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Physical Growth of Children in South Korea in the Past Four Decades—Cross-Sectional Vs Longitudinal Data

Mori H*

Senshu University, Japan

***Corresponding author:**

Hiroshi Mori,
Senshu University, Japan
E-mail: the0033@edu.senshu-u.ac.jp

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1. Abstract

Children Born in 2001 Grew to 1 Year Old (On Birth-Day) in 2002, 6 Years Old in 2007, ---, 19 Years Old in 2020. They Didn't Grow Instantly To 19 Years Old In 2002. Growth In Stature Is Longitudinal And Not Cross-Sectional In Nature. To Determine Physical Growth By Age, From One To 19, For Example, One Needs To Follow The Data By Calendar Year, From 2001 To 2020. Growth Charts Of Korean Boys, From 1st Grade In Primary School To Senior Grade In High School In The Past Four Decades Are Examined, Using Common Cross-Sectional Data Versus Longitudinal Data.

2. Introduction

Steckel States In 1995 That Stature Is A Net Measure That Capturers The Supply Of Inputs To Health [1]. South Korea's Per Capita GDP, In 2015 Constant US$, Increased Steadily From $4,051 In 1980, To $13,320 In 2000 And $31,367 In 2020 And Correspondingly Per Capita Intakes Of Animal Products Soared From 212 Kcal/Day In 1980, To 413 And 576 In 1995 And 2013, Respectively [2]. As The Standard Of Living Grew Steadily, Children Increased In Stature, To Overtake Their Japanese Peers By 3-4 Cm In Mean Height In The Mid-2000s.

As Noted By The Daily Newspaper, Chousun Ilbo, High School Male Seniors Stopped Increasing In Mean Height At 173.7 Cm In 2005 And Declined Slightly To 173.5 Cm In 2015, Whereas They Gained In Mean Weight Significantly Over The Same Period [3].

The Government Of South Korea Initiated A Nationwide, Intensive Health And Nutrition Survey In 1998 And Conducted A 2nd Survey In 2001 And A 3rd One In 2005. After The Start Of The 4th Survey In 2007, The Same Survey Has Been Conducted Every Year Afterwards: Korea National Health And Nutrition Examination Surveys [4].

A Large Group Of Noted Pediatricians Examined Children's Growth Patterns In South Korea And Discussed Development, Improvement And Prospects In 2018 [5, 6], Mainly Based On KNHNES, Various Issues.

The Author Reviewed Their Analyses Rather Critically For The Annals In 2022, Graphically [7]. The Point Is Straightforward: Physical Growth Of Children Is Longitudinal And Not Cross-Sectional In Nature. A Man Or Woman, 20 Years Of Age In 2020, Was Born In 2000. One Born In 2020 Will Be 20 Years Of Age In 2040. Comparing The Mean Height Of One Born In 2010 To Youth Aged 6 Years, 7 Years, ---,20 Years Of Age In Mean Height In The Same Year, 2010, Should Not Be A "Growth Chart". It Is The Year 2031, When This 2010 Birth Cohort Reaches The Age, 20.

Simply, Or Stubbornly Based On This Arithmetic, The Author Criticized Very Laborious Analyses Of Growth Charts In The 2010s, Constructed By The Groups Of S. Korean Professionals. In The Current Paper For The Annals, The Author Will Examine Growth, By Means Of Actual Numbers, In Terms Of Cm In Height, And Adding Weight, In Terms Of Kg.

3. Data and Discussions

National Nutrition Surveys In Korea Have Been Conducted On Continuous Basis Only From 2007 On. National School Health Surveys, Which Cover 12 Ages From 1st Year In Primary School,

6 Years Of Age To 3rd Grade Of High School, 17 Years Of Age, Have Been Conducted In The First Month Of School Year, March, In South Korea. The Author Obtained Officially Printed Data On Mean Height And Average Weight Of School Boys And Girls By Grades From 1962 [8]. For Unknown Reasons, Annual Data By Grades Are Statistically Not Stable, Particularly For The Earlier Years. The Author And His Colleagues Have Been Using 3 Year Moving Averages, H1970= H(1969+1970+1971)/3 For Example.

