)	155.2	(0.84)	54.0	(3.26)	52.6	(1.66)
M3	(17)	(7)	168.7	(1.59)	154.8	(2.26)	63.4	(2.79)	48.3	(1.47)
Total	(260)	(285)	146.6	(0.82)	145.5	(0.58)	43.1	(0.87)	41.2	(0.58)

To compare the results of this survey on children in low income families with general children, we examined the height of children from their third year at elementary school to their third year at middle school recorded in 2009 Seoul Metropolitan Student Health Examination. The height of male children in low income

families surveyed was 0.6-2.9cm shorter than children in general families, for subject school years (see Figure 1).¹⁾

As for the height of female children, those in low income families were found to be 0-3cm shorter than those in general families, for the subjected school years (see Figure 2). This observation shows that the poor socioeconomic environment may have caused retardation of growth in height, both for male and female children in low income families.

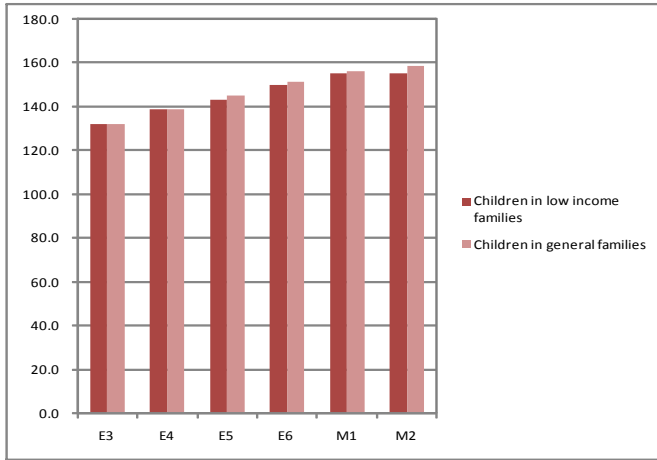
[Figure 1] Comparison of height between children in low income families and children in general families (Male)



Source: Data for children in low income families are based on this study; children in general families based on 2009 Student Health Examination by Seoul Metropolitan Government

1) Children in low income families in their third year at middle school are excluded from the comparison as the number of relevant samples in this survey is too small.

[Figure 2] Comparison of height between children in low income families and children in general families (Female)

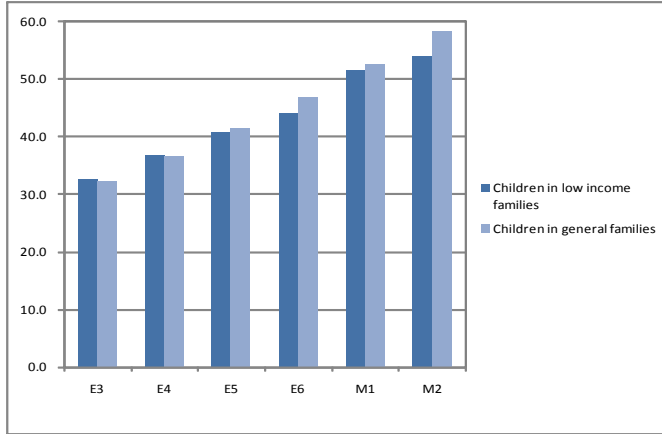


Source: Data for children in low income families are based on the result of this study; Data for children in general families are based on 2009 Student Health Examination by Seoul Metropolitan Government

The weight of male children in low income families was slightly lighter than those in general families of Seoul 2009 data (see Figure 3).

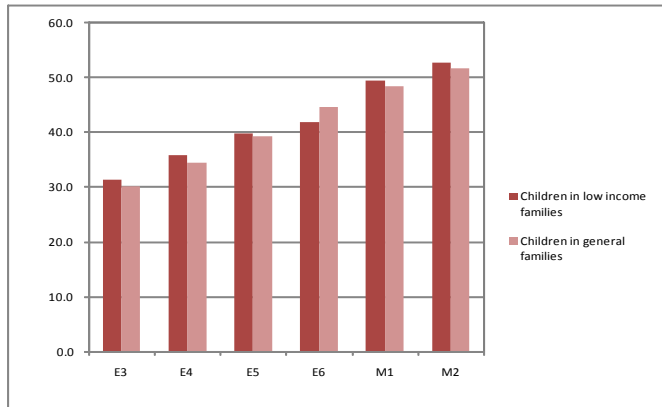
Female children in low income families weighed more than children in general families except for those in their sixth year at elementary school (see Figure 4).

[Figure 3] Comparison of weight between children in low income families and children in general families (Male)



Source: Children in low income families based on the results of this survey; children in general families based on 2009 Student Health Examination in Seoul

[Figure 4] Comparison of weight between children in low income families and children in general families (Female)



Source: Children in low income families based on the results of this survey; children in general families based on 2009 Student Health Examination in Seoul

Overall, the height of both male and female children in low income families were shorter than those of children in general families. For weight, male children were lighter than children in general families, while female children in low income families weighed slightly more than ordinary children.

B. Obesity level distribution

When the weight conditions of children in low income families were classified with the KCDC criteria, overweight children took up 12.3% of all children surveyed (male 8.5%, female 15.8%). The proportion of obese children was 8.6% (male 10.8%, female 6.7%).

When the U.S. CDC criteria were applied, the proportion of overweight children stood at 13.4% (male 10.4%, female 16.1%) while obese children's proportion was 7.5% (male 8.7%, female 6.3%), slightly down from what was found with the KCDC criteria.

According to IOTF's classification based on Cole (2000), overweight children accounted for 21.1% (male 20.4%, female 21.8%) and obese children 5.1% (male 8.1%, female 2.5%).

Whichever criteria are applied, comparison between male and female children in low income families suggests that male children showed greater underweight and obesity levels while the proportion of overweight children was higher among their female counterparts (see Charts 3-5 and Figure 5).

〈Chart 3〉 Overweight/obesity distribution of children in low income families by sex

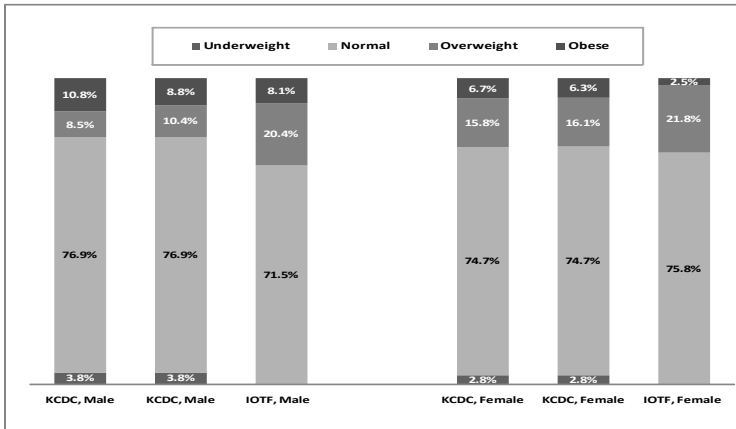
Classification	Division	BMI classification					(N)
		Underweight	Normal	Overweight	Obese	Total	
KCDC child/teenager classification1)	Male	3.8	76.9	8.5	10.8	100.0	(260)
	Female	2.8	74.7	15.8	6.7	100.0	(285)
	Total	3.3	75.8	12.3	8.6	100.0	(545)
CDC child/teenager obesity classification2)	Male	3.8	76.9	10.4	8.8	100.0	(260)
	Female	2.8	74.7	16.1	6.3	100.0	(285)
	Total	3.3	75.8	13.4	7.5	100.0	(545)
IOTF classification3)	Male	71.5		20.4	8.1	100.0	(260)
	Female	75.8		21.8	2.5	100.0	(285)
	Total	73.8		21.1	5.1	100.0	(545)

Note: 1) KCDC standards on the obesity of Korean children are applied.

