

INDONESIA'S POLICY ACTION TO TACKLE OBESITY AMONG ADULTS: The Opportunities and Future Challenges

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Indonesia

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A thesis submitted in partial fulfilment of the requirement for the degree of Master of Public Health

By

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Indonesia

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Abstract

Background: Obesity is reaching epidemic proportion in Indonesia and has been weighing on population health, health care system and the country's economy. Also, there is a worrisome trend that indicates obesity has burdened vulnerable groups disproportionately. It is well recognized that policy approach is needed to control the growing obesity epidemic.

Main objectives: The study aims to explore and analyze obesity prevention policies in Indonesia

Methodology: A literature review and desk review was conducted to achieve the study objective. Analysis has been carried out using the adapted Obesity Prevention Action framework.

Findings: Indonesia has policies that support obesity prevention in upstream (environments), midstream (population behavior), downstream (individual factors) approaches. Most policies for the upstream approach are outside the health sector and were not previously considered part of health policy. Until finally this year the president frames them as part of health promotion efforts to increase physical activity and healthy food diet. But all these policies have not been run optimally due to many challenges namely lack resources and difficulty in multisectoral coordination. Experience from several countries showed that having a national policy for obesity that based on evidence and supported by a robust multi sectoral collaboration and strong leadership are needed to curb obesity

Conclusion: Indonesia's success in obesity prevention will be dependent on government leadership in national and subnational, strong multisectoral coordination and adequate resources.

Key words: Obesity Prevention, Intervention, Policy, Adult

Word count: 10849

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Abbreviation

BMI	Body Mass Index
DPAS	Diet, Physical Activity, and Health
DPR	Dewan Perwakilan Rakyat (The House of Representatives)
DPRD	Dewan Perwakilan Rakyat Daerah (Local Parliament)
GERMAS	Gerakan Masyarakat Hidup Sehat (Community Healthy Living Movement)
GDP	Gross National Product
GNI	Gross National Income
IHME	Institute for Health Metrics and Evaluation
JKN	Jaminan Kesehatan Nasional (National Health Social Insurance)
MDGs	Millenium Development Goals
MICs	Middle-Income Countries
MMR	Maternal Mortality Rate
MOA	Ministry of Agriculture
MOH	Ministry of Health
MOT	Ministry of Transportation
NCDs	Non-communicable diseases
NGO	Non-governmental organization
NIP	Nutritional Information Panel
OPA framework	Obesity Prevention Action framework
OOP	Out of the pocket
PERDA	Peraturan daerah (local regulation)
PODP	Point-of-Decision Prompts
POSBINDU PTM	Pos pembinaan terpadu penyakit tidak menular (NCDs integrated post)
PUSKESMAS	Pusat kesehatan masyarakat (Puskesmas)
RISKESDAS	Riset kesehatan dasar (Basic health survey)
RCT	Randomized control trial
SSBs	Sugar sweetened beverages
THE	Total Health Expenditure
WHO	World Health Organization

Glossary

Overweight and obesity: according to WHO, overweight and obesity are defined as abnormal or excessive fat accumulation that presents a risk to health (WHO) A crude population measure of obesity is the body mass index (BMI), a person's weight (in kilograms) divided by the square of his or her height (in metres). A person with a BMI of 30 or more is generally considered obese. A person with a BMI equal to or more than 25 is considered overweight.

Obesity prevention policy: the systems of laws, regulatory measures, course of action and funding priorities for the prevention of obesity.

Upstream determinant of obesity: the economic, social and physical environments that indirectly influencing population eating and physical activity behavior patterns.

Midstream determinant of obesity: the population eating and physical activity behavior pattern are major determinants of obesity prevalence.

Downstream determinant of obesity: Individual behaviors, motivations, genes and metabolism are the major determinants of the presence of obesity in patients.

Other definitions according to Sacks *et al.*(1)

Introduction

Two years ago, I saw obesity as the elephant in the corner. After giving birth to two beautiful daughters, I continued to gain weight until I became overweight. But I felt undisturbed. Besides, people around me consider being fat after giving birth it is a common thing for women. Almost all our friends also become fat, both men and women. We just laughed at our fat body and thought it was time to be fat considering our age. My husband also became obese. We almost regarded it as inevitable, and we had to be able to accept it and adjust to it. And then, about two years ago one of our best friends died of a heart attack at a young age. He was obese. It is indeed ironic because of my husband and I and our late dear friend; we are physicians. We knew about the obesity, metabolic syndromes, NCDs, and behavioral risk factors but It seems that we could not do much to control this.

So, two years ago my husband and I started trying to tackle obesity in my family. We learned again about nutrition, metabolism and changed our lifestyle. It was not an easy process, but we managed to achieve a normal weight. This not only improves our quality of life but also makes us more confident when providing health counseling to our patients.

Learning from this experience, I wonder how to prevent obesity. Many people do not realize it until it causes serious illnesses. I work in provincial health offices, and the government has several programs to control NCDs including obesity such as community-based intervention for early detection and health promotion. But it looks like the program is not running as expected because of many problems such lack of resources. Its reach is limited in urban areas only.

And then I decided to find out more about public health efforts to prevent obesity through this thesis.

Chapter 1 Background Information on Indonesia

1.1 Geography

Indonesia is a country that situated off the coast of mainland Southeast Asia in the Indian and Pacific oceans. It is the largest archipelagic country in the world that lies across the Equator which is made up of 13,466 islands of which only about 6,000 islands are inhabited. Indonesia shares land borders with Malaysia, Papua New Guinea, and East Timor. Indonesia shares maritime borders with Singapore, Malaysia, Vietnam, Thailand, Philippines, India, Australia, and Palau.



Figure 1. The map of Indonesia

1.2 Demographic and Socioeconomic situation

Indonesia is the fourth most populous country in the world after China, India and the United States. According to national census 2010, the total population is about 237.6 million people, 49.79% residing in urban areas, the sex ratio was 101, the median age was 27.2 years, population dependency ratio was 51.31 (2). The proportion of working age population has been increased from 60% in 1990 to 65% in 2015 (3). The population age 65 years old and above is expected to increase sharply from 5 percent in 2015 to 10 percent by 2030 and 25 percent by 2070(4).

Over the recent decades, the educational attainment has been rising. The proportion of secondary school enrollment has increased from only 47% in 1990 to 86% in 2016 (5). The average educational attainment of the adult population is 7.5 years (8 years for males and 7 years for females) (4).

Indonesia is a lower middle-income country with Gross National Income (GNI) per capita of US\$3,238. The economic growth is relatively strong at 5-6% per year. The poverty rates have declined sustainably in last ten year from 23.4% in 2000 to 11.3% in 2013(5). The level of unemployment is low about 6%, with almost 70% labor force participation rate (4). Indonesia is likely to reach upper-middle income status in the next few years if the economic growth remains stable (4).

However, Indonesia has a relatively low revenue raising efforts that lead to relatively low government expenditure, 17% of GDP in 2015 according World Economic Outlook database 2016 (4). Despite the positive economic growth, the income inequality is rising. Over the period 2003-2010 the bottom 40% of Indonesia's population only make 1-2% average growth in real per capita consumption per year compare to 5-6% of the top 20% population (4). Also, the informal work is persistently high at 60% (4).

1.3 Political Situation

Indonesia is a republic with a constitution, and executive, judicial and legislative branches of government (6). The president is the most influential policy maker according to Datta A *et al.* (2011), as cited by (6). At the national level, there are two sets of major policy processes: (i) regular development planning and budgeting and (ii) the development of more ad hoc laws and regulations (Datta A *et al.*, 2011), as cited by (6). Laws provide high-level principles which require parliament approval and regulations provide detailed guidance to implement particular laws (6). In 1999, Indonesia started to implement the decentralization system that allowed control of large amounts of public expenditure and service delivery being transferred from the central government to provincial and district/city governments (6). In 2013 there were 34 provinces, 98 municipalities, and 410 districts in Indonesia (6).

