

The Burden of Childhood Obesity in Indonesia

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Abstract

Indonesia encounters nutritional transition, described by high prevalence of undernutrition at initial and conversion into overnutrition with the following economic improvement, which also known as double burden of malnutrition. Problem about obese children in Indonesia must get serious attention. Compared to other South East Asian nations, Indonesia has the highest prevalence of obesity in children aged under 5 years. The latest Indonesian data shows that the prevalence of overweight/obese in children aged under 5 years and 5-12 years are 8% and 19.6%, respectively. Childhood obesity is a result of complex interaction between genetic and environmental factors. It leads to many complications that not only appears in childhood, but also in adulthood, including multi organ damage and psychosocial problems. An estimate of IDR 2.85 quadrillion must be spent as the incremental direct medical cost of childhood obesity in Indonesia. Besides, there is also indirect cost of obesity, such as productivity loss. On the contrary, the total cost of prevention program for all Indonesian children is only around IDR 5.83 billion. Therefore, prioritizing treatment and prevention programs for childhood obesity must be urgently realized in Indonesia.

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INTRODUCTION

Children malnutrition has been being an unsolved crucial issue over decades, especially in developing countries.¹ It has been gaining worldwide attention because nutrition sufficiency during childhood affects lifetime conditions, that indirectly determine global future.² Considering the important of optimizing child growth and development by ensuring nutrition sufficiency, World Health Organization (WHO) sets ending malnutrition as one of the terminal goals that directly or indirectly implemented in the several points of Sustainable Developmental Goals (SDGs).³

Although the poverty rate in Indonesia trend to decrease steadily, it is not reflected on the improvement of undernutrition problems.⁴ Indonesian children are still suffering underweight problems, and this condition is exacerbated by the fact that many of them also present with stunted or micronutrient deficiency. Nowadays, Indonesia and other developing countries encounter nutritional transition, of which the initial stage is characterized by high prevalence of undernutrition due to food insecurity and poverty. Later, the improvement of economic condition and urbanization lead to weight gain in some population.⁵ With undernutrition problem remain high, the prevalence of overweight and obesity keep increasing, which is known as double burden of malnutrition.⁶

Indonesia government has been untiredly focusing on eliminating undernutrition problem for long time. They have made detailed strategic plan from the level of primary to tertiary healthcare as well as special budget allocation to execute treatment and prevention programs for undernutrition problems. Contrarily, childhood obesity is still under-noticed and become least concern, which may plausibly be explained because Indonesian government are nescient of the consequences of childhood obesity and the ensuing treatment costs.

OBESITY PREVALENCE

The rising prevalence of overweight and obesity in many countries has been addressed as a global

pandemic, with variations across countries and distinct regional patterns.^{7,8} The global age-standardised obesity prevalence in children and adolescents increased from 0,7% in 1975 to 5,6% in 2016 in girls and from 0,9% in 1975 to 7,8% in 2016 in boys.⁹ The increasing pattern of excess weight is more extreme in middle-income countries than high-income countries.¹⁰

South East Asia (SEA) region also experiences the increased prevalence of overweight and obesity, ranging from 8% to 30% in adult males and 8-52% in adult females.^{11,12} Compared to other countries in SEA, Indonesia has the highest prevalence rate of children under five years with overweight/obesity.¹³ In total population, the increasing prevalence of obesity in Indonesia is more rapid than worldwide, by about 8,1% in men and 8,2% in women from 1980 to 2013.¹⁰

In 1993, the prevalence of overweight/obesity in Indonesian children aged 2-18 years was 5,1% (International Obesity Task Force criteria).¹⁴ In 2007, other study found that the prevalence of overweight/obesity in children aged 6-12 years was 11,5%.¹⁵ The latest Indonesian data from National Health Survey showed the prevalence of overweight/obese children aged 5-12 years in 2013 was 19.6%, and there is a decreased prevalence among children aged under 5 years from 11.8% in 2013 to 8% in 2018.^{16,17}