2) CDC obesity standards and methods are applied.

3) Age- and sex-specific standards based on the International Obesity Task Force (IOTF) criteria on obesity (Cole, as of 2000) are applied. The IOTF standards have no criteria on underweight, so underweight children are classified as normal.

〔Figure 5〕 Distribution of underweight, normal-weight, overweight and obese children by obesity classification criteria



Note: According to the CDC standards, underweight group falls below 5 percentiles.

The normal group ranges from 5 percentiles to less than 85 percentiles and the overweight group from 85 percentiles to less than 95 percentiles. The obese group exceeds 95 percentiles.

〈Chart 4〉 Classification of weight conditions for children in low income families by age (KCDC standards)

Sex	Age	KCDC obesity classification				Total	
		Underweight	Normal	Overweight	Obese	%	(N)
Male	8	14.3	85.7	-	-	100.0	(7)
	9	4.2	70.8	16.7	8.3	100.0	(24)
	10	3.3	71.2	10.6	15.2	100.0	(66)
	11	1.5	86.6	7.5	4.5	100.0	(67)
	12	9.5	9.0	9.5	11.9	100.0	(42)
	13	4.3	73.9	4.3	17.4	100.0	(23)
	14	-	81.0	4.8	14.3	100.0	(21)
	15	-	90.0	-	10.0	100.0	(10)
	Total	3.8	76.9	8.5	10.8	100.0	(260)
Female	8	-	83.3	-	16.7	100.0	(6)
	9	-	67.6	23.5	8.8	100.0	(34)
	10	3.0	70.0	18.6	8.6	100.0	(70)
	11	1.5	80.9	11.8	5.9	100.0	(68)
	12	8.5	78.0	10.2	3.4	100.0	(59)
	13	-	66.7	29.6	3.7	100.0	(27)
	14	-	80.0	6.7	13.3	100.0	(15)
	15	-	83.3	16.7	-	100.0	(6)
	Total	2.8	74.7	15.8	6.7	100.0	(285)

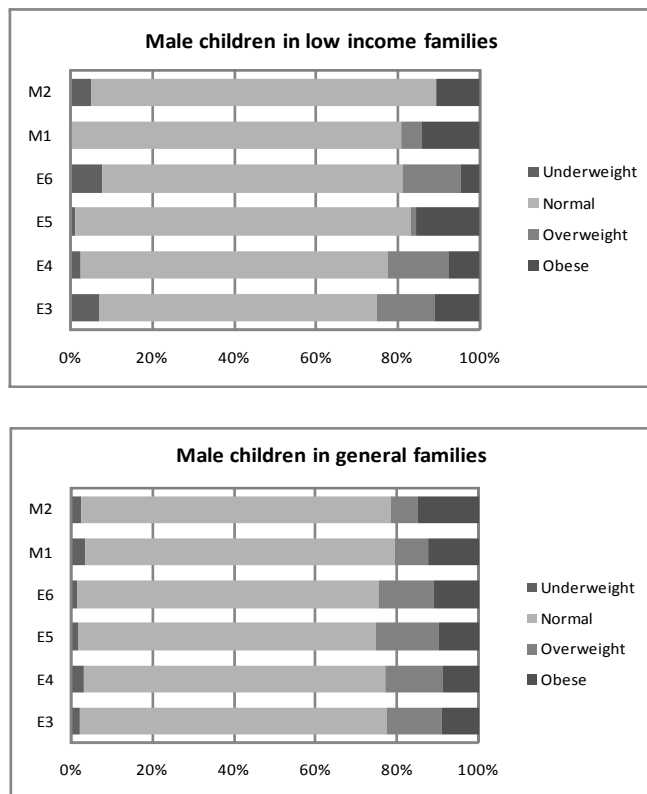
〈Chart 5〉 Classification of weight conditions for children in low income families by age (IOTF standards)

Sex	Age	IOTF obesity classification			Total	
		Normal	Overweight	Obese	%	(N)
Male	8	85.7	14.3	-	100.0	(7)
	9	75.0	16.7	8.3	100.0	(24)
	10	63.6	22.7	13.6	100.0	(66)
	11	79.1	17.9	3.0	100.0	(67)
	12	66.7	21.4	11.9	100.0	(42)
	13	69.6	21.7	8.7	100.0	(23)
	14	71.4	23.8	4.8	100.0	(21)
	15	80.0	20.0	-	100.0	(10)
	Total	71.5	20.4	8.1	100.0	(260)
Female	8	83.3	-	16.7	100.0	(6)
	9	61.8	35.3	2.9	100.0	(34)
	10	65.7	30.0	4.3	100.0	(70)
	11	80.9	17.6	1.5	100.0	(68)
	12	86.4	13.6	0.0	100.0	(59)
	13	74.1	22.2	3.7	100.0	(27)
	14	80.0	20.0	-	100.0	(15)
	15	100	-	-	100.0	(6)
	Total	75.8	21.8	2.8	100.0	(285)

Comparison of weight distribution between children in general families and children in low income families examined in this survey in 2009 indicates that the proportion of underweight children was slightly higher among male children in low income families than among children in general families (see Figure 6).²⁾

2) Data on ordinary children in Seoul are available only by school year but not by age.

[Figure 6] Comparison of weight distribution between children in low income families and children in general families, Male

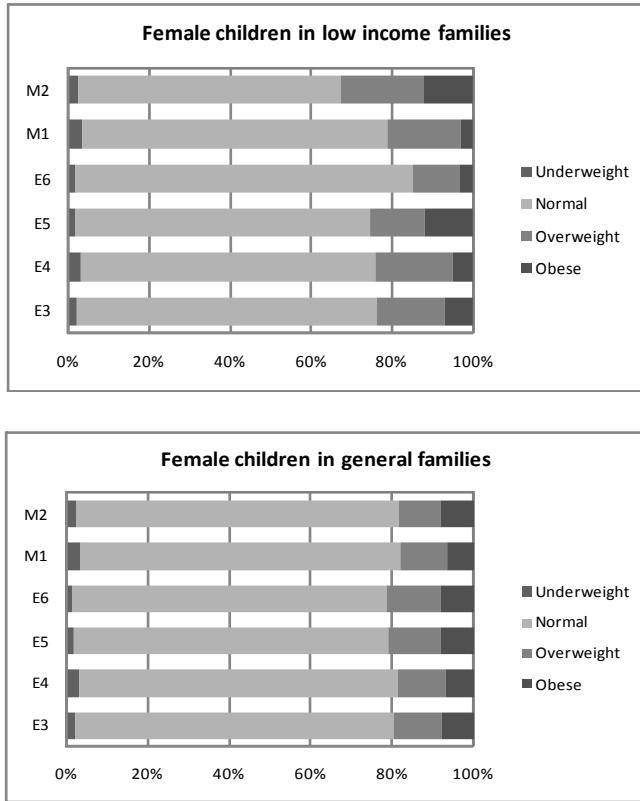


As for female children, the proportion of children in the overweight and obesity groups was clearly higher among those in low income families than among ordinary children. The difference in the proportion of underweight children was not clear,³⁾ while the proportion of children in the normal weight

3) This is believed to be because the number of children as samples by sex and school

group was low (see Figure 7).