1.4 Health system

Indonesia health system comprises of public and private providers and public and private financing (6). In the public sector, central government, provincial and district/municipality shared tasks and responsibility on a concurrent basis. The central government through Ministry of Health (MOH) is responsible for the provision of strategic direction, setting of standards and regulation, ensuring the availability of financial and human resources, and managing of some tertiary hospitals (6). Provincial governments are responsible for providing technical supervision and monitoring to district health services, coordinating cross district health issues and managing the provincial hospitals. While district/municipality governments are responsible for managing the district hospital, and the district community health centers (Puskesmas) and associated sub district facilities (6). Puskesmas are the main pillar of Indonesia's public health system. One Puskesmas serves a catchment area of 25,000-30,000 individuals (4).

On the other hand, the private sector provides medical care through a range of providers, including hospitals, clinics, individual doctors and midwives (6). Recently, private provision for health care has been increasing rapidly, including for primary care (4).

There are four major sources of health financing in Indonesia: government spending, social health insurance (JKN), Out of the pocket (OOP) spending, and external financing (4). At 45.3% of Indonesia's Total Health Expenditure (THE), OOP spending shares the biggest part of health financing source, followed by government budgetary expenditures (41.4%), social health insurance (JKN) (13%), and external source (1%) (4).

Nevertheless, Indonesia's health system remains seriously under resourced. Indonesia's THE levels (3.1% of GDP) are among the lowest in the world and are low even compared to other lower-middle income countries (4). Factors like low of government revenue generation, low prioritization for health, high levels of informality, and low health care utilization rates contribute to the low level of health spending(4).

1.5 Health Status

Indonesia has made a significant improvement in population health outcome over the past several decades. Life expectancy at birth has continuously increased from 63 years in 1990 to 69 years in 2016 (5). The under-five mortality rate has decreased from 85 per 1,000 live births in 1990 to 27 in 2016 (5). Infant mortality rate had steadily declined from 62 per 1,000 live births in 1990 to 22 in 2015 (7) However, maternal mortality rate (MMR) remains high (126 per 100,000 live birth and has not reached the MDG target of 102 (4).

Indonesia now is undergoing epidemiological transition characterized by increasing burden of non-communicable diseases (NCDs) while infectious diseases remain a serious problem. Data from IHME 2016 showed that the morbidity and mortality in Indonesia due to NCDs has almost doubled in 15 years, from only 37% in 1990 to 66% in 2015, as cited by (4). Major NCDs such as cerebrovascular diseases, ischemic heart disease, and diabetes were the leading causes of death and premature death in 2015 (8). Moreover, Ischemic heart disease and diabetes burden have more than doubled over period 1990-2015 (4) The NCDs burden is related to several risk factors including dietary risks, high systolic blood pressure, tobacco smoke, high body mass index (7). Meanwhile, tuberculosis as the third leading cause of death remains the prominent infectious disease burdened Indonesia population(8).

1.6 Nutrition Situation

Riskesdas 2013 (National Health Survey) showed that 37% of children under the age of five were stunted, 19% were underweight, and 12% were wasted, and 11.8% were overweight (9).

On the other hand, evidence showed that adult population has a problem with overweight and obesity. According to WHO, overweight and obesity are defined as abnormal or excessive fat accumulation that may impair health (10). Overweight and obesity are classified based on body mass index (BMI), a simple index of weight-for-height (the weight in kilograms divided by the square of the height in metres;kg/m²)(10) Overweight is a BMI greater or equal to 25, and obesity is a BMI greater than or equal to 30 (10). Based on WHO report, in 2016 the prevalence of overweight and obesity in adult Indonesian was 24% (20.7% in men, 28.1% in women) and 5.7% (3.6% in men, 7.8% in women) respectively (11). Evidence showed that overweight and obesity prevalence in Indonesia increased rapidly over 14 years from 1993 to 2007 by approximately 11% points in men and 13-16% points in women (12). Whereas, it took 33 years (1980-2013) for the global overweight/obesity prevalence to rise at 8.1% points in men and 8.2% points in women(Ng M, et al.)as cited by (12).

Overweight/Obesity among adults coexists with undernutrition and the double burden of malnutrition is shared roughly equally by both under and over nutrition problems (13)

Chapter 2 Problem Statement, Justification, Objectives and Methodology

2.1 Problem Statement

Obesity is reaching epidemic proportions in both developed and developing countries including Indonesia. According to World Health Organization (WHO), globally, obesity rates have more than doubled between 1980 to 2014. WHO estimated in 2014 the obesity prevalence in adult was 13% (11% in men and 15% in women) worldwide. The global obesity prevalence by 2025 is estimated will reach 18% in men and surpass 21% in women (14). Meanwhile, in Indonesia, according to the National Health Survey (Riskesmas) in years 2007 and 2013, the combined prevalence of overweight/obesity in adults had increased from 19.1% in 2007 to 26.2% in 2013. Further, it showed that the prevalence in men has increased from 13.9% in 2007 to 19.7% in 2013 and the prevalence in women has increased significantly from 14.8% to 32.9%, respectively (9). It is a worrisome trend in women prevalence because it has more than doubled within less than half the time frame of the trend in women globally.

Obesity is a major risk factor for NCDs such as cardiovascular diseases, type 2 diabetes, musculoskeletal disorders, and some cancers (15). Riskesdas 2007 showed that the prevalence of diabetes and impaired glucose tolerance (IGT) were higher in respondents who were overweight and obese (16). Furthermore, in Indonesia, obesity related NCDs place a huge burden on the population. Cardiovascular diseases are the leading cause of premature death in 2012 (17). And there is an alarming growth of number people with diabetes that will nearly double from 7.6 million in 2013 to 11.8 million by 2030, Blueprint for Change Program (2013) as cited by (18).

Obesity is also weighing the country's economy. Across the world, the health care cost attributable to obesity approximately between 0.7% and 2.8% of a country's total expenditure(19). As for Indonesia, according to Professor Ir. Hardinsyah Ridwan, as cited by (20), the direct cost of obesity was estimated 2% of the total health expenditure or about 278 billion rupiahs (\$20 million) . And according to the World Economy Forum calculations, cardiovascular diseases and diabetes will cost Indonesia \$1.77 trillion and \$0.20 trillion respectively, from 2012 through 2030(18). Moreover, it also calculated that cardiovascular diseases alone account for 39.6% of the total loss of GDP output 2012-2030 (18).

Moreover, obesity, once considered a disease of the socioeconomic elite, now is also a problem in less advantage population. One recent study indicated that in Indonesia, the growth of the adult obesity prevalence among less advantaged groups was higher than the wealthy groups (21). Similarly, evidence from Brazil showed that there is a shifting of obesity burden toward the poor (22).

The fundamental cause of obesity is an imbalance between calories consumed and calories expended (10). Over-consumption of high-energy foods and a lack of physical activity are the main behavioral risk factors for obesity(23). Riskesdas 2013 showed that 93,5% of the population eat less than a requirement (5 servings per day) of fruit and vegetables and 26.1% do less physical activity(9). This indicated that many Indonesians might be at risk to develop obesity. However, these risky behaviors are often the result of environment and social

changes (15) i.e. Obesogenic environment (24) It is well recognized that the obesogenic environments can be influenced by policy changes(25) .

The government through the MOH is running a program to control NCDs including obesity aims to change people's behavior such as physical activity, healthy diet and doing regular early detection of disease. This program is a community-based health effort in the form of integrated health posts (Posbindu PTM) established at the community or village level (26). However, the reach of this program is still limited. In 2016 there were only 14.8% of villages have Posbindu PTM (27).

Based on the fact above, it is important to find out how to prevent obesity among Indonesian adults, what the government should do to tackle obesity, and what kind of interventions that will effectively prevent obesity.

