Roles of Parents and Primary Health Care Workers in Early Childhood Obesity Prevention

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Objectives

- Describe the current prevalence and trends in early childhood obesity
- Identify the risks factors and health consequences of obesity in young children
- Explore the role of parents and caregivers
- Examine the role of primary health care workers
- Evaluate evidence-based interventions
- Discuss strategies to overcome barriers in promoting healthy lifestyle

Childhood Obesity

In 2022, 1 in 8 people in the world were living with obesity

Overweight is on the rise in low- and middle-income countries

Almost half of the children < 5years with overweight/ obesity lived in Asia (*WHO*)

In 2023, global data from the *World Obesity Atlas*

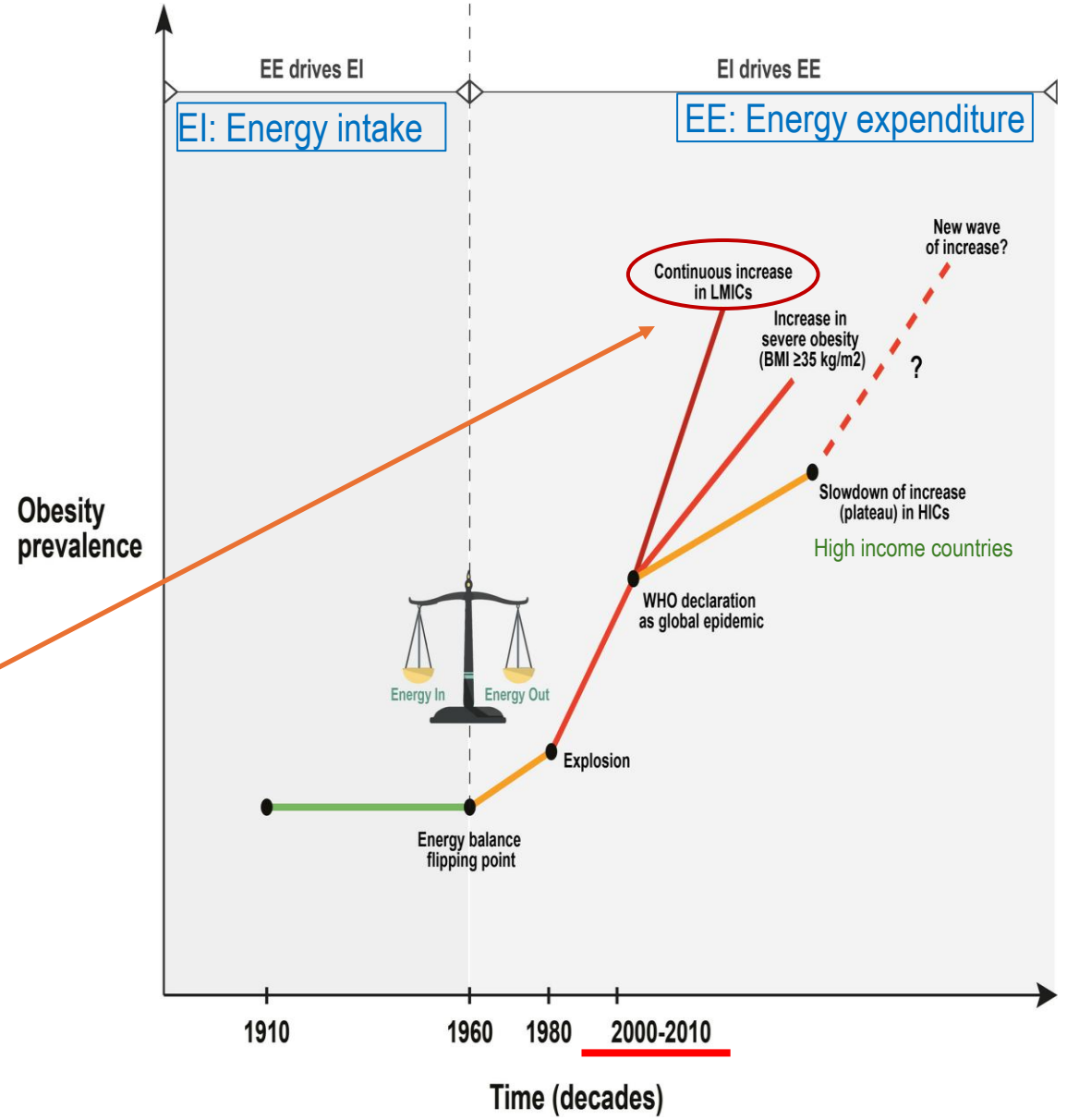
- ~ 39 million children under 5: overweight or obese

During pandemic: increasing trends

- 45% spike in obesity rates among 4-5 years old (UK)

OBESITY in LMI Countries

Overall, the universal trend is **obesity escalation** rather than slow down, mainly driven by the steep increases in the obesity prevalence of **low-and middle-income (LMI)** populations.



Koliaki C, Dalamaga M, Liati, S.
Update on the Obesity Epidemic: After the Sudden Rise, Is the Upward Trajectory Beginning to Flatten?
Curr Obes Rep 12, 514–527 (2023). https://doi.org/10.1007/s13679-023-00527-y

A graphical summary of global obesity prevalence trends over decades of the twentieth and twenty-first century

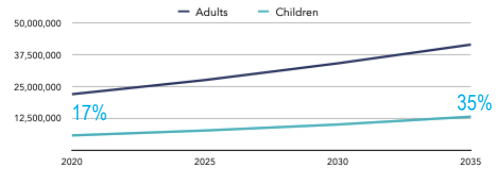
World Obesity Atlas 2024

Philippines

4.3% Annual growth rate in the projected numbers of adults with high BMI 2020–2035

5.6% Annual growth rate in the projected numbers of children with high BMI 2020–2035[1]

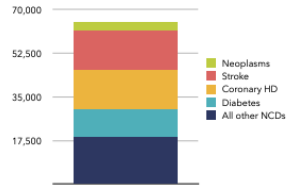
Projected numbers of adults and children with high Body Mass Index (BMI)