[Figure 7] Comparison of weight distribution between children in low income families and children in general families, Female



year was small.

2. Children's Obesity by Socioeconomic Characteristics

A. Obesity level distribution by household characteristics of children

The mix of underweight, overweight and obese children by the characteristics of households and their members are suggested in Chart 6, Figure 8, Figure 9 and Figure 10.

〈Chart 6〉 Underweight and obesity of children in low income families by household characteristics

(Unit: %, multiple responses made on household types)

		Household situation			Household type			
		Welfare recipient (N=149)	Near poverty household (N=229)	General household ¹⁾ (N=148)	Mother & child (N=158)	Father & child (N=95)	Grandparent & child (N=46)	Parents & child (N=273)
Total	Underweight	2.7	4.4	2.7	3.8	3.2	6.5	3.3
	Normal	79.2	72.5	77.0	74.7	74.7	78.3	74.0
	Overweight	10.7	14.4	11.5	11.4	10.5	8.7	12.8
	Obese	7.4	8.7	8.8	10.1	11.6	6.5	9.9
Male	Underweight	2.9	5.4	3.0	3.7	4.0	8.7	4.7
	Normal	85.7	72.1	75.8	75.6	78.0	69.6	72.9
	Overweight	5.7	11.7	7.6	8.5	2.0	8.7	9.3
	Obese	5.7	10.8	13.6	12.2	16.0	13.0	13.2
Female	Underweight	2.5	3.4	2.4	3.9	2.2	4.3	2.1
	Normal	73.4	72.9	78.0	73.7	71.1	87.0	75.0
	Overweight	15.2	16.9	14.6	14.5	20.0	8.7	16.0
	Obese	8.9	6.8	4.9	7.9	6.7	--	6.9

Note: 1) Normal households refer to those that are not welfare recipients or near poverty households.

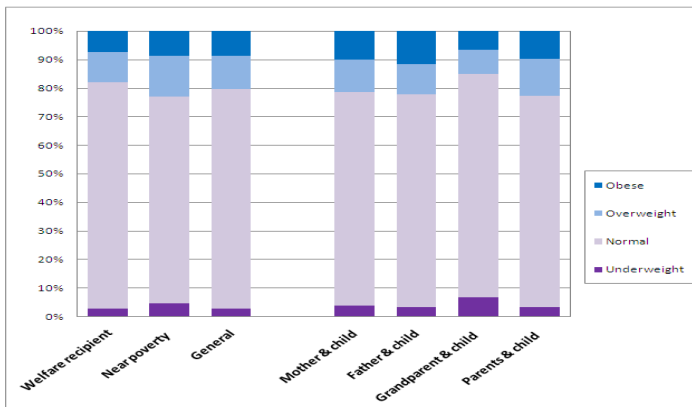
Even among children in low income families, their underweight, overweight and obesity distribution varied by the characteristics

of household members.

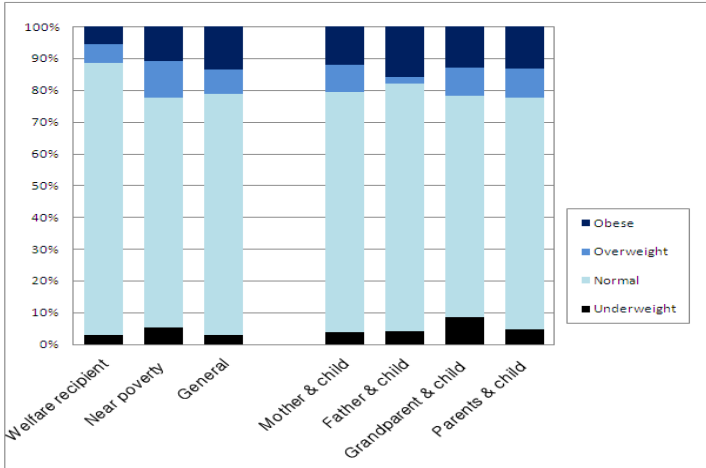
For male children, the proportion of overweight and underweight children was high among children in near poverty households, while that of obese children and underweight children was high among father-child households and among grandparent-child households, respectively. For female children, no obese children were found among grandparent-child households and the proportion of underweight children was high.

In other words, the proportion of underweight children was high among near poverty households. By household type, grandparent-child, mother-child, and father-child household had high proportion of underweight children. Overweight and obesity were prevalent among near poverty households; the proportion of obese children was high among male children in father-child households while that of overweight children was high among female children in father-child households.

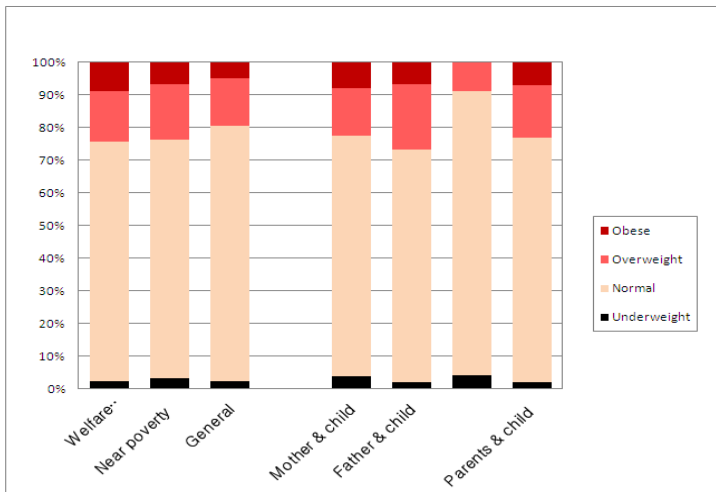
[Figure 8] Distribution of weight status for children in low income families by household characteristics (All)



[Figure 9] Distribution of weight status for children in low income families by household characteristics (Male)



[Figure 10] Distribution of weight status for children in low income families by household characteristics (Female)



B. Obesity level distribution of children by educational background, occupation and weight of parents

We examined whether the obesity and underweight conditions of children differed by the educational background of fathers and mothers in low income families.⁴⁾

The proportion of overweight and obese children was low when the educational background of fathers was university graduate or higher, while that same proportion was high when their fathers' educational background was high school graduate or under. We also took a look at the correlation between the educational background of mothers and obesity/underweight of children. The proportion of overweight and obese children was lower when the educational background of mothers was university or higher (see Chart 7).

⁴⁾ As for many of children in low income families, they often have single parents or the educational background of their parents is unknown.

〈Chart 7〉 Proportion of underweight and obese children by educational background of parents

		KCDC obesity classification				Total	(N)	Average	(S.E.)	F (P)
		Underweight	Normal	Overweight	Obese					
Educational background of fathers	Middle school or lower	2.4	75.6	14.6	7.3	100.0	(41)	19.23	(0.55)	1.839 (p=0.161)
	High school	3.1	72.8	12.3	11.7	100.0	(162)	19.65	(0.27)	
	University or higher	3.8	84.9	7.5	3.8	100.0	(53)	18.65	(0.39)	
	Total	3.1	75.8	11.7	9.4	100.0	(256)	19.38	(0.21)	
Educational background of mothers	Middle school or lower	4.5	75.0	9.1	11.4	100.0	(44)	19.54	(0.51)	1.503 (p=0.224)
	High school	2.9	73.7	13.7	9.7	100.0	(175)	19.67	(0.27)	
	University or higher	5.8	80.8	5.8	7.7	100.0	(52)	18.71	(0.49)	
	Total	3.7	75.3	11.4	9.6	100.0	(271)	19.46	(0.21)	

The proportion of overweight and obese children was high among those whose fathers were jobless or had other or unknown occupation (see Chart 8).