2.2 Justification

Indonesia is experiencing demographic dividend characterized by a higher proportion of working age population compared to non-working age. Indonesia wants to take advantage of this changing age structure to increase its economic growth. Those working population as the human capital are expected to produce enough surplus wealth to support the older and the children population. Improving their health will help increase their productivity. Having an effective obesity prevention policy can contribute to improving human capital productivity by reducing the burden of obesity and its related NCDs.

Evidence showed that the prevalence of obesity among the socioeconomically disadvantaged population, women and lower income group have alarming increase. So, obesity must be considered a potential factor that amplifies many health problems faced by the poor such as undernutrition, infectious diseases, maternal and perinatal conditions(28). Policy approaches can be effective in reaching them and also other multiple sectors of the community to reduce obesity prevalence(22).

Moreover, according to WHO addressing obesity main risk factors (poor diet and physical inactivity) could prevent at least 80% of premature heart disease, stroke and type 2 diabetes and 40% of cancer (13).

Therefore, it is needed to study Indonesia's current policies on obesity prevention in order to control the growth of obesity epidemic in Indonesia.

2.3 Objective of the study

2.3.1 General Objective

The main objective of the study is to explore and analyze current obesity prevention policies in order to provide evidence based recommendation to policy maker to control obesity in Indonesia.

2.3.2 Specific Objective

1. To analyze the social determinants of obesity in adults in Indonesia.
2. To review evidence of potential obesity prevention intervention and

experiences in obesity prevention policy process from other countries.

3. To describe and analyze obesity prevention policies in Indonesia.
4. To identify policy gap, barriers, and opportunities of current obesity prevention policies in Indonesia.
5. To provide recommendation to policy maker to develop relevant and effective public policy on obesity prevention to control obesity in Indonesia

2.4 Methodology

2.4.1 Research Design

A literature review and desk review were conducted to achieve the objectives of the study.

2.4.2 Search strategy

2.4.2.1 Objective 1

In order to describe the obesity determinants in adults in Indonesia searches were conducted in PubMed and VU library. Google scholar and Google were also used to identify articles from Indonesia. Boolean operators (AND, OR or NOT) were used in combination with keywords 'obesity', 'determinant', 'risk factor', 'adult', and 'Indonesia' in the search.

2.4.2.2 Objective 2

In order to review evidence of obesity prevention intervention and obesity policy process from other countries searches were conducted in PubMed, VU library, Cochran library. Boolean operators were used in combination with key words 'obesity', 'prevention', 'intervention', 'policy', 'food', 'diet', 'physical activity', 'exercise', 'environment', 'behavior', 'lifestyle', 'community', 'primary care' in the search. I also hand searched the reference lists of relevant studies and review articles.

2.4.2.3 Objective 3

In order to review the national policies in Indonesia on obesity prevention with regards to physical activity and dietary recommendation/healthy food, the various websites of government agencies in Indonesia i.e. Ministry of Health, Ministry of Agriculture, Ministry of Home Affairs, Ministry of public works, Ministry of transportation, Ministry of trade, Ministry of youth and sports, and Ministry of manpower were searched for policies. Mid-level officers from MOH and North Sulawesi provincial health office were also approached for assistance to obtain relevant documents. PubMed and VU library were also searched for intervention obesity prevention and policy process in Indonesia. Boolean operators were used in combination with key words 'obesity', 'NCD', 'prevention', 'intervention', 'physical activity', 'diet', 'food', 'policy', 'process', and 'Indonesia' in the search.

2.4.2.4 Inclusion and exclusion criteria

Articles included were all studies, programs, policies and strategies, report from Indonesia and other countries. Only articles and documents in English or Indonesia were selected.

For review on potential intervention, I included studies that were published from January 2010 up to June 2017, peer-reviewed, available in full text, English and Indonesian languages articles that describing obesity prevention intervention. Study design that were eligible for inclusion were qualitative studies, experimental studies, observational studies, effectiveness analysis (modelling), evaluation study. Articles were excluded if they were descriptive studies with no specific intervention and no outcomes or outputs, and focusing on clinical features of obesity and treatment.

2.4.3 Limitation of the study

The analysis of obesity prevention policies in Indonesia is limited only to documents that can be accessed online and articles of research that may be incompatible with Indonesia's dynamic socio-political situation. Policies analyzed are also almost entirely national policies and few policies of local government. This is due to time constraints and technical limitations. The review of the evidence intervention is also limited to English literature so that the relevant literature in other languages will be left out.

2.4.4 Conceptual Framework

The Obesity Policy Action (OPA) framework and analysis grids developed by Sacks and colleagues(1) were used to as a tool to analyze obesity prevention policy. This framework was modified from the World Health Organization framework for the implementation of the Global Strategy on Diet, Physical Activity and Health (DPAS) (29). The DPAS is applicable to obesity prevention policy action because it is the global approach for activities to promote healthy diet and physical activity(1).

The OPA framework set out the context of policy actions by incorporating three different public health approaches to address obesity (1) (figure 1)

1. Upstream or socio-ecological approach

Policy actions target the food environment, physical activity environment and socio-economic environment which indirectly influencing population eating and physical activity behavior patterns.

2. Midstream or behavioral approach

Policy interventions target the population or sub population and directly influencing eating and physical activity behavior change.

3. Downstream or health service approach

Policy interventions that support health services and clinical interventions.

While the analysis grids provide a systematic way of organizing potential policy action areas by the sector to which they apply and the level of governance responsible for their administration (1)

In addition, this framework was used to analyze the policy process of obesity prevention.

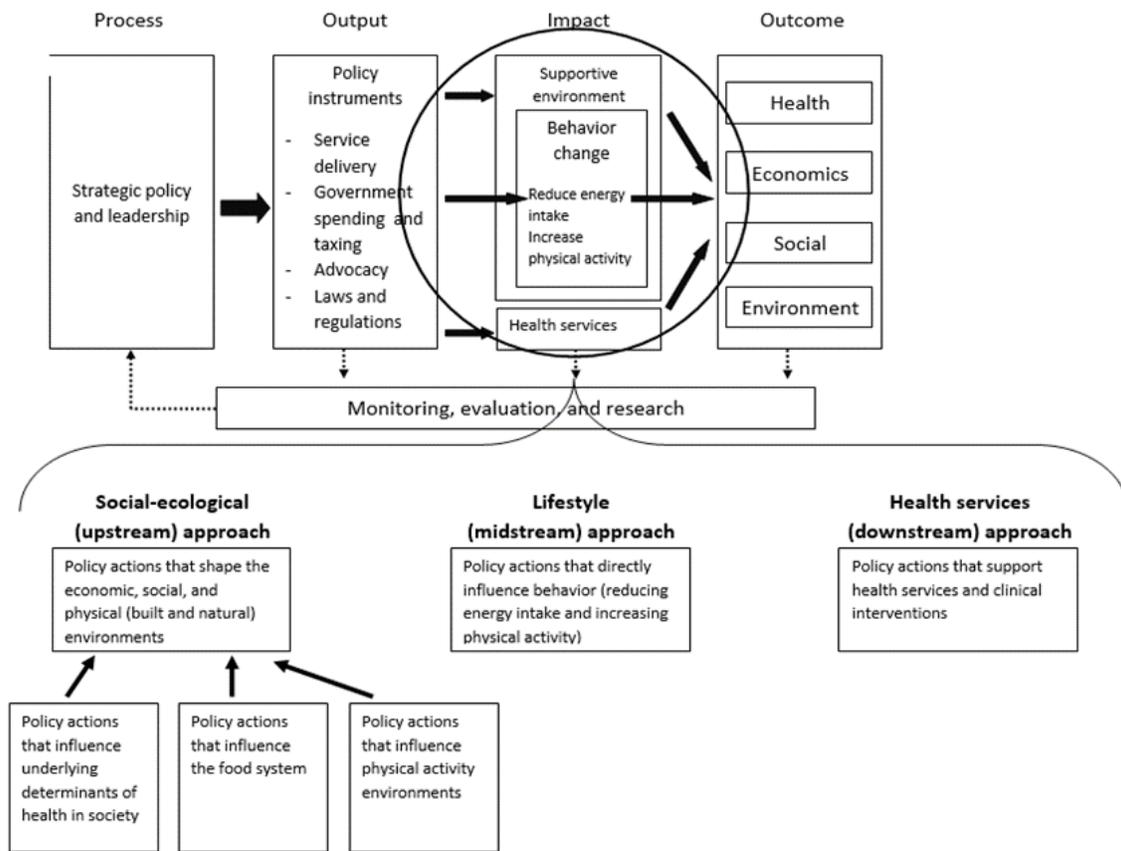


Figure 2. Obesity Policy Action framework: breakdown of upstream, midstream and downstream policy targets (1)