Needless To Mention, Seniors In High School In 2000 Were Juniors In 1999, ---, 1st Graders In Middle School In 1995, ---, And Freshmen In Primary School In 1989. In Another Expression, 1st Graders In Primary School In 2000, Grew To Seniors In High School In 2011. No Students Grow From 1st Grade In Primary School In 2007 To High School Seniors In In The Same Year, 2007. Every Student Ascends One Grade By One Year, Either In Korea Or Japan [9].

Now The Audience Should Be Ready To Comprehend Table 1-B: Those High School Seniors Who Were 172.5 Cm In 1998 Have Grown In Height From 117.2 Cm In 1987, When They Were 1st Graders In Primary School, Not From 119.9 Cm, 1st Graders In 1998. In Respect Of Average Weight, Table 2-A, Those High School Seniors In 2018, 70.7 Kg In Average Weight, Have Grown From 24.5 Kg, Fresh Men In Primary School In 2007, Not From 24.5 Kg, Fresh Men In Primary School In 2018. As The National Economy Stops Growing Very Fast, Children Tend To Slowdown In Growth From Year To Year. Fresh Men In Primary School Were 21.0 Kg In 1987, 2.1 Kg Lighter Than In 1998.

Table 1: Changes pf mean height of S. Korean school boys, by age, 1987-1998 and 2007-2018: longitudinal vs cross-sectional data

A												(cm)
Kr/age	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
6	117.2											119.9
7		122.9										125.6
8			128.1									130.9
9				133.3								136.1
10					138.7							141.3
11						144.7						147.2
12							151.0					153.9
13								158.7				160.8
14									164.7			166.2
15										168.9		169.9
16											171.5	171.8
17												172.5
B												(cm)
Kr/age	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
6	121.8											120.8
7		127.5										125.8
8			133.1									131.8
9				138.5								137.4
10					144.0							143.0
11						149.9						149.6
12							157.0					157.2
13								163.4				164.4
14									168.5			169.0
15										171.6		171.9
16											172.9	173.1
17												173.6

Sources: Republic Korea, School Health Survey Statistics, various issues.
Note: every year denotes 3-year moving average, such as 2018=average (2017:2019).

Table 2: Changes pf mean weight of S. Korean school boys, by age, 1987-1998 and 2007-2018: longitudinal vs cross-sectional data

A												(kg)
Kr/age	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
6	21.0											23.1
7		23.3										26.0
8			26.1									29.3
9				29.7								32.7
10					33.3							36.4
11						38.0						40.7
12							42.7					46.0
13								48.7				51.4
14									54.3			56.1
15										59.4		60.1
16											61.8	62.3
17												64.3
B												(kg)
Kr/age	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
6	24.5											24.5
7		28.0										27.4
8			31.9									31.8
9				36.0								36.1
10					40.9							41.0
11						45.7						46.7
12							50.9					52.4
13								56.4				58.4
14									61.5			63.1
15										65.4		66.7
16											68.4	68.9
17												70.7

Souces and Note: the same as Table 1.

4. Conclusions

Should Economic Developments Reach Certain Levels Or Stages, Inputs To Health Shift From Food Supply To Other Aspects, The Elderly Cares, Recreation, Cleaner Air And So Forth. Public Concerns On Physical Growth Of Children Are Focused On Weight, Obesity Rather On Height [10]. As In The Case Of Height, Overweight In The Late Adolescence Should Be Examined Longitudinally, Rather Cross-Sectionally. Obese Primary School Children In 2020, For Example, Should Not Be Compared To Those In High School In The Same Year. Overweight Primary Students In 2010, For Example, Could Be Even Heavier High School Students In 2020, Or Leaner-Normal High School Students In 2020. Growth Is Longitudinal In Nature.

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