As indicated in existing research findings, the proportion of underweight, overweight and obese children was high when mothers were employed, as the children might have been neglected and failed to keep their weight under control owing to inadequate diets and physical activities (see Chart 9).

〈Chart 8〉 Occupation of fathers and proportion of underweight and obese children

	KCDC obesity classification				Total	(N)	Average	(S.E.)	F (P)
	Underweight	Normal	Overweight	Obese					
Office worker, administrative worker or professional	2.6	81.6	7.9	7.9	100.0	(38)	18.65	(0.56)	1.292 (p=0.276)
Laborer or self-employed	3.1	75.7	12.4	8.8	100.0	(226)	19.61	(0.23)	
Jobless, other or unknown	2.5	74.7	13.0	9.9	100.0	(162)	19.54	(0.26)	
Total	2.8	75.8	12.2	9.2	100.0	(426)	19.50	(0.17)	

〈Chart 9〉 Employment status of fathers and proportion of underweight and obese children

	KCDC obesity classification				Total	(N)	Average	(S.E.)	F (P)
	Underweight	Normal	Overweight	Obese					
Employed	3.6	73.1	13.3	10.0	100.0	(361)	19.64	(0.18)	1.066 (p=0.303)
Jobless	1.4	79.5	11.0	8.2	100.0	(73)	19.18	(0.39)	
Total	3.2	74.2	12.9	9.7	100.0	(434)	19.56	(0.16)	

For a large number of obese children, their fathers were slightly or very fat. Underweight children tended to have slightly or very thin fathers, but there was no statistically significant difference (see Chart 10).

Many of obese or overweight children had mothers who were slightly or very fat. The mothers of underweight children were often slightly or very thin, while no statistically significant difference was observed (see Chart 11).

〈Chart 10〉 Correlation between children's weight conditions and physique distribution of their fathers

Weight status of children	Father's physique			Total	
	Very or slightly thin	Normal	Slightly or very fat	%	(N)
Underweight	40.0	46.7	13.3	100.0	(15)
Normal	26.0	40.1	33.9	100.0	(354)
Overweight	36.0	28.0	36.0	100.0	(50)
Obese	16.7	40.5	42.9	100.0	(42)
Total	26.7	39.0	34.3	100.0	(461)

〈Chart 11〉 Correlation between children's weight conditions and physique distribution of their mothers

Weight conditions of children	Mother's physique			Total	
	Very or slightly thin	Normal	Slightly or very fat	%	(N)
Underweight	31.3	31.3	37.5	100.0	(16)
Normal	19.6	39.7	40.8	100.0	(358)
Overweight	23.2	30.4	46.4	100.0	(56)
Obese	11.6	44.2	44.2	100.0	(43)
Total	19.7	38.7	41.6	100.0	(473)

3. Factors Related to Children's Obesity in Low Income Families

We now seek to examine factors that may affect the weight and obesity level of children aside from socioeconomic factors. This study, however, aims to identify possible related factors

rather than directly exploring the association as it is based on data obtained from cross-sectional surveys and the number of its samples is limited.

A. Physique recognition and distorted perception of body image

When asked "What do you think of your physique?" 29.6% of male children and 44.6% of female children stated that they perceived themselves as "slightly fat" or "very fat". Though they actually belonged to the normal weight group, female children showed strong tendency to perceive their weight conditions as overweight or obese (see Chart 12).

〈Chart 12〉 Physique perception by sex

	Physique perception					Total	(N)
	Very thin	Slightly thin	Normal	Slightly fat	Very fat		
Male	12.1	26.8	31.5	21.0	8.6	100.0	(257)
Female	7.1	17.7	30.7	32.2	12.4	100.0	(283)
Total	9.4	22.0	31.1	26.9	10.6	100.0	(540)

As for the distorted perception of body image by normal-weight children, the rates stood at 32.5% for female children and 15.7% for male children, hinting that a large share of female children perceived themselves as overweight or obese though their weight was actually normal.

The perception of body image became increasingly distorted with increase in age and school year (see Chart 13).

〈Chart 13〉 Distorted perception of body image for children in low income families by age

(Unit: %, persons)

	Male		Female	
	(N)	Distorted perception of body image (%)	(N)	Distorted perception of body image (%)
8	(6)	-	(5)	-
9	(17)	11.8	(23)	34.8
10	(46)	10.9	(49)	22.4
11	(56)	12.5	(55)	41.8
12	(29)	24.1	(46)	37.0
13	(17)	17.6	(18)	27.8
14	(17)	29.4	(11)	27.3
15	(9)	22.2	(5)	40.0
Total	(197)	15.7	(212)	32.5

B. Attempts to control weight

Female children tended to make more attempts to lose weight than their male counterparts; those belonging to the overweight and obese groups, in particular, made such efforts quite often. Many of the children in the normal weight group also tried to lose weight, suggesting the possibility that there might be a large number of children engaging in excessive weight control. This has to do with the distorted perception of body image explained earlier (see Chart 14).

〈Chart 14〉 Weight control attempts by weight status

Sex	Weight control attempts	Weight condition (KCDC classification)			Total
		Under-weight	Normal	Overweight/ obese	
Male	Try to lose weight	-	25.8	69.4	33.2
	Try to keep weight at current level	20.0	17.5	10.2	16.2
	Try to gain weight	50.0	17.5	2.0	15.8
	Do not try to control weight	30.0	39.2	18.4	34.8
	Total	100.0	100.0	100.0	100.0
	(N)	(10)	(200)	(50)	(260)
Female	Try to lose weight	12.5	42.5	81.0	50.2
	Try to keep weight at current level	25.0	27.8	15.9	25.1
	Try to gain weight	25.0	6.6	-	5.7
	Do not try to control weight	37.5	23.1	3.2	19.1
	Total	100.0	100.0	100.0	100.0
	(N)	(18)	(413)	(114)	(545)

Exercise and reduced meal portion took a vast majority of methods used to control weight, while an unusually large number of children turned to inadequate weight control methods such as fasting, unprescribed intake of weight-losing drugs, consumption of copragogue or diuretic, after-meal vomiting, one-food diet, intake of oriental medicine, consumption of diet food and smoking. The proportion of children choosing inadequate weight control methods was especially high in the obese group (27.7%) and the overweight group (20.9%). Normal-weight children (10.2%) and underweight children (11.1%) also had experience of choosing inadequate weight control methods, hinting the urgent need to correct wrong public perception on weight control and management methods (see Chart 15).