Chapter 3 Findings

3.1. Determinants of obesity in Indonesian adults

In this section, the determinants of obesity in adults in Indonesia are described.

Socioecological (upstream) factors

From the socioecological perspective, the economy, social and physical environments are the factors that determine population eating and physical activity behavior patterns that lead to obesity epidemic (1).

Roemling *et al.* (2012) analyzed panel data from the Indonesian Family and Life Survey (IFLS) found that income determines nutritional status indirectly in Indonesia (30). Using a panel regression model Roemling *et al.* showed that having higher living standards which measured as total expenditure levels per capita contributed to higher BMI (30). This finding is in line with Riskesdas 2007 (16). However, Roemling *et al.* also noticed that the BMI only raise in a small amount (0.02 and 0.03 among men and women, respectively) in 25% increase of expenditure (30). Thus, Roemling *et al.* suggested that there must be other important factors influencing nutritional outcomes (30). Meanwhile, Aizawa *et al.* (2016) indicated that the growth of the adult obesity prevalence among those with a low socioeconomic status was higher than among those with a high socioeconomic status (21).

Also, Roemling *et al.* noted that level of education positively contributes to BMI particularly in men. Diana *et al.* (2016) have analyzed the Riskesdas 2010 data and also found that higher level education may be a protective factor for overweight/obesity in women as well (31). It showed that women with high level of education (high school and above) had a risk for overweight/obesity 20% lower compared to women with a lower level of education (31). Roemling *et al.* suggested that education is likely to increase nutritional awareness and health knowledge thus it could contribute to lower BMI (30).

Studies also found that living in urban areas were significantly associated with overweight and obesity(14,27–29).This may be due to better access to food and a wider range of food choices available in urban areas that stimulate higher consumption (33). Further, this probably related to lower physical activity level due to better transportation system in urban compared to rural areas (30) However, Roemling *et al.* showed that overweight/obesity was increasingly becoming problem in rural areas (30).

Being married is significantly increasing the risk of overweight/obesity especially for women (30,31) . This effect is likely due to cultural factors and changing lifestyles after marriage (30).

Culture may influence obesity's predisposition. Roemling *et al.* suggested that in countries with a high Muslim population like Indonesia, women are sometimes less free to do sports and other physical activity which may raise the likelihood of accumulating excess weight (30). Sohn (2014) contended that Indonesian's perception of obesity is positive and obese in Indonesia are content with their lives and happier than the non-obese (34). His study claims that the positive relationship between obesity and happiness were related to improved SES and health enjoyed by the obese (34). In this situation, it would be difficult to promote weight loss, particularly according to Brown (1991) as cited by (34) if obesity is perceived as a symbol of health, prestige, and prosperity in the societies where the problem of undernutrition still exist.

Behavioral (midstream) factors

From midstream perspective, the population's eating and physical activity behavior patterns are major determinants of obesity (1).

Roemling *et al.* also showed overweight/obesity in Indonesia associated with changing diets in the nutrition transition, a shifting diet pattern from traditional diets high in cereal and fiber to more modern Western pattern diets which are high in fat, sugar, and animal-sourced food (30). Roemling *et al.* found that in overweight population the expenditure for meat and dairy products was significantly higher than for traditional staple foods (30). However, Lipoeto *et al.* asserted that regarding food consumption pattern and nutrition transition shift, Indonesians still maintained their traditional food pattern, but they consumed more sugar and vegetable oils added to their traditional recipes (33)

Further, Roemling *et al.* stated that lighter physical activity during work and leisure time contribute to overweight/obesity(30). Individuals with sedentary jobs and those in housekeeping have a higher chance to become obese compared to those who have higher physical activity level occupation (30). Diana *et al.* also showed the same evidence, women who become housewives had an increased risk to develop obesity compared to women with other jobs(31). In addition, Roemling *et al.* noticed that owning household appliances mainly a television prevent people from more physically active during leisure time which correlated with higher BMI (30).

Individual (downstream) factors

Women had a higher chance of being overweight/obesity compared to men (30,31). This phenomenon partly can be explained by biological factors not only as described above as gender and cultural influences (30). Women appear to have a higher tendency to store fat (30). In addition, studies have revealed that excessive weight gain during pregnancy is associated with later overweight and obesity (35)

Two different studies (36,37) investigated the genetic risk factor for obesity among two different ethnics in Indonesia, the Javanese, which is the largest ethnic group that makes up almost a half of all population of Indonesia and the Balinese. Study on the Javanese showed a weak relationship between a genetic factor and obesity(36). Research on the Balinese demonstrated the importance of environmental settings (the urban) rather than genetic factor on the development of obesity among the Balinese(37).

3.1 Obesity prevention intervention

In this section evidence of obesity intervention targeting adult population in upstream, midstream, and downstream level is analyzed.

3.1.1 Upstream approach intervention

3.1.1.1 Taxation on Sugar sweetened beverages (SSB)

Nakhimovsky *et al.* (2016) systematically reviewed the effectiveness of an SSBs tax in MICs (Middle Income Countries) and found that in Mexico after government imposed an excise tax on SSBs the price of sugary soda increased by more than the rate of the imposed tax, making

a significant changing in the relative prices paid by consumers. While sugary fruit drinks only have increased less than tax rate (38). The same pattern also observed in a study in France (39). Nakhimovsky *et al.* also found that there was a decrease in SSB consumption equivalent to 5-39 kilo Joule per person per day given a 10% increase in price. Further, Nakhimovsky *et al.* showed that in MICs the lower socio-economic groups were more responsive to SSBs price changes compared to high socio-economic groups(38).

Regarding the effect of increased price on the prevalence of obesity, Nakhimovsky *et al.* pointed out that although studies reviewed showed that increasing the price reduced overweight/obesity prevalence by about 3% given a 20% tax fully passed on to consumer (95% confident interval (CI)), this evidence based on modeling studies ,did not assess an actual tax,and relied on many assumptions thus limits the ability to causally attribute changes in obesity prevalence to price changes observed (38).

Nakhimovsky *et al.* and Bes-Rastrollo *et al.* (2016) stated that the tax tool alone showed to be inadequate to control obesity pandemic, but still, the tax has to be included in a multicomponent and structural comprehensive strategy to curb obesity (38,39).

In order to change behavior (i.e., reduce consumption of the product) Nakhimovsky *et.al* and Wright *et al.* (2017) agreed that the rate of the tax has to be set a sufficiently high level that can increase the price of products by 20% or more (38,40). Moreover, Wright *et al.* added that revenue stream from high rate taxes the generate health behaviors are not predictable(40). Conversely, this study suggested, if the raising revenue is the aim of the tax then setting a lower rate is the appropriate choice (40).

Backholer *et al.* (2016) and Nakhimovsky *et.al* highlighted the issue of regressivity of this type of tax but agreed that the tax delivers health benefit across socio economic strata (38,41).