Non-communicable diseases (NCDs) in adults attributed to high BMI, 2019

	Person-years lost (DALYs) to NCDs due to high BMI in 2019	Deaths from NCDs due to high BMI in 2019
All non-communicable diseases	**2,326,306**	**65,173**
of which diabetes mellitus	473,362	10,713
of which coronary (ischaemic) heart disease	508,023	15,828
of which stroke	593,318	15,822
of which cancers (neoplasms)	108,568	3,614

Deaths from NCDs due to high BMI in adults 201



Early signs of NCDs in children aged 5–19 years, 2020 and 2035[1][2]

	2020	2035
Prevalence of children with high BMI	17%	35%
Numbers of children with high BMI	**5,760,657**	**13,107,475**
of which, children with high blood pressure attributable to high BMI	430,541	1,150,488
of which, children with hyperglycaemia attributable to high BMI	195,648	457,592
of which, children with low HDL cholesterol attributable to high BMI	535,948	1,290,917

Environmental correlates of obesity[2][3]

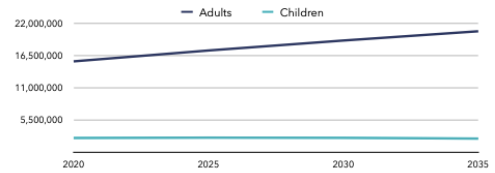
Greenhouse gas (GHG) emissions CO_2 equivalent 2015 (tonnes per capita per year)	1.0
Annual increase in GHG emissions 2000–2015 (%)	1.0
Proportion of the population living in urban areas 2020 (%)	47.4
Annual increase in urbanisation 1995–2020 (%)	0.07
Plastic waste (latest year) (kg per capita)	14.9
Proportion of adults taking insufficient physical activity 2016 (%)	39.7
Proportion of youth (age 11–19y) taking insufficient physical activity 2016 (%)	93.4
Consumption of animal proteins 2021 (grams per capita per day)	28.4
Consumption of sugar and sweeteners 2021 (kg per capita per year)	23.1

South Korea

1.9% Annual growth rate in the projected numbers of adults with high BMI 2020–2035

-0.3% Annual growth rate in the projected numbers of children with high BMI 2020–2035[1]

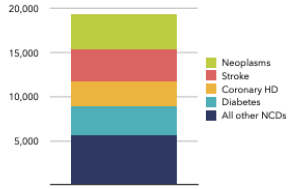
Projected numbers of adults and children with high Body Mass Index (BMI)



Non-communicable diseases (NCDs) in adults attributed to high BMI, 2019

	Person-years lost (DALYs) to NCDs due to high BMI in 2019	Deaths from NCDs due to high BMI in 2019
All non-communicable diseases	**644,522**	**19,333**
of which diabetes mellitus	189,776	3,316
of which coronary (ischaemic) heart disease	60,160	2,943
of which stroke	118,934	3,557
of which cancers (neoplasms)	92,304	4,003

Deaths from NCDs due to high BMI in adults 2019



Early signs of NCDs in children aged 5–19 years, 2020 and 2035[1][2]

	2020	2035
Prevalence of children with high BMI	34%	49%
Numbers of children with high BMI	**2,407,996**	**2,301,675**
of which, children with high blood pressure attributable to high BMI	175,620	186,552
of which, children with hyperglycaemia attributable to high BMI	81,466	79,228
of which, children with low HDL cholesterol attributable to high BMI	222,211	220,214

Environmental correlates of obesity[2][3]

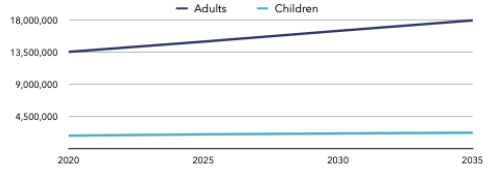
Greenhouse gas (GHG) emissions CO_2 equivalent 2015 (tonnes per capita per year)	11.4
Annual increase in GHG emissions 2000–2015 (%)	1.6
Proportion of the population living in urban areas 2020 (%)	81.4
Annual increase in urbanisation 1995–2020 (%)	0.16
Plastic waste (latest year) (kg per capita)	96.3
Proportion of adults taking insufficient physical activity 2016 (%)	35.4
Proportion of youth (age 11–19y) taking insufficient physical activity 2016 (%)	94.2
Consumption of animal proteins 2021 (grams per capita per day)	61.3
Consumption of sugar and sweeteners 2021 (kg per capita per year)	49.1

Australia

1.9% Annual growth rate in the projected numbers of adults with high BMI 2020–2035

1.4% Annual growth rate in the projected numbers of children with high BMI 2020–2035[1]

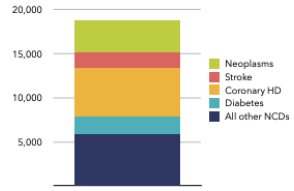
Projected numbers of adults and children with high Body Mass Index (BMI)



Non-communicable diseases (NCDs) in adults attributed to high BMI, 2019

	Person-years lost (DALYs) to NCDs due to high BMI in 2019	Deaths from NCDs due to high BMI in 2019
All non-communicable diseases	**523,193**	**18,712**
of which diabetes mellitus	105,848	1,917
of which coronary (ischaemic) heart disease	101,852	5,498
of which stroke	50,459	1,831
of which cancers (neoplasms)	74,685	3,588

Deaths from NCDs due to high BMI in adults 2019



Early signs of NCDs in children aged 5–19 years, 2020 and 2035[1][2]

	2020	2035
Prevalence of children with high BMI	38%	46%
Numbers of children with high BMI	**1,787,382**	**2,203,057**
of which, children with high blood pressure attributable to high BMI	139,703	192,078
of which, children with hyperglycaemia attributable to high BMI	61,149	76,816
of which, children with low HDL cholesterol attributable to high BMI	168,849	216,432

Environmental correlates of obesity[2][3]

Greenhouse gas (GHG) emissions CO_2 equivalent 2015 (tonnes per capita per year)	15.9
Annual increase in GHG emissions 2000–2015 (%)	-0.7
Proportion of the population living in urban areas 2020 (%)	86.2
Annual increase in urbanisation 1995–2020 (%)	0.06
Plastic waste (latest year) (kg per capita)	42.7
Proportion of adults taking insufficient physical activity 2016 (%)	30.4
Proportion of youth (age 11–19y) taking insufficient physical activity 2016 (%)	89.0
Consumption of animal proteins 2021 (grams per capita per day)	77.7
Consumption of sugar and sweeteners 2021 (kg per capita per year)	104.2

REFERENCES:

(1) For 161 countries where data are available, high BMI in children is classified as BMI > 1 s.d. above WHO reference (equivalent to BMI ≥25kg/m²).
For 25 countries (see annex in Atlas) overweight is classified as BMI > 2 s.d. above WHO reference (equivalent to BMI ≥30kg/m²).
(2) See methodology sections of the World Obesity Federation Atlas 2024
(3) Colour coding in this table shows the country position in world ranking: highest (red), medium (amber), lowest (green).