〈Chart 15〉 Proportion of children choosing inadequate weight control methods (%)

Total	Sex		Weight condition			
	Male	Female	Underweight	Normal	Overweight	Obese
13.0	15.0	11.2	11.1	10.2	20.9	27.7

Note: Wrong methods for weight control — Fasting, unprescribed intake of weight-losing drugs, consumption of copragogue or diuretic, after-meal vomiting, one-food diet, intake of oriental medicine, consumption of diet food and smoking

C. Physical activities and dietary behaviors

We examined the exercise practicing rates of children by obesity levels. The moderate exercise practicing rate is the proportion of children practicing moderate exercise for more than five days a week; the vigorous exercise practicing rate refers to the proportion of children performing vigorous exercise for more than three days a week. The exercise practicing rate is the proportion of children practicing moderate exercise for more than five days a week or vigorous exercise for more than three days a week. The vigorous exercise practicing rate was slightly higher among overweight children, while the moderate exercise practicing rate was higher among obese children. Overall, the exercise practicing rates of overweight or obese children were higher, as obese children put physical activities into practice more actively to control weight. The exercise practicing rates of underweight children were low (see Chart 16).

〈Chart 16〉 Exercise Practicing rates of children in low income families

(Unit: %, persons)

	(N)	Moderate exercise practicing	Vigorous exercise practicing	Exercise practicing
Underweight	(18)	22.2	44.4	44.4
Normal	(412)	28.2	43.9	48.1
Overweight	(67)	20.9	50.7	52.2
Obese	(47)	31.9	44.7	53.2
Total	(544)	27.4	44.9	48.9

Note: The moderate exercise practicing rate is the proportion of children practicing moderate exercise for more than five days a week; the vigorous exercise practicing rate refers to the proportion of children performing vigorous exercise for more than three days a week. The exercise practicing rate is the proportion of children practicing moderate exercise or vigorous exercise.

Unlike the exercise practicing rates, the duration of physical exercise for overweight and obese children was significantly shorter than that for underweight and normal-weight children (see Chart 17).

The daily average walking time was also longer for underweight children than for overweight and obese children (see Chart 18).

〈Chart 17〉 Time spent in physical exercise activities by children in low income families

	physical exercise					(N)	Average	(S.E.)	F
	None	1-2 hours	3-5 hours	6+ hours	Total				
Underweight	13.3	40.0	20.0	26.7	100.0	(18)	3.25	(0.59)	2.511 P= 0.082†
Normal	11.4	54.0	20.7	13.9	100.0	(408)	2.65	(0.10)	
Overweight/obese	13.0	57.0	23.0	7.0	100.0	(113)	2.27	(0.17)	
Total	11.8	54.2	21.2	12.8	100.0	(539)	2.59	(0.09)	

Note: The average duration of physical exercise is calculated by converting none to "0," one hour to "1," two hours to "2," three hours to "3," four to five hours to "4.5" and six or longer hours to "7."

† p<.10

〈Chart 18〉 Daily average walking time for children

	Daily average walking time				Total	(N)
	<0.5 hours per day	0.5~1 hours per day	1~2 hours per day	2+ hours per day		
Underweight	-	50.0	27.8	22.2	100.0	(18)
Normal	15.9	33.7	22.2	28.3	100.0	(410)
Overweight/obese	17.5	39.5	22.8	20.2	100.0	(114)
Total	15.7	35.4	22.5	26.4	100.0	(542)

The sedentary time for children (i.e. time spent sitting while watching television or video, searching the web or playing games) was longer during weekends than during weekdays. The sedentary time was especially longer for overweight and obese children during both weekdays and weekends. Though there was no statistically significant difference, the proportion of children spending more than four hours sitting during weekends was higher among the overweight and obese groups (see Chart 19).

〈Chart 19〉 Sedentary time for children during weekdays and weekends

Division		Sedentary time					Total	(N)	Average	(S.E.)
		<1 hour per day	1~2 hours per day	2~3 hours per day	3~4 hours per day	4+ hours per day				
Weekday	Underweight	41.2	17.6	23.5	17.8	5.9	100.0	(17)	1.82	(0.37)
	Normal	36.3	28.9	16.8	9.4	8.6	100.0	(405)	1.88	(0.08)
	Overweight/obese	33.9	31.3	16.1	8.0	10.7	100.0	(112)	1.96	(0.16)
	Total	36.0	29.0	16.9	9.2	9.0	100.0	(534)	1.90	(0.07)
Weekend	Underweight	23.5	5.9	23.5	29.4	17.6	100.0	(17)	2.88	(0.45)
	Normal	20.3	27.7	23.0	9.8	19.1	100.0	(408)	2.58	(0.09)
	Overweight/obese	23.0	23.9	16.8	12.4	23.9	100.0	(113)	2.76	(0.19)
	Total	21.0	26.2	21.7	11.0	20.1	100.0	(538)	2.63	(0.08)

Note: The average sedentary time is calculated by converting less than one hour to "0.5," one to two hours to "1.5," two to three hours to "2.5," three to four hours to "3.5" and four or longer hours to "6."

The findings of this study suggest that major activities made by children in low income families when staying home alone include watching television and playing online games. Especially, obese and overweight children were found to spend more time playing online games and watching television. This means the time they spent sitting (i.e. screen time) was longer, thus reducing their physical activities (see Chart 20).

〈Chart 20〉 Major activities performed by children when staying home alone

Division	Obesity classification				Total
	Underweight	Normal	Overweight	Obese	
Hardly left alone	44.4	15.9	22.7	17.4	17.8
Relaxing and playing	11.1	16.9	13.6	19.6	16.5
Homework and study	22.2	11.8	9.1	6.5	11.3
Watching television	11.1	27.2	31.8	23.9	27.0
Internet/games	5.6	17.6	10.6	23.9	16.9
House chores	-	3.7	4.5	-	3.3
Other	5.6	6.9	7.6	8.7	7.1
Total	100.0	100.0	100.0	100.0	100.0
(N)	(18)	(408)	(66)	(46)	(538)

The proportion of two extreme responses was high among obese children: "skip almost every breakfast" and "have breakfast almost everyday (6-7 times/week)." Many of the underweight children stated they would hardly have breakfast. Despite no significant difference across weight groups, underweight children showed stronger tendency to skip lunch and dinner than the other weight groups, while the obese group did not skip any meal.

D. Perceived health status, sleeping time, stress and depression and their correlation with weight conditions

In this study, the health conditions of children surveyed were limited to their subjective perception of health levels, stress and sleeping time.

〈Chart 21〉 Children's weight conditions and perceived health levels

	Obesity classification				Total	BMI average	(S.E.)	F(P)
	Underweight	Normal	Overweight	Obese				
Very good	33.3	30.7	30.8	17.4	29.7	18.97	(0.25)	1.243 (p=0.292)
Good	27.8	41.5	41.5	45.7	41.4	19.53	(0.23)	
Fare	38.9	22.9	21.5	30.4	23.9	19.68	(0.30)	
Poor	-	4.2	4.6	6.5	4.3	20.15	(0.81)	
Very poor	-	0.7	1.5	-	0.7	19.47	(1.41)	
Total (N)	100.0 (18)	100.0 (407)	100.0 (65)	100.0 (46)	100.0 (536)	19.42	(0.15)	

Subjective healthiness perception was calculated with the percentage of children deeming themselves "very healthy" and "relatively healthy." The healthiness perception rate of children surveyed was 71.1%, while the figure was lower for underweight and obese children than the other weight groups. No statistically significant difference was discovered, but the response of "relatively unhealthy" was found more often among obese children. The average BMI was slightly higher among those regarding their subjective health conditions as poor (see Chart 21).

The difference in obesity levels by sleeping time was apparent among male children. The obesity rate was high among male children sleeping less than six hours per day, while no difference

was observed among female children (see Chart 22).