ETIOLOGY OF CHILDHOOD OBESITY IN INDONESIA

Principally, obesity is the outcome of energy imbalance, with more energy input compared to output. The etiology of obesity is complex, involving interaction between environmental, genetics, and ecological factors.^{18,19} Interestingly, the origin of obesity has been affected by early childhood development. Children who experience early adiposity rebound (before 5 years of age) are more likely to get obesity than children with late adiposity rebound (after the age of 5 years), and this difference is maintained throughout adulthood.¹⁸

Unrestricted or over parental feeding style may lead to obesity in early childhood. Maladaptive coping mechanism due to psychosocial pressure may lead to abnormal eating behavior to suppress

emotional distress. The expand markets of cheap sweetened-beverages, snacks, and fast-foods are associated with increased prevalence of childhood obesity.¹⁹

Continuous technology advancement transforms the way of children to spend time, with more sedentary activities, such as playing computer game, watching television, and texting by phone. Increased calories intake and reduced calories expenditure result in positive energy balance that is stored in adipocytes. Beside environmental factors, genetic factors inevitably contribute in 30-50% of adiposity variation.¹⁹

MEDICAL CONSEQUENCES

Childhood obesity has many consequences that not only appears in their childhood, but also in adulthood. One study found that around 70% of adolescents with severe obesity are persistently obese throughout adulthood, while only 8% of normal weight adolescents become obese in adulthood.¹⁹ Another problem is parental obesity contributes in increasing at least 2-fold the risk of getting obese in adulthood.²⁰

Childhood obesity stimulates chronic inflammatory state that results in multiple organ damage, including cardiovascular, endocrine, gastrointestinal, musculoskeletal, dermatologic, and neurologic.¹⁹ Obesity induces multiple risk factors of cardiovascular factors, such as deterioration of glucose metabolism, arterial hypertension, dyslipidaemia, activation of thrombogenic factors (lipoprotein-a, C reactive protein, IL-6, plasminogen activator inhibitor-1, and fibrinogen), and local vascular wall inflammation.^{19,21} In super-obese children (BMI > p97), more than 60% of them have high LDL level and around 20% of them have high triglyceride and low HDL levels.²² Childhood obesity accelerates vascular aging and the ensuing atherosclerosis process in children and young adults.²³

Childhood obesity may be secondary to endocrine abnormalities, but it may also reciprocally disrupts hormone homeostasis.¹⁹ Obesity alters hypothalamic-pituitary-gonadal (HPG) axis activity that results in decreased testosterone production in men. Meanwhile, it causes increased androgen production and

infertility in women, that similar to polycystic ovarian syndrome (PCOS) characteristics.²⁴⁻²⁶ Obesity also precipitates growth hormone and vitamin D deficiency, hypothalamic-adrenal axis dysregulation, and thyroid dysfunction.²⁶

Childhood obesity increases risk of sleep obstructive sleep apnea (OSA), non-alcoholic fatty liver disease (NAFLD), musculoskeletal problems (e.g. fracture, joint pain, extremity malalignment), skin problems (e.g. hidradenitis suppurativa, stretch marks), and idiopathic intracranial hypertension.¹⁹

Around 34% of obese Indonesian children aged 10-19 years develop metabolic syndrome based on National Cholesterol Education Program-Adult Treatment Panel (NCEP-ATP) III.²⁷ Meanwhile, the prevalence of metabolic syndrome among Indonesian children aged 12-15 years based on International Diabetes Federation (IDF) criteria is 19.6%.²⁸ Indonesian Pediatric Society defines metabolic syndrome by waist circumference $\geq P_{80}$, with two or more parameters as follows: systolic and/or diastolic blood pressure $\geq P_{95}$, HDL-cholesterol level ≤ 40 mg/dL, triglyceride level ≥ 110 mg/dL, and fasting blood glucose level ≥ 100 mg/dL or diagnosed with diabetes mellitus type 2 (DMT 2).²⁹

SOCIAL AND PSYCHOLOGICAL CONSEQUENCES

In addition to several medical comorbidities, childhood obesity affects mental and social health. Overweight and obese child are more likely to receive weight stigmatization and social marginalization. The popular stereotype that obese children are lazy, indiscipline, and lacking in motivation, leads to social devaluation and later it develops into prejudice, social rejection, and discrimination. The stigma is mainly expressed as weight-based victimization, teasing and bullying.³⁰ Pre-school age children would prefer to play with thin or average sized friend, rather than overweight friend.³¹