Backholer *et.al* and Wright *et al.* suggested government to consider allocating some revenue from the tax to support health promotion targeting marginalized population or to subsidize healthier product(40,41).

Moreover, Wright *et al.* identified factors affecting the feasibility and implementation of SSBs taxes. Wright *et al.* showed that public and political support for the SSBs tax is mixed(40).

Hence, Wright *et.al* pointed out a study of four countries in the Western Pacific region by Thow *et al.* (2010) which suggested that when governments' framing a tax as a health intervention to improve health outcome, they could gain support from the stakeholders (40). Also, Wright *et al.* found that although the media may be useful for health advocacy to raise the public and political awareness on SSBs tax issue, it is not sufficient to make the policy implemented (40).

3.1.1.2 Food labeling

Food labels for prepackaged food can be implemented in different forms. Cecchini *et al.*(2014) in a systematic review and meta analysis of randomized studies found that food labeling would increase the amount of people selecting a healthier food product by about 17.95% (confident interval +11.24% to +24.66%)(42).However, Cecchini *et al.* noted that the effectiveness of food of labeling schemes in modifying calorie intake/choice was not statistically significant. On average, food labeling can be expected to decrease calorie intake/choice by about 3.6%(CI -8.90% to +1.72%)(42). However, Lichtenstein *et al.* (2014) claimed that population with higher intake food product with front-of pack labelling, which is one of food labelling system, was associated with lower risk of obesity (26%), lower risk of elevated waist circumference (29%), and lower risk of metabolic syndrome (24%) (all p <0.05) compared with the lowest intakes (43).

Meanwhile, a study from Mexico showed that nutritional information panel (NIP) on the back of pre-packaged foods was difficult to understand and this prevented consumers from using the NIP for purchasing decisions (44).

Food labeling regulation also has been implemented for food purchased in restaurants in few high-income countries. A systematic review of studies in developed countries context by Sinclair *et al.* (2014) suggested that labeling of restaurants menus with calories alone had no effect on calories selected or consumed (45). However, Sinclair *et al.* suggested that interpretative or contextual nutrition information along with calories was helpful to help consumers choose and consume few calories when eating in restaurants(45).

While most of the effectiveness research on food labeling come from high-income countries, one narrative review of studies from developing world context by Mandle *et al.*(2015) added insight on the general population perception on this policy. This study noted the similarity of food labels preferences among customers in both developing and developed countries (46). In addition, this study showed there was a disparity between rates of use (40%-70%) and comprehension of food labels' information(24.4%-55.9%) in developing countries(46).

Further, Sinclair *et al.* suggested that industry plays an active role in influencing legislation and regulation (45). For example, the industry may propose food regulation requirements differ from government regulation, or even totally opposed the labeling regulation (46).

A qualitative study by Shelton *et al.* (2017) in the USA described more on how the private industry and public health sector engaged in policy making process of food labeling. This study pointed out that private industry and public health used different key framing approaches in policy making process. Public health sector used social justice frame and emphasizing on positive health outcomes and supported their argument with data. On the other hand, industry used market justice frame that emphasized the minimizing government regulation and used emotional appeal, depicted themselves as vulnerable groups. This study suggested that public health sector should directly counter the industry's argument, especially on the impact and cost burden of the policy for the industry, and use framing devices that add the emotional appeal of its argument (47).

3.1.1.3. Urban planning and active transport.

Evidence from developed countries suggests that changing in urban built environment can change people behavior to be more physically active.

One natural experimental study from the UK suggests that a new transport infrastructure may change travel behavior towards active transport (walking, cycling or use public transportation) (>30% increased) and less car use (>30% decreased)(48)

A quasi-experimental two-group pre-post study from New Zealand shows that improvement in infrastructure and associated programs increase by 37% (95% CI 8% to 73%) active transport (49).

Similarly, evidence from Brazil showed that installing a fitness center in an urban community in promoting physical activity among the population surrounding that facility (OR = 1.16; 95%CI: 1.03-1.30) (50).

However, a systematic review suggested that improving infrastructure for cycling have the potential to increase cycling by modest amounts (3.4%) point, particularly in areas without established cycling culture (51).

Further, a study from Australia notes that installing sidewalks in established neighborhood as a single intervention is unlikely to improve health cost effectively (52).

Nevertheless, one qualitative research in Australia (53) pointed out the difficulty to have policy change that promoting physical activity through improving infrastructure. This study noted the powerful lobby from the car industry and automotive association, the weakness in the planning system and the cost of potential interventions hinder the policy implementation. But this study recommended clear guidelines for the government and including health outcome in the planning and transportation sectors (53).

However, research in Singapore demonstrated that a small intervention could support commuters to be more physically active. This study showed that a colorful stair-riser point-of-decision prompts (PODP) in an underground Singapore Mass Rapid Transit (MRT) station made more people use stairs by a factor of 1.49 (95% CI 1.34–1.64) instead of escalators (54).

3.1.2 Midstream approach intervention

3.1.2.1 Community-based setting

Three studies from China(55), Japan (56), and The Netherlands(57) investigated community-based intervention to promote physical activity and healthy diet among elderly. Study(56) and (57) evaluated the effectiveness of 9 and 12 months respectively, community wide campaign. Despite using a different design, RCT, and a quasi-experimental respectively, they showed a similar result. Both studies found that there was an increase of the awareness but the only small effect in changing behavior in short and medium term.

On the other hand, study(55) evaluated a more comprehensive intervention including a record establishment, health evaluation and health management and closely working with community health service center. It also had a longer duration (18 months) and had monthly followed up. This study showed that there was an improvement ($P < 0.01$) in diet and physical activity level among elderly.

Meanwhile, two studies from Vietnam(58) and England(59) evaluated the community-based intervention in the rural population using a quasi-experimental study and RCT respectively. Study (58) suggested the 3 years campaign failed to reduce the physical inactivity. Meanwhile, study (59) showed no improvement (adjusted OR 1.02, 95% CI: 0.88 to 1.17; $P = 0.80$) in the level of physical activity after providing 12 weeks tailored physical activity opportunities and 12 months support following the intervention. Furthermore, this study added that the low of awareness was the cause of the ineffectiveness of the intervention.

Evidence from Iran shows a comprehensive community-based intervention that used many strategies included public education, marketing, intersectoral collaboration, organizational development, policy development can be effective to reduce the prevalence of obesity in women by 2.75% (60).

A study from Australia points out that careful management, planning, and good governance are required for community-based intervention. In addition, it noted that to ensure acceptance of the community, the intervention should be based on evidence and the local needs. Also, it suggested that government has to show strong leadership and collaborate with the research community and local practitioners (61).

3.1.2.2 Worksite setting

A systematic review on diet and/or physical activity intervention suggested that workplace health promotion may improve physical activity, diet, and weight. Further, this study indicated

that to reach successful outcome the physical activity intervention should be based on multi-component program including step counting, active commuting, and organizational change. It also found that nutrition education or combined with environmental modifications could improve dietary behavior among employees(62).

One study from Vanuatu(63), a developing country, evaluated the effectiveness of pedometer-based intervention among Pacific female civil servants to promote physical activity. It found that the intervention increased the physical activity level by 26%. Also, it showed that high-risk participants benefit most from this intervention.

A study from Germany(64) also indicated the same finding. According to this study, workplace health intervention may support health behavior change, and overweight employees profit more from that intervention.

3.1.2.3 Healthy lifestyle Campaign

Studies have measured the campaign effect on people behavior to healthy life changes. Three studies (65–67) agree that campaign increase people awareness. Conversely, one study showed that even after the second wave of the campaign, people only gave small attention towards healthy food choice (68) Yet, only one study claims that there are desirable behavior change after the exposure to the campaign (67) However this study was a survey study, used self-reports to measure the campaign effect on behavior. That study design has a limitation in drawing firm conclusion about the causal effectiveness of the campaign. In addition, the use of self-reports may not represent the real effect because of respondent bias.