〈Chart 22〉 Weight conditions of children by sex and sleeping time

		KCDC obesity classification								Total	
		Underweight		Normal		Overweight		Obese			
		(N)	%	(N)	%	(N)	%	(N)	%	(N)	%
Male*	~6 hours	(3)	14.3	(12)	57.1	(1)	4.8	(5)	23.8	(21)	100.0
	7-9 hours	(4)	2.4	(136)	80.5	(14)	8.3	(15)	8.9	(169)	100.0
	10+ hours	(3)	5	(45)	75	(5)	8.3	(7)	11.7	(60)	100.0
	Total	(10)	4	(193)	77.2	(20)	8	(27)	10.8	(250)	100.0
Female	~6 hours	(1)	4.5	(18)	81.8	(3)	13.6	(0)	-	(22)	100.0
	7-9 hours	(4)	2.1	(144)	74.6	(30)	15.5	(15)	7.8	(193)	100.0
	10+ hours	(3)	4.8	(45)	72.6	(11)	17.7	(3)	4.8	(62)	100.0
	Total	(8)	2.9	(207)	74.7	(44)	15.9	(18)	6.5	(277)	100.0

Note: * P<0.05

Responses to the question "How much stress do you feel during your daily lives?" indicate that children in low income families as the subjects of this study had higher stress perception rates than ordinary children explored in the online survey on youth health behaviors.

Overweight children felt the biggest stress; underweight and obese children were also found to be more stressed out than normal-weight children (see Chart 23).

〈Chart 23〉 Obesity and stress perception levels of children

	Obesity classification				Total
	Underweight	Normal	Overweight	Obese	
Not stressed at all	5.6	3.7	1.5	4.3	3.5
Rarely stressed	5.6	14.6	9.1	12.8	13.5
Slightly stressed	33.3	39.0	28.8	29.8	36.8
Significantly stressed	38.9	28.5	37.9	40.4	31.1
Very much stressed	16.7	14.1	22.7	12.8	15.2
Total	100.0	100.0	100.0	100.0	100.0
(N)	(18)	(410)	(66)	(47)	(541)
Stress level (average score)* (S.E.)	3.56 (0.25)	3.35 (0.50)	3.71 (0.12)	3.45 (0.15)	3.41 (0.44)

Note: * P=0.05

The biggest cause of stress for children was friendship, followed by conflict with parents, academic performance and career. By weight group, obese children were most stressed out by appearance (e.g. height, physique and look) (see Chart 24).

〈Chart 24〉 Stress factors by weight conditions of children

	Obesity classification				Total
	Underweight	Normal	Overweight	Obese	
Conflict with parents	23.5	18.7	21.9	13.3	18.8
Friendship	52.9	35.5	37.5	26.7	35.6
Academic performance and career	-	18.9	18.8	22.2	18.6
Appearance (height, physique, look, etc.)	5.9	13.3	9.4	24.4	13.5
Other	17.6	13.6	12.5	13.3	13.5
Total	100.0	100.0	100.0	100.0	100.0
(N)	(18)	(410)	(66)	(47)	(541)

To examine the sense of depression for children surveyed, we took the question from the online survey on youth health

behaviors, "Have you felt any sorrow or despair hindering your daily lives that continued for two weeks or longer over the past year?" The proportion of children feeling depressed was the highest in the obese group and significantly high in the overweight group, backing up existing findings that obese children show a higher level of depression than their normal-weight counterparts. This also suggests the possibility that a sense of depression may be associated with weight conditions (see Chart 25).

〈Chart 25〉 Depression experiences of children in low income families by weight condition

Depression	Obesity classification				Total
	Underweight	Normal	Overweight	Obese	
Yes	11.1	20.9	25.8	28.9	21.9
No	88.9	79.1	74.2	71.1	78.1
(N)	(18)	(410)	(66)	(47)	(541)

E. Psychosocial factors: Self-esteem and body image

To measure the levels of self-esteem, we used the self-esteem measure developed by Rosenberg (1965). Considering children's understanding of the questionnaire and their response levels, each question was converted into a three-point-scale question (i.e. one point for "disagree" and three points for "agree"). The scale of points was reversed for negative questions so that higher scores would represent high self-esteem levels. Analysis results show no significant difference in self-esteem across obesity classification groups and between sexes (see Chart 26).

〈Chart 26〉 Children's self-esteem by sex and obesity level

Division	Total	Sex		Obesity classification			
		Male	Female	Underweight	Normal	Overweight	Obese
(N)	(545)	(260)	(285)	(18)	(413)	(67)	(47)
Average	23.30	23.22	23.36	23.61	23.32	22.75	23.77
(S.E.)	(0.21)	(0.30)	(0.21)	(1.10)	(0.24)	(0.73)	(0.68)
F (P)		0.105(p=0.746)		0.437 (p=0.726)			

As for the body image perceived by children themselves and their self-esteem, no significant difference was observed across the groups. Nevertheless, children perceiving their physique as "moderate (normal)" had high self-esteem, while those labeling themselves as "very fat" tended to show low self-esteem (see Chart 27).

〈Chart 27〉 Body image and self-esteem

Division	(N)	Average	S.E.	F(P)
Very thin	51	23.57	0.60	2.012 (p=0.092)
Slightly thin	119	23.60	0.50	
Moderate	168	23.71	0.35	
Slightly fat	145	23.28	0.42	
Very fat	57	21.68	0.63	
Total	540	23.34	0.21	

Body esteem is one's self-evaluation of his/her body or appearance; high body esteem indicates positive perception of one's own body or appearance. To measure body esteem, we chose six out of 23 questions as the measure of body esteem for teenagers and adults—developed by Mendelson, White and Mendelson (1988) and adapted by Moon Jeong-sin (2003)—after

conducting preceding studies and preliminary surveys.

To measure distorted physical perception, we chose four appropriate questions for children out of 20 questions of the simple questionnaire on body image distortion—developed by Littleton, Axon and Cynthia (2001) and adopted by Moon Jeong-sin (2003)—after conducting preceding studies and preliminary surveys.

As shown in Chart 28, the body esteem score was the highest in the underweight group. It is noteworthy that the level of body esteem was lower in the overweight group than in the obese group ($p<0.01$).

〈Chart 28〉 Children's body esteem by weight condition

Division	(N)	Average	S.E.	F(P)
Underweight	(18)	13.50	0.63	4.002 ($p=0.008$)**
Normal	(406)	12.92	0.13	
Overweight	(64)	11.95	0.32	
Obese	(45)	12.11	0.40	
Total	(533)	12.76	0.11	

Note: ** $p<0.01$

Children perceiving their physique as slightly thin or moderate showed significantly greater body esteem, while the body esteem of those perceiving themselves as very thin or very fat was significantly low. In other words, one's perception of his/her body had greater impacts on body esteem than the actual weight (see Chart 29).

The degree of distorted physical perception was the highest among overweight children and the lowest in the underweight group (see Chart 30).