These stigmatization and social isolation have many consequences for the psychological health of children and adolescents. There is an increased of vulnerability to depression, anxiety, substance use, and low self-esteem among children who are teased

or bullied about their weight. Furthermore, these may induce self-harm behaviours and suicidality. Weight teasing and social isolation also have additional negative effects on academic performance. They have been found to be one of the underlying causes of reduced school performance that expressed by lower academic grade. Obese children also commonly dissociate from school environment because they want to avoid weight-based teasing and bullying.³⁰ Obese children showed lower health-related quality of life (HRQoL).³²

COST ESTIMATION OF OBESITY RELATED COMPLICATIONS

The childhood and following adulthood obese morbidity and mortality increase both medical and non-medical costs.³³ Compared to children with normal Body Mass Index (BMI), children with overweight and obesity have an incremental healthcare costs of 180 USD and 220 USD, subsequently, accumulated from more outpatient visits and expenses.^{34,35}

In spite of the nearly equal prevalence of childhood obesity between Indonesia and other nations, we must take the exact number of obese population into account when comparing the cost

burden generated by childhood obesity complications.⁹ Estimating lifetime medical cost of obese children is important to calculate financial benefits that will accrue from successful prevention program. Finkelstein and team had tried to calculate the additional lifetime medical cost of obese child compared to normal weight child, with adjustment of dollar inflation and discount that represent a 10-year boy perspective in 2012. They found that an approximate rate of USD 19,000 is needed as additional direct lifetime medical cost of obese child.³⁶

By estimating 8% of 23,729,600 children aged under 5 years, 18.8% of 23,878,500 children aged 5-10 years, 10.8% of 22,878,700 children aged 10-14, and 8% of 22,242,900 children aged 16-18 years are obese, the total number of obese children is approximately 10,7 million.^{16,17,37} Therefore, an estimate of USD 189,7 trillion or equal to IDR 2.85 quadrillion (USD 1 = IDR 15.000) must be spent as the incremental direct medical cost. Besides, there is also indirect cost precipitated by obesity, such as productivity loss. On the contrary, the total cost for prevention program, including material, equipment, practitioner-related visits, phone counselling, and parent-incurred cost was only USD 259 per child.³⁸ An estimate of IDR 5.83 billion is needed to execute

Table 1. Behavioral intervention for childhood and adolescence obesity.^{19,39}

Dietary modification
• Scheduling intake of 3 big meals and 2 healthy snacks (such as fruits) daily • Decrease consumption of high-calories food, such as fast-food and salty snacks • Decrease consumption of sweetened-beverages • Avoid forcing children to consume specific food • Giving meals in accordance with total calories based on daily recommended dietary allowance (RDA) • Avoid skipping breakfast
Physical activity modification
• Decrease sedentary behavior to < 2 hour/day • Engage activity that is appropriate with their hobby • Ensuring physical activity >1 hour/day

prevention program for all Indonesian children. By this calculation, it can be estimated that quadrillion IDR can be economized from successful prevention program.

PREVENTION OF CHILDHOOD OBESITY

Prevention and treatment of childhood obesity must involve all relevant parties, including health care personnel, family members, society environment, and government. The program must be implemented in all level of health care systems.^{19,39}

Nutritional intervention should be adjusted with children age and their development. The main objective of nutritional intervention is decreasing body weight with target of 20% above ideal body weight, maintaining health dietary pattern and physical activity for long term, without inhibiting their potential to growth and develop. Behavioral modification for childhood and adolescence obesity are listed in Table 1.^{19,39}

Prevention of childhood obesity consists of 3 steps - primary, secondary, and tertiary prevention. Primary prevention includes educating parents to promote healthy lifestyle and approaching high-risk population. Secondary prevention is accomplished by detecting early adiposity rebound among children aged under 5 years. The last step is prevention of comorbidities by performing early treatment for obese children.³⁹

CONCLUSION

Childhood obesity has been being a crucial issue in Indonesia. It causes many complications, not only in childhood, but also throughout adulthood. The cost of lifetime medical problems directly related to obesity was enormous. Therefore, prioritizing treatment and prevention program for childhood obesity must be urgently realized in Indonesia.

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