High BMI data: NCD Risk Factor Collaboration projections by RTI International.
DALYs and deaths: Institute for Health Metrics and Evaluation Global Burden of Disease database.
Children with NCD risk factors: World Obesity Federation (see methodology in 2024 Atlas) and UN population projections.
Environmental correlates: World Bank, FAO, and other sources (see methodology in 2024 Atlas).

Risk Factors for Obesity in Young Children

A combination of **genetic,** behavioral, environmental, and social elements

- Family history of obesity: Parents, grandparents
- Early onset of obesity In children younger than 5 yeas of age
  - **Monogenic obesity**
  - **Gene mutation**
    - Leptin and leptin receptor gene mutations →hyperphagia
    - Proopiomelanocortin (POMC) gene mutation →hyperphagia & pigmentation changes
    - Melanocortin 4 receptor (MC4R) gene mutation: common cause
  - **Hypothalamic tumor**
    - Hypothalamic hamartoma

Risk Factors for Obesity in Young Children

A combination of genetic, **environmental**, behavioral and social elements

- **Diet and Nutrition:**
  - Excessive amount of milk formula
  - Diets high in sugar, processed foods, and unhealthy fats
  - Sugary beverages and calorie-dense snacks

- **Physical Inactivity:**
  - Sedentary behaviors, including excessive screen time and limited physical activity

Risk Factors for Obesity in Young Children

A combination of genetic, environmental, **behavioral and social elements**

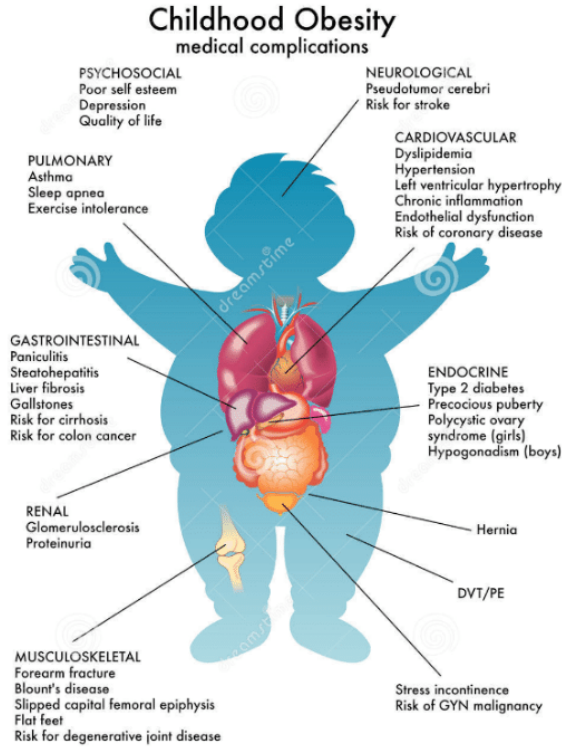
- **Behavioral and Socioeconomic Factors:**
  - Parental misperception of “healthy” weight
  - Children adopting their parents’ eating and activity habits
  - Parents giving food as “rewards” or as “comfort” to the children
  - Lower socioeconomic status with limited access to
    - healthy food options
    - safe spaces for physical activity

Health Consequences of Childhood Obesity

- **<u>Young children</u> with obesity → <u>adolescents</u> with obesity → <u>adults</u> with obesity**
  - Obese children and adolescents: ~ 5x more likely to be obese in adulthood

- **Early onset of medical risks at younger age**
  - **Physical Health Risks**:
    - Type 2 diabetes
    - Hypertension
    - Dyslipidemia
    - Fatty liver disease
    - Precocious puberty
    - Sleep apnea

  - **Psychological Effects:**
    - Low self-esteem, social isolation, and depression
    - Impact on mental health, affecting academic performance and social interactions



Simmonds M, Llewellyn A, Owen CG, Woolacott N. Predicting adult obesity from childhood obesity: a systematic review and meta-analysis. Obes Rev. 2016 Feb;17(2):95-107. doi: 10.1111/obr.12334. Epub 2015 Dec 23. PMID: 26696565.

Early childhood

- a critical period for obesity prevention
- a crucial time for establishing healthy habit that can last a lifetime