〈Chart 29〉 Body image and body esteem of children in low income families

Division	(N)	Average	S.E.	F (P)
Very thin	(51)	12.88	0.38	12.491 (p=0.000)***
Slightly thin	(116)	13.44	0.22	
Moderate	(165)	13.23	0.18	
Slightly fat	(141)	12.35	0.22	
Very fat	(56)	10.86	0.36	
Total	(529)	12.76	0.11	

Note: *** p<.001

〈Chart 30〉 Distorted physical perception of children in low income families by obesity level

Division	(N)	Average	S.E.	F(P)
Underweight	(18)	5.67	0.43	0.519 (p=0.669)
Normal	(406)	6.13	0.11	
Overweight	(64)	6.36	0.29	
Obese	(44)	6.02	0.31	
Total	(532)	6.14	0.10	

〈Chart 31〉 Body image and distorted physical perception of children in low income families

Division	(N)	Average	S.E.	F(P)
Very thin	(51)	6.41	0.36	4.811 (p=0.001***)
Slightly thin	(116)	5.90	0.21	
Moderate	(164)	5.77	0.15	
Slightly fat	(141)	6.23	0.18	
Very fat	(56)	7.16	0.35	
Total	(528)	6.13	0.10	

Children who perceive their physique as "slightly thin" or "moderate" showed low levels of distorted physical perception, while the levels were significantly higher for those regarding themselves as "very fat."

In sum, one's perception of his/her physique rather than the actual weight had greater influence on the level of distorted physical perception (see Chart 31).

4. Discussions on Study Results

The height of both male and female children in low income families was shorter than ordinary children surveyed in Seoul Metropolitan student medical examination, suggesting the possibility that the poor socioeconomic environment facing these children might have hindered their height growth. While male children in low income families weighed less than ordinary children, the weight of their female counterparts was slightly greater than ordinary children.

For both male and female children in low income families, the number of children in the normal weight group was smaller than ordinary children. The proportion of underweight and obese children was high among the male children and that of overweight ones among the female children.

Even among these children in low income families, their underweight, overweight and obesity distribution varied by the characteristics of their household members. The proportion of male underweight children was high in near poor households;

underweight children were prevalent in grandparent-child, mother-child and father-child households. The proportion of obese children was high among male children in father-child households, while overweight children took up a large share of female children in such households.

When it came to the socioeconomic characteristics of children, the proportion of overweight and obese children was found to be low when fathers and mothers were university graduates.

The share of overweight and obese children was high in the group where fathers were jobless or had other or unknown occupation. Meanwhile, the proportion of underweight, overweight and obese children was high in households with employed mothers. This hints the possibility that the children of employed mothers might have been neglected, failing to control their weight due to inadequate diets and physical activity.

Children in low income families showed high levels of distorted physical perception (32.5% for female children and 15.7% for male children). Distorted physical perception grew in general with increase in school years.

As for physical activities, vigorous or moderate exercise practicing rates were high among overweight and obese children. The daily average walking time, however, was longer for underweight children, while the duration of physical exercise was shorter for overweight and obese children than for underweight or normal-weight ones. Overweight and obese children also had tendency to spend more screen time.

One's perception of his/her body had greater impacts than actual weight. The levels of distorted physical perception were

higher among overweight children. Obese children, in particular, were often stressed out by their appearance (e.g. height, physique and look).

The findings of this study show the current situation concerning overweight and obese children in low income families.


As the number of survey samples was small, however, there were not enough children classified as underweight. In the future, follow-up research should be carried out by securing a larger number of survey subjects and investigating the reality of underweight and overweight children in low income families.



Chapter

03

**Policy Options for Prevention and
Management of Children's Obesity in
Low Income Families**



Chapter 3

Policy Options for Prevention and Management of Children's Obesity in Low Income Families

1. Basic Directions

Obesity or underweight issues with children in low income families constitute a part of health policy issues, and the solution to the issues have a lot to do with overall health policies.

In an endeavor to prevent/control the obesity of children in low income families and improve the overall health of these children, this study suggests the following four basic directions for future policy development:

- First, the central government should take responsibility in reinforcing investment in the health of children in low income families and come up with health service schemes so that basic health services as children's essential rights can be offered to these children on a sustainable basis without any gap between regions and facilities. Also, resources from the private sector should be leveraged to provide relevant services efficiently.
- Second, projects and programs designed to enhance the health status of children in low income families should provide quality food service support, nutrition education and promotion of physical activities as part of basic healthcare regardless of the

formats and types of these facilities.

- Third, law systems and infrastructure should be provided to ensure that health, as a key element of child welfare, is systematically offered as part of laws and institutions related to children in low income families.
- Fourth, obesity and overweight should be controlled and healthy lifestyle behaviors monitored continuously at community child centers visited by children in low income families. Also, health issues should be included in evaluation items for community child centers and other facilities visited by these children.

2. Policy Options

A. Reinforced health service support system for children in low income families

- The findings of this study also indicate that overweight issues are more serious among female children in low income families than among ordinary children, hence the need to create a health support system for less privileged children.
 - Ensuring right to be healthy for children in low income families and protecting their health based on support from the central government, local governments and the private sector should be set as an important national agenda so that these children, whose healthy needs to be managed, can grow healthily.

- After school programs for poor children are recently being expanded, but relevant programs are scattered across multiple government agencies with virtually no system linking these programs. These programs also lack quality health service, so it is imperative to reinforce linkage and cooperation among related programs.
- More specifically, the following practical measures should be put into practice:
 - Reinforce healthcare for less privileged children starting with areas heavily populated with low income families
 - Introduce regular and systematic healthcare in line with the process of children's growth, such as screening of child growth/development in facilities visited by children in low income families
 - Provide continuous health and nutrition management for children in low income families combined with other health services such as visiting health services and community nutrition programs.
 - Align with healthcare at schools, include kindergartens and nursery schools to provide healthcare for target children
 - Introduce health education at community child centers visited by children in low income families to promote healthy behaviors such as right eating habits for children; provide mobile education programs by experts and launch health education training sessions for teachers at community child centers for children in low income families to ensure effective health counseling and education

- Build local networks to support health services for less privileged children
- Leverage those working for facilities used by children in low income families and private resources in the local community to form and operate "working groups for child healthcare"
- To support and reinforce health for children in low income families, support for private facilities and institutions in the local community, such as existing community child centers, should be strengthened—instead of launching new programs or pilot projects—to ensure systematic provision of health for less privileged children.
- To this end, the currently minimal budget for child health needs to be expanded.

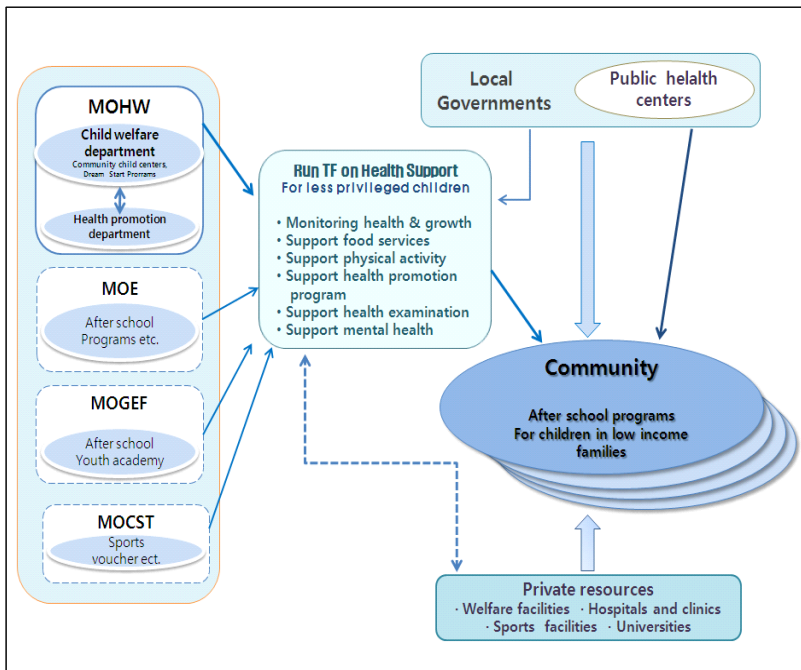
B. Establishment of cooperative system to offer systematic health support for children in low income families

- To provide health support for children in low income families, it is essential to set up and implement plans for cooperation in child/youth health promotion for which relevant central government agencies, departments and local governments can work with each other.
- A "task force on health support for less privileged children" (tentatively named) should be created and engage government

agencies working on projects for supporting less privileged children (e.g. Ministry of Health and Welfare; Ministry of Education; Ministry of Gender Equality and Family; and Ministry of Culture, Sports and Tourism) as well as local governments and the private sector.