Recently, modern information and communication technologies have been using to promote physical activity and healthy diets. A systemic review of studies conducted in developing countries showed that 50% electronic and mobile health interventions were effective in increasing physical activity and 70% of the identified interventions were effective in improving diet (69).

3.1.3 Downstream approach intervention

There is evidence for the effectiveness of physical activity (70) and diet promotion (71) in primary care setting in developed countries context. Study (70) systematically reviewed RCTs studies of physical activity promotion in sedentary adults using a different type of intervention such as advice or counseling given face to face or by phone on multiple occasion, delivered by health professionals (e.g., primary care doctors, nurses, health counselors, etc.). This study showed that there was a significant increase of physical activity level measured at 12 months after the intervention.

Evidence from developing country also showed a similar result with the study (72). A non-randomised, controlled intervention study found that health education and physical exercise classes delivered in primary health center in a region of low socioeconomic status in Brazil were effective to increase the practice of physical activity(72)

Study (71) systematically reviewed RCTs studies on diet promotion given to non high risk participants in primary care suggested that this intervention had moderately sustained but small effect on changing diet.

Studies have been done to investigate the feasibility of implementing health promotion in the routine primary health care conditions. One study evaluated the innovative project for health promotion at Public health center (PHC) setting called “prescribe vida saludable” (PVS) in Spain indicated that the success of implementation by PHC professionals seems to be

associated with the context, the implementation process and the collaborative modelling (73) Another study on the same project investigated the use of a multifaceted collaborative modelling implementation strategy which incorporated bottom-up primary care organisational change, top down support from managers, community involvement, and the development of communication technologies (74) The result showed that this strategy had a good impact on the adoption, the reach and the implementation of healthy lifestyle promotion in the context of routine PHC.

3.2 Obesity prevention policy process: experiences from Mexico, Brazil and Singapore

Mexico

Mexico's obesity prevalence is among the countries with the highest obesity rates (75). In 2012 the prevalence of overweight and obesity combined among adult women was 70% and among men was 69.4% (75). Many efforts have been done to control obesity and they have been contributing to lower the obesity rate of increase from 1.2% per year (1999-2006 period) to 0.2% per year (2006-2012 period) in women and from 1.0% per year (1999-2006 period) to 0.5% per year in men(75).

Barquera *et al.* in 2013 study identified factors that facilitate the policy process in Mexico.

Firstly, Mexico's attempts to tackle obesity was built on scientific evidence. Government through MOH use reliable national data from surveys and other data base to identify the scope of the problem. From these sources government can identify the regional distribution of obesity and the association with other risk factors, sex, age group and socioeconomic status patterns in food expenditure, transportation, leisure time activities (75). And when looking for solution, MOH sought recommendations from experts who were independent, based on scientific merit, worked pro bono and without conflict of interest (75). As a result, MOH recognized the need to create a comprehensive, multisectorial, multilevel policy with participation of government, civil society, academia, private sector (industry) and non-governmental organization(NGO)(75).

Secondly, MOH strong leadership and commitment strengthen the collaborative works with other ministries namely education, agriculture, social development to organize unified messages to the people and unified approaches to engage with the food industry(75).

Lastly, strong support from civil society, academia and NGOs. Civil society organization and academia supported obesity prevention policy in the legal process of policy (public hearing) and NGOs organized campaign against sugary beverages which attracted a wide media coverage (75).

However, Barquera et al. also noted some challenges in the policy process. First, challenges come from the food industry. There was a lack of harmonization between industries interests and public health objectives which perceived by industries as a threat to their business(75). Second, government limitation including poor planning capacity, insufficient resources and funds, and lack of accountability and transparency(75).

Brazil

Obesity prevalence in Brazil in 2008–2009 was 12.5% among men and 16.9% among women based on data from Instituto Brasileiro de Geografia e Estatística (76). Brazil has started to

recognize obesity as a national problem and identified need for intersectoral policies since 1999 (76).

Throughout the policy process, Jaime *et al.* in 2013 study found several facilitating factors:

1. There was an excellent collaboration among high-level government agencies. Interministerial Chamber of Food and Nutritional Security which composed of 19 ministries developed a national and inter-departmental plan to prevent and control obesity and also to confront the social and environmental causes of the obesity epidemic (76). Further, aware of the challenge involving multi sectors, this governmental authority also provided plan anticipating issue of sector fragmentation so the programs will complement one another thus more effectively confront obesity in the country(76).
2. Effective participation of social movements and organizations in supporting government agenda on diet and nutrition. In Brazil, social organizations have important role in public policies process as they are the formal avenue for civil participation in formulating, implementing and controlling public policies according to Burlandy L (2011) as cited by (76).
3. Having an information system that supports the planning, monitoring, and assessment of policies and programs particularly in primary health care, Coutinho *et al.* (2009) as cited by (76).
4. Local government active supports. Municipalities through municipal health departments have led initiatives to promote physical activity among the population by building infrastructures in parks, squares, and streets near public health centers that include equipment and qualified trainers to guide the public in physical Health (50).

Nevertheless, government's resolution on food regulation was challenged in court by several lawsuits by different sectors and association which most of them are related to food industry (76). The resolution was suspended by the federal attorney general despite the commitment of the MOH and other supporters namely civil society and academia (76). Jaime *et al.* suggested that learning from this experience it is needed to build a broad political consensus among government's executive, legislative and judicial branches along with social support and acceptance when formulating obesity prevention policy in Brazil (76).

Singapore

Compared to other developed countries, Singapore's obesity prevalence based on National Health Survey 2010 was relatively low at 10% in 2010, yet the 40.1% of the population were overweight, whereas the prevalence of obesity in men was higher than in women, 12.1% and 9.5% respectively, as cited by (77). Contrary to Mexico and Brazil which have higher prevalence of obesity among women.

To prevent obesity, Health Promotion Board (HPB), a coordinator board for obesity prevention and management in Singapore, has made a strategic shift from just public education campaigns targeting individual behaviors, to focus on creating a ground-up social movement to enable individuals to make healthier choice by changing the environments and create collaborative partnerships among the public, the people and the private sectors (77).

Foo *et al.* in a study in 2013 noticed several factors that supported obesity prevention policy process in Singapore.

First, HPB has tried to look for evidence in developing or evaluating a policy. For example, a study was conducted by HPB to measure the effectiveness of using visual cues in the Singapore Mass Rapid Transit (MRT) stations to promote physical activity among commuters (54). HPB also conducted a dietary study to evaluate whether the consumption of the Healthier Choice Symbol (HCS) program's products has been associated with better diet quality (77).

Second, HPB collaborates with food industry by making healthy food as a case of business to increase the food supply (77). Together with the ministry of trade's agency and the Singapore Food Manufacturer's Association (SFMA) HPB collaborates to build local food manufacturing industry with the goal of developing healthier food products. And the food industry found this proposition is beneficial as they see the potential for exporting these healthier products regional and global markets (77).

Lastly, there are many stakeholders involved actively. Foo *et al.* stated the local politicians and the grass root organizations were the key actors in the community (77). For instance, HPB programs to encourage hawkers use healthier ingredients in their signature dishes was accepted by hawkers due to support from local grassroots organizations (77).

3.3 Policy process in Indonesia

In this section, the policy process in central level and regional (provincial and district/municipality) level are analyzed.

Policy process in central level

The policy process in Indonesia can be divided into two main processes: 1) the planning and 2) developing of laws. The planning is a regular process which includes long-term, medium-term and annual planning at the national and ministerial levels. Development of state budget (APBN) is a part of annual planning which requires parliamentary approval. The other process entails the development of laws, implementations guidelines, regulations, decrees, and instructions. The development of laws requires parliamentary approval while others do not (78). While laws provide statements of general principles, the government regulations provide implementation guidelines for specific law, which initiated by a minister and signed by the president (78). In the lower level of the hierarchy of legal processes, there also ministerial regulations, ministerial instruction, joint ministerial decrees (78).