Parents and primary health care workers

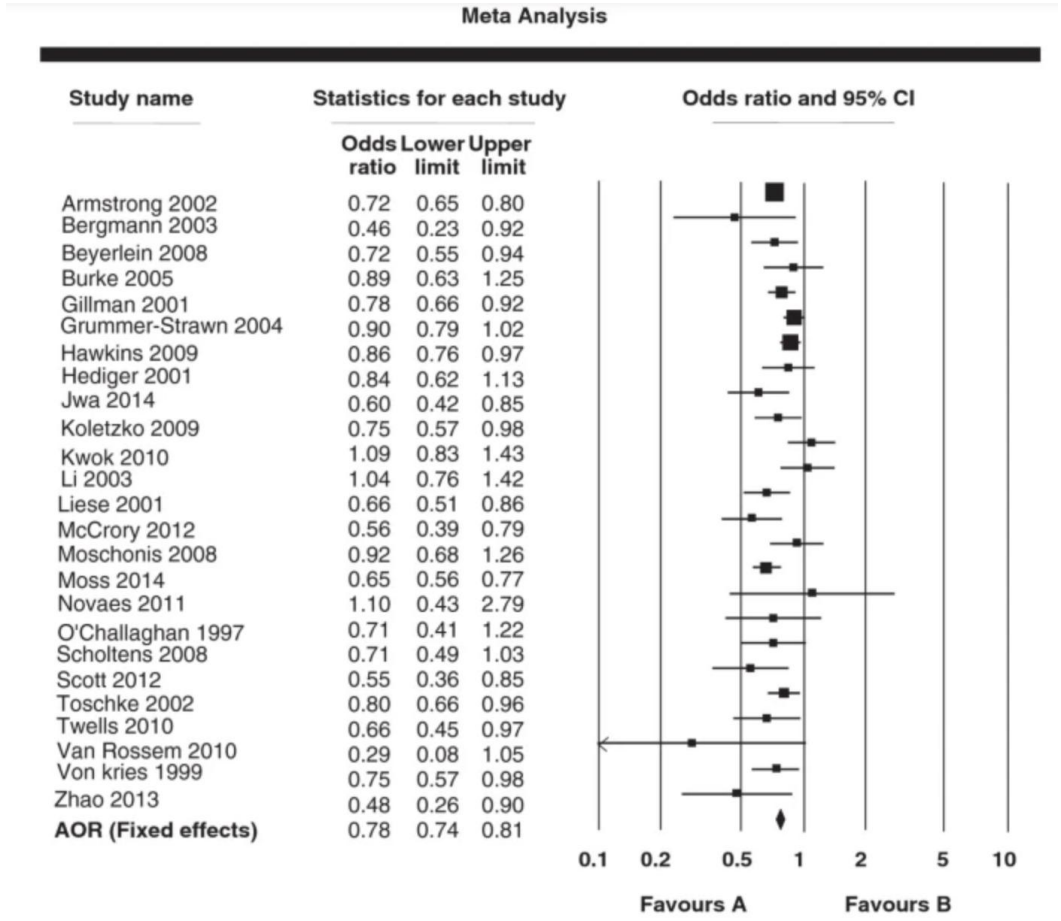
- play important roles in preventing obesity in early childhood

Roles of Parents in Preventing Early Childhood Obesity

- Breastfeeding
  - a protective factor against obesity in children
- Healthy eating habits
  - Parental **control** over food choices, portion sizes and regular meal routines
- Physical activity
  - Encouraging active play
  - Reducing sedentary behaviors: setting limits on screen time
- Sufficient sleep
- Behavioral and emotional support

The Association Between Breastfeeding and Childhood Obesity: a meta-analysis

- 25 studies, total of 226,508 participants, in 12 countries, in this meta-analysis
- Results: breastfeeding was associated with a significantly reduced risk of obesity in children (AOR = 0.78; 95% CI: 0.74, 0.81)
- The risk of childhood obesity was lower in the breastfed children by 22% compared with those who were never breastfed
- Children being breastfed for ≥7 months are significantly less likely to be obese in later childhood



Yan J, Liu L, Zhu Y *et al.* The association between breastfeeding and childhood obesity: a meta-analysis. *BMC Public Health* **14**, 1267 (2014).

Breastfeeding is associated with reduced risks of central obesity and hypertension in young school-aged children

- Cross-sectional survey in 2019 with breastfeeding records of 8480 children in first grade of primary schools in Shanghai, China
- Height, weight, waist circumference (WC), blood pressure (BP): obesity (OB)/central obesity and hypertension
- Associations between the type/duration of breastfeeding and
  - children's BMI, WC, and BP
  - risks of OB/ central obesity and hypertension
- Exclusive breastfeeding > one month was associated with a reduced risk of central OB
- Breastfeeding > 12 months was linked with a lower risk of hypertension
- Breastfeeding could be a potential component of the public health strategy to reduce population levels of metabolic and cardiovascular diseases

Lin, D., Chen, D., Huang, J. *et al.* Breastfeeding is associated with reduced risks of central obesity and hypertension in young school-aged children: a large, population-based study. *Int Breastfeed J* **18**, 52 (2023).

Caregiver Feeding Practices and Child Weight Outcomes

27 articles (8 controlled trials, 19 longitudinal cohort studies): moderate evidence

- responsive feeding guidance to teach mothers to recognize and respond appropriately to children's hunger and satiety cues
  can lead to "normal" weight gain and/or "normal" weight status in children aged ≤2 y
- a mother's feeding practices are related to concerns about her child's body weight
- an association between maternal feeding practices and the child's weight status and/or weight gain

Conclusion:
highlights the importance of the interaction between caregivers and infants & toddlers related to child feeding practices on children's weight outcomes

Research is needed on more diverse populations
with consistent methodological approaches and objective measures

Spill MK, Callahan EH, Shapiro MJ, et al. Caregiver feeding practices and child weight outcomes: a systematic review. Am J Clin Nutr. 2019 Mar 1;109(Suppl_7):990S-1002S.

The Influence of Parental Dietary Behaviors and Practices on Children's Eating Habits

- Family meals contribute the most in modeling children's dietary habits
  - an important moment of control and interaction between parents and their children
- The parental practices that influenced their children most: role modeling and moderate restriction
  - the increase of parental encouragement and decrease of excessive pressure could have a positive impact in their children's dietary behaviors

- This narrative review highlights that parental child-feeding behaviors should receive more attention in research studies as modifiable risk factors
  - to design future dietary interventions and policies to prevent dietary-related diseases

Mahmood L, Flores-Barrantes P, Moreno LA, Manios Y, Gonzalez-Gil EM. The Influence of Parental Dietary Behaviors and Practices on Children's Eating Habits. Nutrients. 2021 Mar 30;13(4):1138.

Childhood Obesity: Facts and Parental Perceptions

- More than half of the children were overweight (30%) or obese (25%)
- The parents underestimated their child's weight status (61%)
- They were unconcerned about them becoming overweight (52%)
- Being overweight did not rank high on sources of parental concerns

- Parents need to be made aware of their child's weight status
- Efforts are needed to spread awareness about childhood obesity health risks

Abbas N, Rouaiheb H, Saliba J and El-Bikai R: Childhood obesity: Facts and parental perceptions. World Acad Sci J 5: 38, 2023.