- The model for a health service scheme to ensure the right to be healthy and network infra for health safety for children in low income families is illustrated in Figure 11.

[Figure 11] Healthcare scheme for children in low income families (Suggestion)



Note: MOHW (Ministry of Health and Welfare), MOE (Ministry of Education), MOGEF (Ministry of Gender Equality and Family), MOCST (Ministry of Culture, Sports and Tourism)

C. Legal Basis upon health services for Children in low income families

- A provision on basic child health services has been added to laws for supporting less privileged children. The Act on the Poverty Prevention and Support for Children was enacted in July 2011 and will take effect in a year from then.
 - Implementing ordinances of the law and regulations to be devised in the future should include specific provisions on key elements of child welfare, such as sound growth of children, support for physical/mental health services.
- Many local governments are recently enacting "ordinances on the operation of and support for child care centers." In the future, we should encourage all local governments nationwide to enact such ordinances and ensure roles of local governments can be reinforced in health for children in low income families at a local level. The ordinances should include continued provision of operational expenses for community child centers, protection of less privileged children, and active utilization of resources at public health centers and private medical, social, welfare institutions in the local community.

D. Equity of health services offered at after-school programs to protect the health of children in low income families

- Requirements for children in low income families eligible for

using after school child care facilities (e.g. community child center, dream start center and after-school youth academy) hardly vary, but huge differences are found across facilities in terms of government subsidy, support program and staff mix as well as health services offered.

- Though the background of foundation and initiators may vary, basic health services for children in low income families should be standardized to provide equal health services at all facilities.
- The operational methods for child health service at Dream Start Program, which seek to offer comprehensive health and welfare services for children in low income families, should be benchmarked and further developed so that they can be applied to other facilities used by these children such as community child centers and after-school youth academies. Essential to this end is to expand the central government's support for health services of less privileged children.
- Though the differences in the operators/supporters of facilities like community child center, Dream Start Program center and after-school youth academy may be considered, it still is necessary to set health service guidelines for protecting the health of children in low income families and preventing obesity and overweight and promote them as national standards.
- It may be taken into account that representative programs for less privileged children in other countries (e.g. Head Start of

the United States and Sure Start of the United Kingdom) aim to improve the health and nutrition of less privileged children as their key objectives.

□ Recommended guidelines for health protection, obesity/overweight prevention and basic health services suitable for children in low income families should include the followings:

- Identify target children for health services
- Outline: Medical examination on marginalized children; monitor child growth/development; provide dietary guidance, education on nutrition and diets; promote physical activities; encourage oral healthcare; provide physical/mental health education aligned with counseling
- Evaluate and monitor
- Obtain human and financial resources to implement the programs and build networks with local resources

E. Reinforced food service support system for children in low income families

□ It is imperative to enhance the quality of food service and expand the targets by expanding budget as follows:

- Raise the unit price for food services
- Alleviate regional differences in food services
- Expand the range of children in low income families to

receive food services support

- Come up with child food services criteria to ensure the quality of food offered to less privileged children
- To provide balanced meals, it is necessary not just to secure adequate amounts of food services budget but also to create recommended food services criteria in the form of food-based guidance or nutrient-based standard so that minimum nutritious quality can be ensured.
- Systems to support food services management for children in low income families should be put in place.
 - Recent studies on community child centers used by children in low income families point out that the quality of food is poor. Essentially needed with this respect are systems to support menu development and food services.
 - The Special Act on the Children's Food Safety regulates that child food services management and support centers be established at local governments. However, community child centers used by children in low income families are not subject to such support.
 - Food services support center for children are intended to support nutrition management, menu development and operational management at facilities used by children in low income families and promote right dietary habits for these children through nutrition education and material development. This center should be allowed to support smaller facilities providing food services for children in low

income families. To this end, relevant provisions in the Special Act on the Children's Food Safety should be revised to create adequate catering support systems for such children.

F. Promotion of projects and improved environment to support physical activities by children in low income families

- Community child centers and other facilities running after-school programs should be encouraged to set targets on increasing the number of children participating in physical activities.
- Children in low income families and welfare teachers surveyed voiced their concerns over the lack of space for physical activities and opportunities for physical exercises. Against this backdrop, offering greater opportunities for physical activities would be a very urgent task.
- More space and opportunities for exercises should be offered so that children in low income families can make adequate physical activities. The government should also endeavor to secure space for promoting physical activities and improve related environments.
- After-school facilities used by children in low income families should provide greater opportunities to participate in adequate health and physical activity programs. Relevant programs and support also need to be offered to increase time spent in physical activities and exercises.

□ Pursued by the Ministry of Culture, Sports and Tourism, the "Sports Voucher" project for children and teenagers in low income families should be effectively linked to children in such families, with the number of less privileged children benefiting to be expanded.

G. Regular monitoring and health/life guidance on child growth and development at facilities used by children in low income families

□ Regular monitoring height and weight of children regularly should be offered at facilities running after-school programs such as community child centers and after-school youth academies for reducing the incidence of overweight/obesity and underweight should be set as a health service target for children in low income families.

□ Support should be offered to community child centers and after-school youth academies to have scales and height measuring instrument in place and ensure teachers or children themselves can make body measurement on a regular basis.

□ Public health centers should offer health education on nutrition, obesity and healthy life to less privileged children in the local community and ensure the protection and management of their health. They should also screen underweight and obese children and tie with after-school exercise programs such as sports

voucher and child obesity voucher projects.

- To prevent and manage underweight, overweight and obesity, practical opportunities should be offered to help children learn healthy lifestyle (e.g. cooking class, nutrition education and playing class). Health promotion programs for less privileged children should also be developed and provided.

H. Expanded health survey and continued monitoring on children in low income families

- As follow-up research to this survey, which was made as a sort of pilot survey in terms of sample size, a major health survey on children in low income families should be carried out to investigate underweight and obesity issues with less privileged children.
 - The findings suggested in this survey have their limits in clarifying the underweight and obesity of Korea's children in low income families and identifying related factors, as the sample size and surveyed regions are limited. Owing to the limited sample size, children classified as underweight were small in sample size or involved missing values depending on age, school year and sex, failing to ensure the consistency of results. For this reason, it was hard to identify the real issues related to underweight children.
- Also, continuous monitoring is required when such surveys indicate that children in low income families have more problems compared to ordinary families.

- Health-related issues (e.g. child health service, utilization of resources and linked services for health) should be included in basic performance indicators in the evaluation of facilities running after-school programs for children in low income families in an attempt to provide incentives for reinforcing the health services in child welfare services.
- Health experts should be included in the group of experts to evaluate facilities used by children in low income families so that their basic health conditions and health situations can be better explored.

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