According to Suzetta (2007) as cited by (78), the development planning should be comprising the agenda proposed by the president (political), evidence based (technocratic), involving different stakeholders (participatory), concentrated on plans prepared by the president, ministries and agencies (top-down) and lastly, built on plans from the villages, districts and regionals levels (bottom-up).

Drafting and passing laws based on formation of legislation (Law 12/2011, Law 27/2009) can be initiated by both the government or by the Parliament, as summarized in box 1

Box 1. Drafting and passing laws based on Law 12/2011, Law 27/2009

- The bill of the House of Representatives (DPR) is proposed by members of parliament, commissions, coalitions or the Regional Representative Council (DPD)
- The bill suggested by the President is prepared by the relevant ministers or heads of non-ministerial government institutions.
- The bill is then drafted in the National Legislation Program (Prolegnas) by the Legislative body of DPR.
- Any proposed bill should be accompanied by an Academic Paper except for the State Budget (APBN) Bill, the draft law on the enactment of Government Regulation in Lieu of Law (Perpu) into law, as well as the revocation bill of the Act or the revocation of the Perpu.
- The DPR leaders shall inform the draft of the bill and distribute the bill to all DPR members in plenary sessions
- The DPR in the next plenary session decides the bill to be in the form of approval, consent with change, or rejection
- Next, the bill is followed up with two levels of discussions.
- Level I discussions are conducted in committee meetings, joint meetings of commissions, meetings of the Legislation Body, meetings of the Budget Board, or special committee meetings
- The activities in the first-level discussion are conducted with introductory deliberations, discussion of the inventory list of issues, and the submission of mini-fractions
- The second-level talks are conducted in plenary sessions. In the plenary session contains: a) Submitting a report containing the process, mini-fractional opinion, and the result of the Level I Discussion; b) Statement of consent or rejection of each faction and member orally requested by the chairman of the plenary meeting; c) The final opinion of the President submitted by relevant ministry.
- If not reached agreement through consensus, decision is taken with the most votes
- In the preparation and discussion of the Bill, including the discussion of the Bill on APBN, the public is entitled to provide input orally and / or in writing to the DPR.
- The Bill which has been approved by the DPR then passed to the president to be signed.

Datta *et al.* (2011) observed, in general, the knowledge up take in making a law/regulations is low. Data *et al.* noted that although throughout these processes the knowledge in the form of Academic Paper and consultation processes among many stakeholders have the significant role in drawing up plans and policies, little effort was made by the government and DPR to create a reliable academic paper or to elaborate the input from stakeholders and use all these knowledge to create an aspiration and responsive law (78).

The World Bank (2009) noted that decision-making processes underlying formulation of policies are often unclear, cited by (78).

Moreover, according to Mangkusubroto *et al.* in Indonesia, the government bureaucracy approach is sectoral in nature. Mankusubroto *et al.* observed that ministries only focus on their own sector or purpose and thus can not meet the more cross-sectoral and multidimensional challenges (79). Christiani *et al.* (2016) also highlighted the multisectoral and coordinating

weakness in government bureaucracy particularly in tobacco control policy making and implementation in Indonesia. Christiani *et al.* found that even within the MOH there was an inadequate collaboration among directorates because of the narrow and rigid understanding of their working domain and poor communication(80).

Mietzner (2016) and Burhanudin(2015) also observed the constant compromise in the cabinet due to a coalition in the government resulted by the multiparty system adopted by Indonesia (81,82). In addition, Mangkusubroto *et.al* added, because of the government coalition only supported by four parties which control only less than 30% of the parliament, the government has to make more compromise in both legislative and executive body (79). The implication of this situation is a potential conflicting interest among policy makers when dealing with an issue and proposed solutions/policy undertaken to address it may not be well accepted by all related stakeholders (80). Also, it may lead to creating conflicting policies in different sectors, for example, Indonesia has the tobacco control policy which aims to reduce tobacco consumption and the roadmap of tobacco product industry that aims to increase tobacco production(80).

Evidence showed that the influence of the private sector (industry) play an important role in shaping public policy in Indonesia. The roadmap of tobacco product industry is also a result of tobacco industry influence (83).

Policy process in regional level

Indonesia has embarked on a process of decentralization starting with the enactment of law on regional government no. 22/1999, law 32/2004 and subsequently law 23/2014. Through decentralization, a wide range of responsibilities have been transferred from central government to provincial, municipality and district governments in the areas of health, middle-level education, public works and spatial arrangement, transportation, environment, communication, agriculture, manufacturing, and other economic sectors.

Based on law 23/2014, regions have the right to enact regional policies to administer government affairs under their jurisdiction and shall be guided by the norms, standards, procedures, and criteria established by the central government.

President regulation 87/2014 regulates the mechanism of drafting the regional (provincial and municipality/district) regulation (PERDA) which is similar to national level process. The regional head and local parliament (DPRD) can initiate PERDA. The draft must be accompanied by academic paper. Then DPRD will discuss the draft within DPRD's commission and plenary session. If approved, the regional head will sign the PERDA. The public is also allowed to be involved in formulating the PERDA.

Following the decentralization, it was suggested that local government policies would be more responsive to local needs. However, Sutmuller *et al.* (2011) identified several problems related to local policies: 1) Regional governments lack creativity and innovation in formulating their local policies because of the uniformity and detailed prescriptive government directives; 2) Most local governments are dependent on conditional grants for development that mostly do not meet local needs and policy priorities; 3)There is no habit involving stakeholders (practitioners, experts, universities,civil society) in the policy decision-making process; 4) Sector strategies are likely to be copy pasted from national sector strategies. On

the other hand, annual plans and budgets tend to be copy pasted from previous years plans and budgets (84)

Mangkusubroto *et al.* also noticed that local governments adopted central government's sectoral approach as local government budget and disbursement is structured and based on the existing ministries which created sectoral minded and lack of collaboration across sectors (79).

Additionally, Christiani *et al.* showed that there was a disconnection between national policy and local implementation that created a barrier for effective implementation (80). For instance, the national policy to create smoke-free areas through regulation requires provincial and districts regulation in its implementation, but in reality not all provinces and districts have done this. And even though the local government implement the national policy, it may be done in a suboptimal way (80).

Nevertheless, in certain policy areas and regions decentralization has led to increased policy performance. Some regions have made and enforced local regulations. Examples of local health policies are the tobacco advertising ban in Bogor city, smoking cessation support in primary care in Yogyakarta city and the Tobacco free Tuesday campaign in Bandung city (80).

Sutmuller *et al.* showed that most of the time it was the Governor, Mayor or Regent who came up with the idea and championed the formulation of the local policy either as an immediate consequences of their campaigned vision and mission or preparing local health or education policies emerging from local issues brought to their attention(84).

In addition, Yuwono (2016) showed that civil society played pivotal roles in local governance particularly in Surakarta City(85). Yuwono showed that civil society in Surakarta is actively influencing policy analysis, advocacy, monitoring and control(85). Moreover, Yuwono stated that the civil society in Surakarta City is a strong pillar for sustainable local good governance practices(85).

3.4 Obesity prevention policy in Indonesia

In this section, 25 government policies related to obesity prevention are identified and analyzed based on the Obesity Policy Action framework. Most of the policies are national policies and two provincial policies and one district policy. Program logic approach was used to identify the potential policy areas (86).

3.4.1 Upstream approach: policy actions that influence food environment and physical environment

In upstream policy targets, policies that influence the food environment and physical activity environment are identified and analyzed. The intention of obesity prevention policies regarding the food system is typical to change the food environment such that healthier choices are the easier choices (87). The policy actions that influence food environment are identified and analyzed by considering the food system components including primary production, food processing, distribution, marketing, retail and catering and food service (87).