Process Evaluations of Early Childhood Obesity Prevention Interventions Delivered Via Telephone or Text Messages

- a systematic review
- 24 studies were eligible, and the overall risk of bias was low
- 8 studies (33%) examined participants' perceptions of interventions
- Participants appreciated the convenience of receiving interventions via telephone or text messages
- 63% of all studies in this review showed improvement in one or more behaviors related to childhood obesity prevention
- Participants were likely to modify behaviors if they received information from a credible source such as from health professionals

Ekambareshwar, M., Ekambareshwar, S., Mihrshahi, S. *et al.* Process evaluations of early childhood obesity prevention interventions delivered via telephone or text messages: a systematic review. *Int J Behav Nutr Phys Act* **18**, 10 (2021).

Factors Predicting Parent Engagement in a Family-based Childhood Obesity Prevention and Control Program

- Family-based interventions are efficacious at preventing and controlling childhood overweight and obesity
- Implementation is often hindered by low parent engagement
- Predictors of parent engagement: anthropometric, sociodemographic, psychosocial variables
- Higher levels of family functioning predicted degree of attendance at activities

- Consider assessing and tailoring intervention strategies to align with the family's readiness to change and promote family functioning

Schmied EA, Madanat H, Chuang E, et al. Factors predicting parent engagement in a family-based childhood obesity prevention and control program. BMC Public Health. 2023 Mar 8;23(1):457.

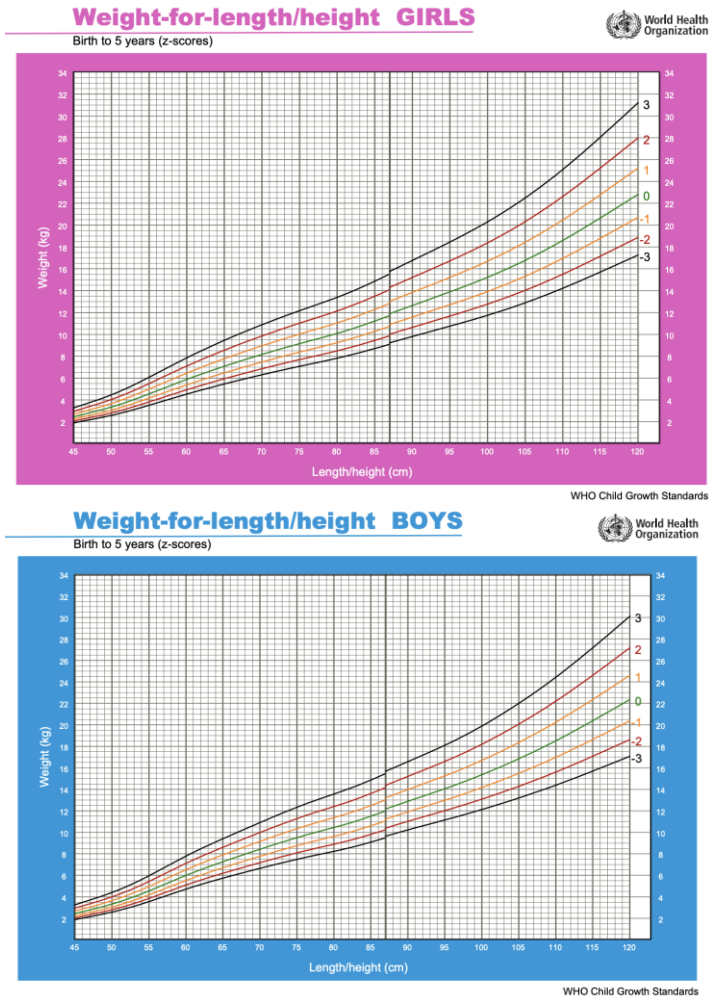
Roles of Health Care Workers/ Professionals

Pediatricians, school physicians, nurses

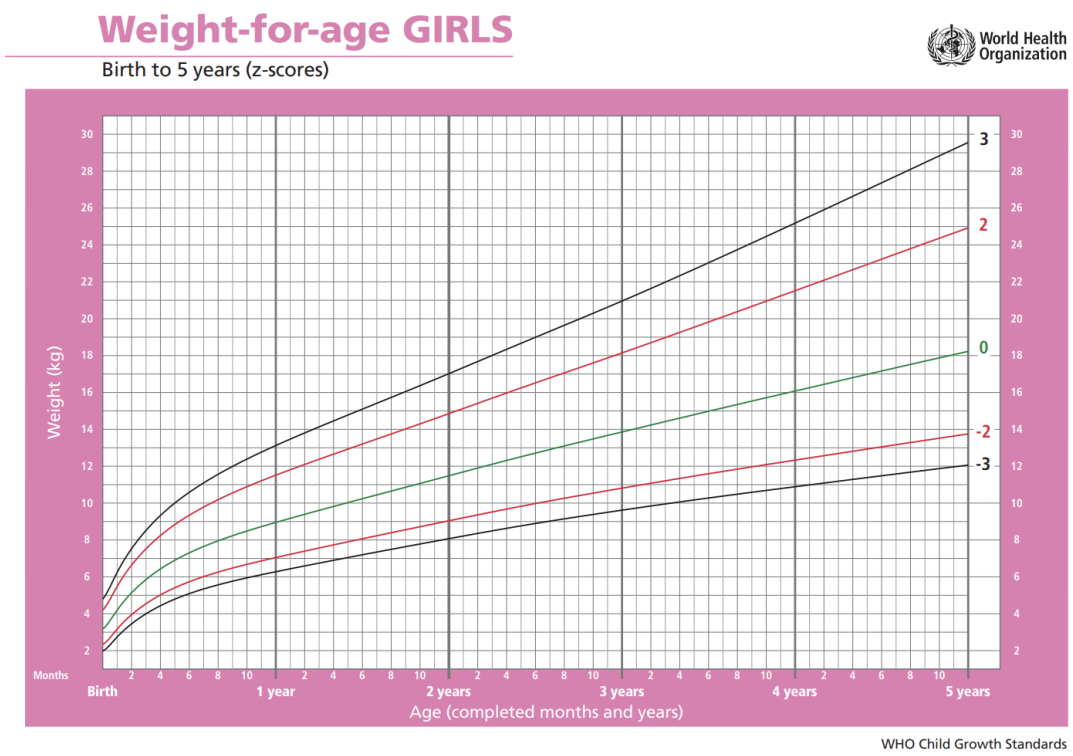
- Measure weight, length or height, waist, hip
- Plot on the growth charts for age and sex
  - Weight for length / height
  - Weight for age

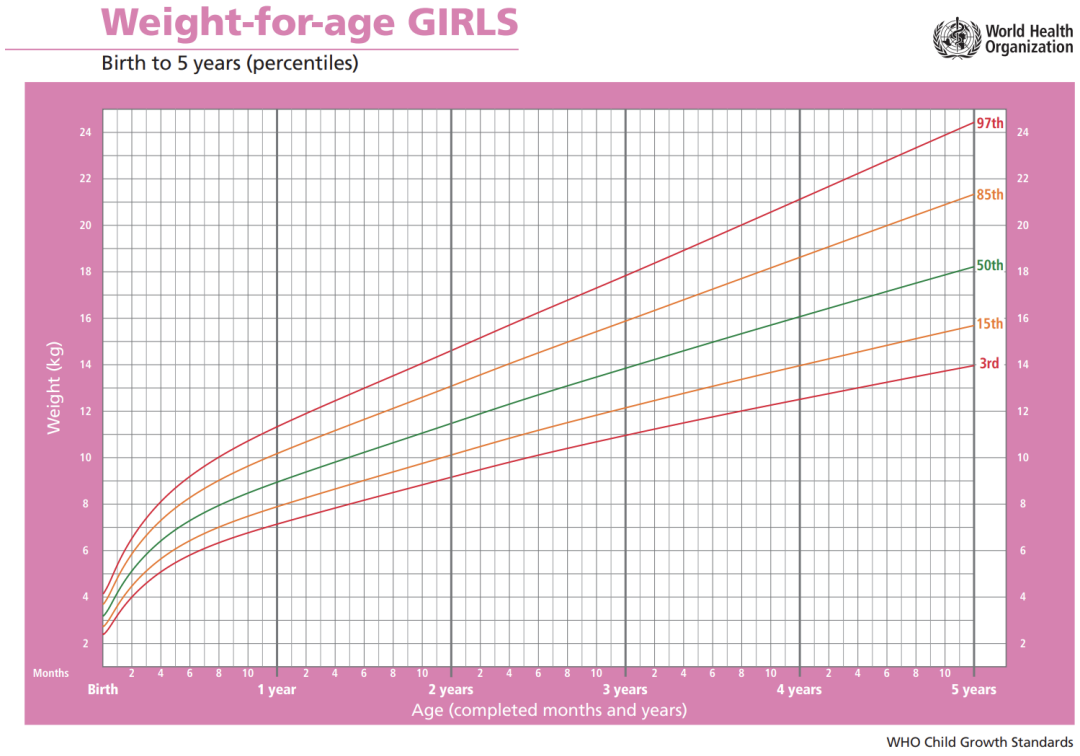
- Compute body mass index (BMI)

WHO Weight for Length/ Height Charts (GIRLS and BOYS)

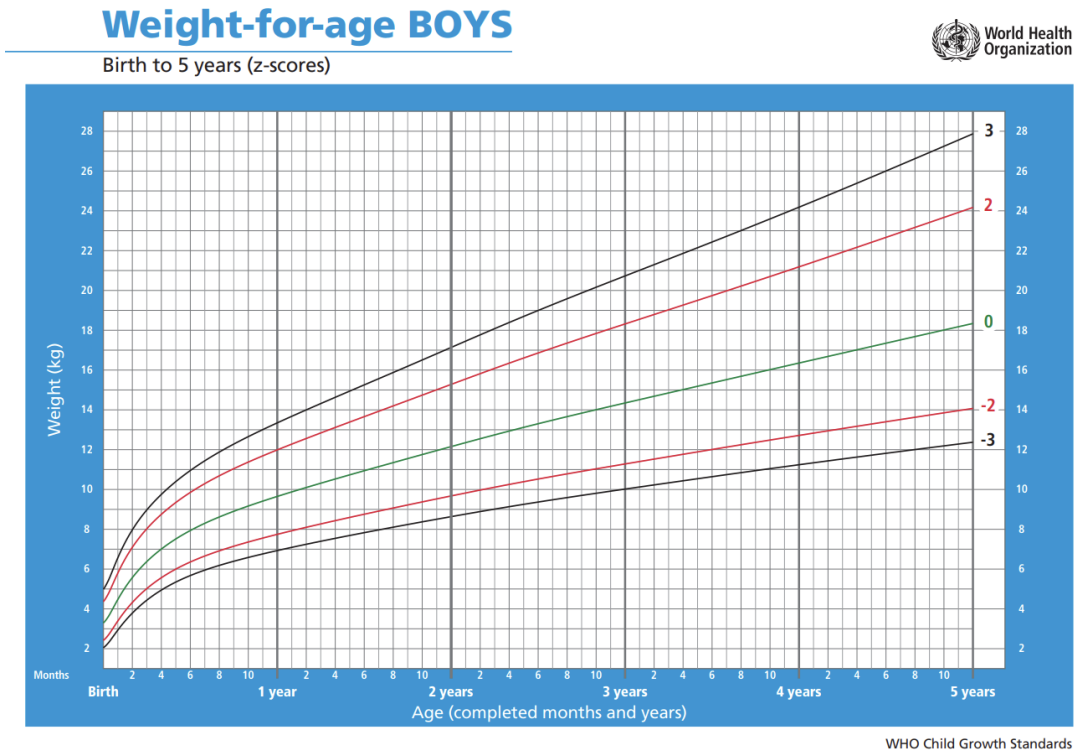


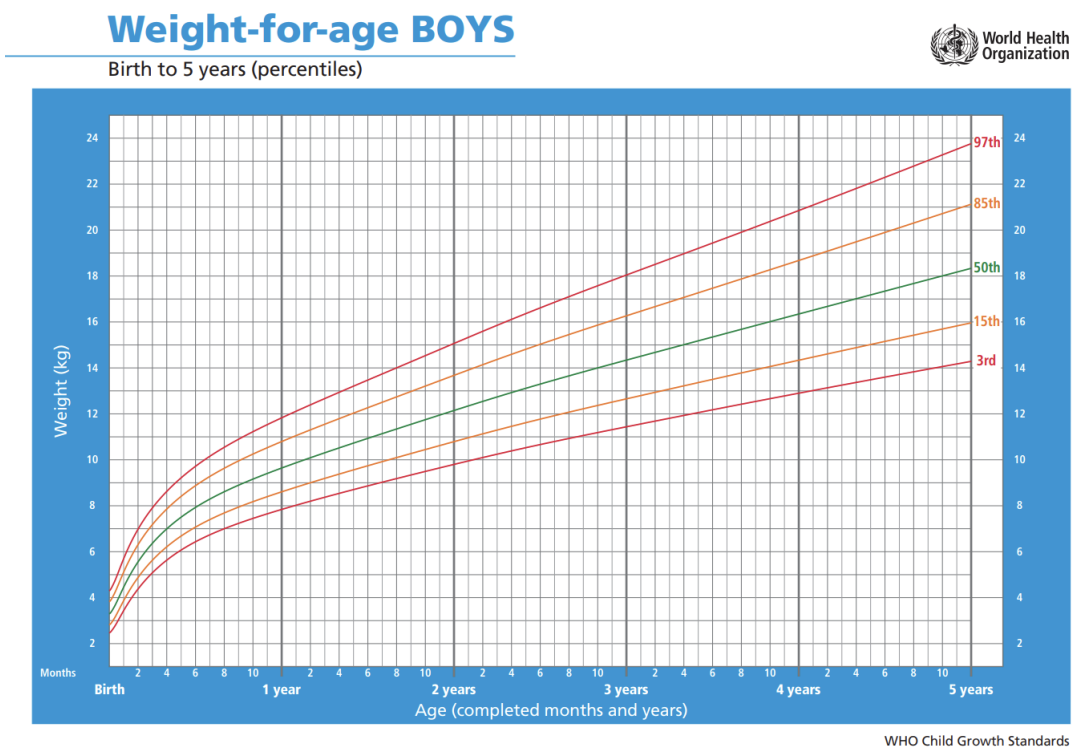
WHO Weight for Age Charts (GIRLS)





WHO Weight for Age Charts (BOYS)





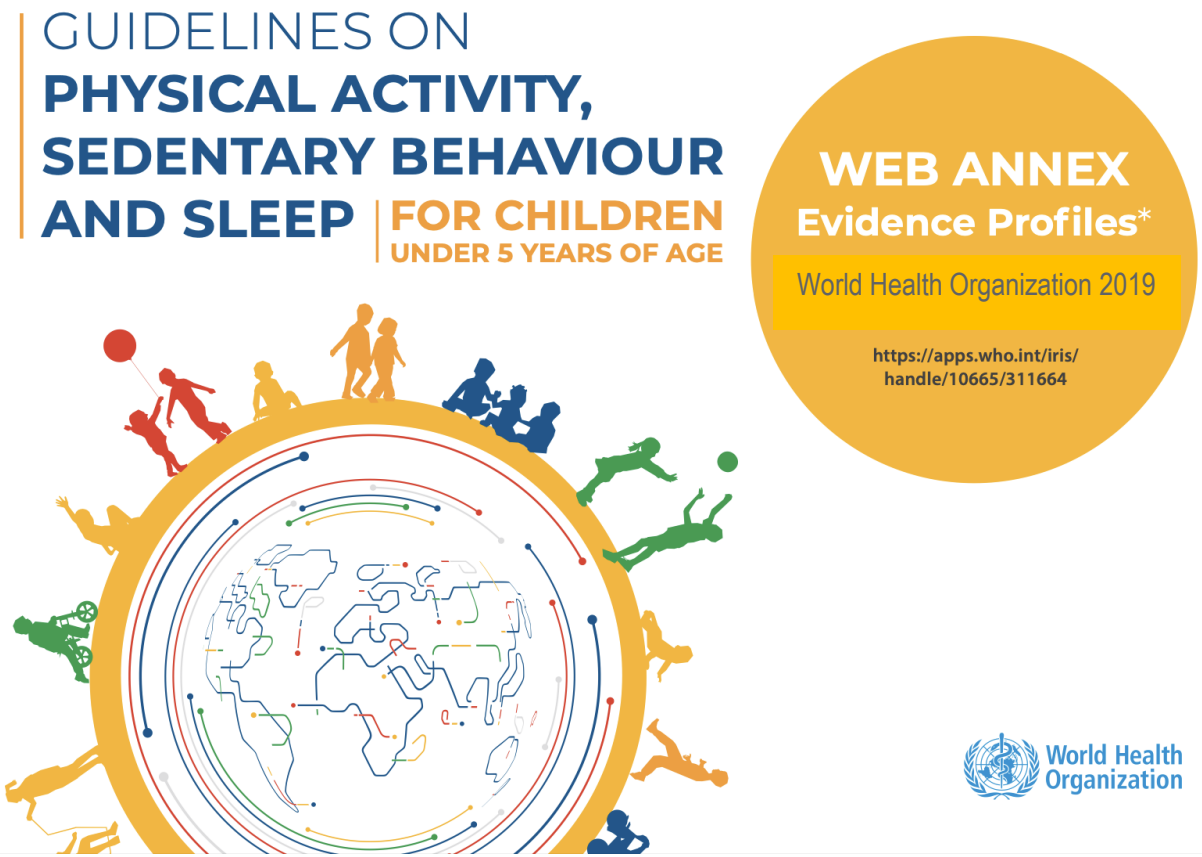
Roles of Health Care Workers/ Professionals

Educate / guide parents towards healthier practices

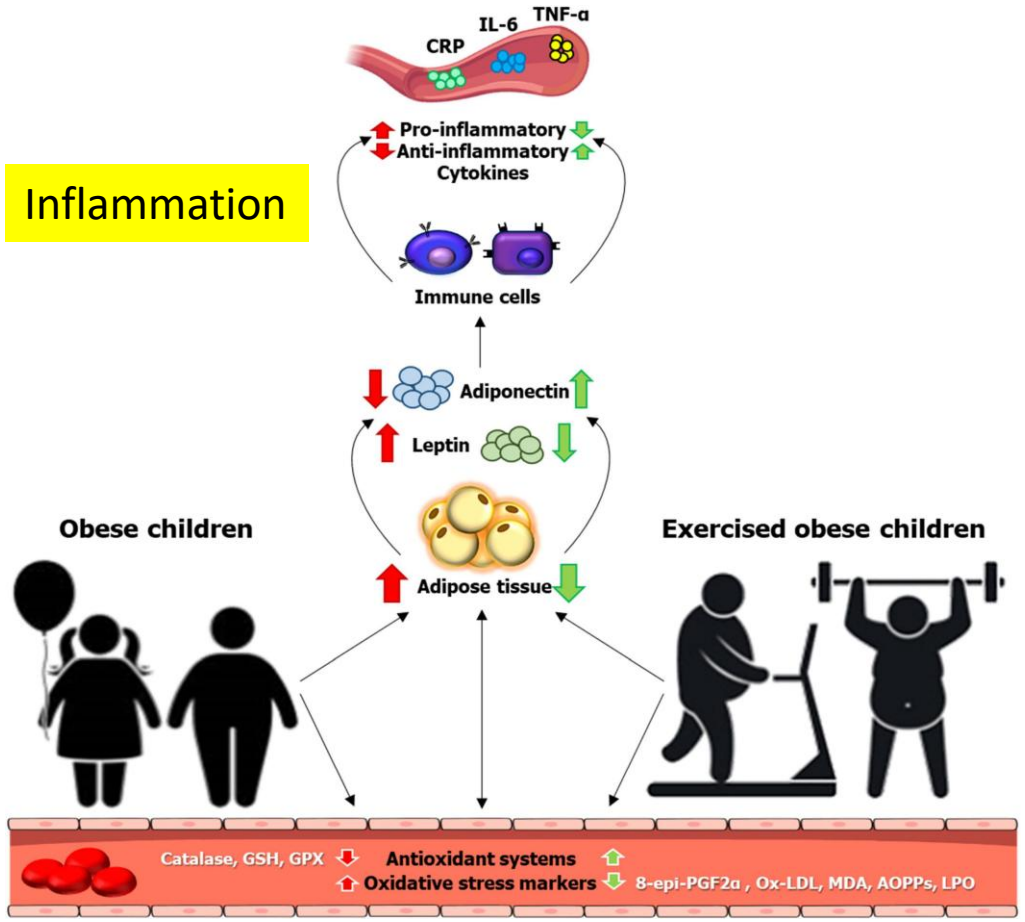
- Breastfeeding
- Proper introduction of solids
- Inclusion of vegetables and fruits
- Limiting sugary foods
- Physical activity

WHO Guideline at Primary Health Care Facilities

Physical Activity Guidelines: 0-5 Years



Importance of Physical Activity in Children and Adolescents



Regular physical activity / playing

makes it

- less likely to develop obesity-related risk factors and co-morbidities
- more likely that children remain healthy when they become adults

Exercise training in

children with overweight or obesity

- can improve body composition by reducing overall levels of body **fat** as well as abdominal fat

Estébanez B, et al. Front. Nutr. https://doi.org/10.3389/fnut.2022.886291

Roles of Health Care Workers/ Professionals

- Identify possible **obesity related cardiometabolic risks** in the child
  - Have good history
    - Family history of obesity and cardiometabolic risks
    - Nutrition and physical activity of the child
- Refer to specialists as indicated

Studies / Evidence-based Interventions

Promoting Healthy Weight for All Young Children:
A Mixed Methods Study of Child and Family Health Nurses' Perceptions

- The role of child health nurses in educating parents on obesity prevention, highlighting the importance of reinforcing healthy behaviors through parental engagement and routine advice during check-ups

- Parental involvement, accurate awareness, and supportive family routines are central to effective early childhood obesity prevention

Cheng H, Eames-Brown R, Tutt A, et al. Promoting healthy weight for all young children: a mixed methods study of child and family health nurses' perceptions of barriers and how to overcome them. BMC Nurs. 2020 Sep 14;19:84.

Studies / Evidence-based Interventions

Family-Based Behavioral Treatment for Childhood Obesity Implemented in Pediatric Primary Care

Randomized clinical trial in 4 US settings

- enrolled 452 children aged 6 to 12 years with overweight or obesity
- their parents, and 106 siblings
- followed up for 24 months (November 2017 through August 2021)
- a variety of behavioral techniques to develop healthy eating, physical activity, and parenting behaviors within families

- Children receiving family-based treatment had better weight outcomes based on the difference in change in percentage above median BMI (-6.21% [95% CI, -10.14 % to -2.29%])
- Longitudinal growth models found that children, parents, and siblings undergoing family-based treatment all had outcomes superi

Epstein LH, Wilfley DE, Kilanowski C, et al. Family-Based Behavioral Treatment for Childhood Obesity Implemented in Pediatric Primary Care: A Randomized Clinical Trial. JAMA. 2023 Jun 13;329(22):1947-1956..

Barriers in Promoting Healthy Lifestyle

- Barriers:
  - Limited resources
    - Healthy food choice
    - Safe accessible play spaces for physical activity.
  - Challenge of changing long-established family routines
  - Challenges in ensuring consistent, long-term adherence from families

Strategies in Prevention of Early Childhood Obesity

- Parents: Guidance and support
  - Healthy lifestyle
  - Perception of healthy weight
- Health Care Workers
  - Monitor growth and development
  - Note any growth deviation
  - Identify obesity related risks
- Multisectoral involvement
  - Family
  - Community – affordable healthy food, safe spaces for physical activity
  - Government – policy in promotion of healthy lifestyle

Roles of Parents and Primary Health Care Workers in Early Childhood Obesity Prevention

Summary

- Increasing prevalence and trends in childhood obesity
- Risks factors and health consequences of obesity in young children
- Essential role of parents and caregivers
- Important role of primary health care workers
- Multisectoral involvement to promote healthy lifestyle