Table 1 set out the policies areas that influence the food environment by the level of government responsible for their administration and by the sector to which the policy action applied (the food system) (87).

Obesity prevention policies targeting physical activity environment aims to alter the environment to make increased levels of physical activity the easy choices for the population(87). The policies that are targeting sectors that control environments within which physical activity mainly occurs are identified and analyzed. The level of governance and the sector to which the policy action applies are set out in table 2 (modified from (1)).

It is shown in Table 1 that, in the Indonesia context, most of the policy areas influencing the food system is outside the health sector. Central government through the ministry of agriculture and the local governments are responsible for securing the availability and access of healthy food (i.e., vegetables and fruits). On the other hand, the health sector is more focused on food safety and health promotion and health education. The ministry of health regulation on nutrition labeling aims to reduce the risk factor of NCDs by giving the consumers information on the content of sugar, salt, and fat accompanied with health message on processed food and fast food label. Local governments will have a responsibility to enforce this regulation in 2019.

On the other hand, it is notable in table 2 that all the policy areas influencing physical activity environment are outside the health sector. Governments at all levels are the key actors to carry out these policies. The central level ministry of public works is responsible for spatial planning and establishing infrastructures (roads, parks, etc.) and ministry of transportation is responsible for traffic network and road transportation. These ministries set up the policies, guidelines, and standards whereas implementation at the local level is coordinated by local public works and transportation office.

It is evident obesity prevention policy in upstream level is a cross-cutting issue. Non-health sectors are the key players whereas health sector as the leading institution for obesity prevention has limited influence on policies in this area. Moreover, MOH regulation no 71/2015 states that NCD prevention (including obesity) effort is focusing on modifying behavior risk factors (e.g., physical activity and diet) through health promotion and early detection of risk factors which rely heavily on primary health centers (Puskesmas) to deliver those activities.

However, early this year the president in presidential instruction no.1/2017 (see table 1 and2) declare the community healthy living movement which realized through including increased physical activity and healthy diet which incorporate various policies and measures from different government agencies.

Although this policy is starting to show some progress in supporting efforts to prevent obesity its implementation may not work as it is intended. For example, the policy of construction the bicycle facilities may be difficult to be implemented in urban areas in Java and Bali due to the number of motor vehicles exceed the capacity of the roads. In Java and Bali, one kilometer of road serves more than 500 vehicles, where in DKI Jakarta the number reaches more than 2000 vehicles (88).

Table 1 Policy areas that influence food environment in Indonesia (modified from (1) Documents from MOH (89) Ministry of Agriculture (MOA) (90)

Sector	Level of governance			Policies identified
	Central	Provincial	District/City	
Primary Production	Infrastructure development (land, irrigation system,etc) and facilities (machines, fertilizer,etc)	Infrastructure development (land, irrigation system,etc)	Infrastructure development (land, irrigation system,etc.)	Law no.18/2012 on food , Law no.13/2010 on horticulture , Presidential instruction no.1/2017 on healthy live community movement (addressed MOA to increase national vegetables and fruit production)
	Tax Incentive and credit subsidies	Tax incentive and credit subsidies	Tax incentive and credit subsidies	
Food processing	Sustainable food garden program	Sustainable food garden program	Sustainable reserve food garden program	Ministry of Agriculture (MOA) decree no. 8/2017 on technical guidelines for sustainable food garden program
Distribution	Transportation	Transportation	Transportation	Law no. 13/2010 on horticulture
	Importation regulation for horticulture product			Ministry of agriculture regulation no. 16/2017 on horticulture product importation
Marketing	Promotion of local vegetables and fruits	Promotion of local vegetables and fruits	Promotion of local vegetables and fruits	Presidential instruction no.1/2017 on healthy live community movement
Retail	Food Labeling	Food Labeling	Food Labeling	MOH regulation no. 30/2013 and no. 63/2015 on inclusion of sugar,salt,and fat information and health

				message on processed food and fast food label
Food service in catering service		Food safety	Food safety	MOH regulation no.1096/2011 on catering service hygiene and sanitation

Table 2 Policy areas that influence physical activity environments in Indonesia (modified from (1) Documents of Ministry of Public Works (91) Ministry of Transportation (92) Ministry of Internal Affairs (93))

Sector	Level of governance			Policies identified
	Central	Provincial	Districts/City	
Infrastructure and planning	Urban planning	Urban planning	Urban planning	Law no. 26/2007 on spatial planning
	Bicycle facilities development	Bicycle facilities development	Bicycle facilities development	Law no.22/2009 on traffic and road transportation, Government regulation 79/2013 on traffic network and road transportation, Presidential instruction no.1/2017 addressed MOT to arrange facility for cyclists and pedestrians, Jakarta Provincial regulation on transit rapid bus system 2014, Banjarbaru city regulation on transportation 2016
	Pedestrian paths development	Pedestrian paths development	Pedestrian paths development	Presidential instruction no.1/2017 (see above) , Ministry of public works regulation no. 16/2007 on Guidelines for the provision and use of urban pedestrian infrastructure and facilities in urban areas.
Transport	Intermodal connectivity including park and ride lots provision	Intermodal connectivity including park and ride lots provision	Nonmotorized transport area provision	Presidential instruction 2017 addressed:a. MOT to encourage connectivity between mass transportation modes of including provision of "park and ride",b. District/city for non motorized transport area provision.

				Jakarta Provincial regulation on transit rapid bus system 2014
Sport and recreation	Sports facilities	Sports facilities	Sports facilities	Government regulation on the organization of sports 16/2007, Bangka Belitung Provincial regulation 13/2016

3.4.2 Midstream approach: policy action that directly influences behavior

The purpose of the midstream policy approach is to directly influence behavior to control the population’s level of energy intake and increase the level of physical activity (1) . In order to directly influence behavior, the policy has to have a direct effect in the settings where people live their lives (1). In this study, the policies in community and worksite settings are identified and analyzed. Table 3 presented the level of governance of the policy and to settings (i.e worksite and community) which the policies applied.

It is shown in table 4 that central and local governments use community-based intervention program and campaign as policy instruments to promote healthy behavior. Based on presidential instruction 1/2017, a national campaign promoting healthy life style called Gerakan Masyarakat Hidup Sehat (GERMAS) or healthy living community movement was launched by MOH. GERMAS campaign is implemented by all components of the nation and this year the campaign messages are about physical activity, consumption of vegetables and fruits and periodic health check (94).

The community-based intervention called Posbindu PTM or the NCD integrated health post program was developed by MOH aims to control NCDs through healthy behavior promotion and NCDs screening. Therefore, MOH has developed guidelines and has allocated resource to provincial and district/municipality health office to implement this program. Community volunteers were trained to organize the post and carry out this program in collaboration with the community health center. While in the workplace the health promotion program is a part standard of safety and health work management system. The safety and health management team of the respective workplace is responsible for carrying out this program.

Regarding Posbindu , MOH has placed Posbindu as an important strategy in NCDs prevention and control program in Indonesia. The number of Posbindu established is one of the indicators for NCDs control and prevention program(27). MOH targets in 2019 50% of villages in Indonesia have posbindu ptm which is about 40thousands posbindu. Recently, MOH data showed in 2016 the number of posbindu was 21.470 and 14.8% of villages organizing posbindu(27).So MOH has to speed up the posbindu formation to reach the target. Meanwhile, evidence showed that the proportion of community who came in contact in with this program was quite low. Krishnan et.al (2010) showed in Depok city the program reached only 32% of the target population (95). In addition, Ekowati *et al.* found that the good performance of posbindu depend on Puskesmas support (96). However, in 2016 only 49% of Puskesmas support the developing of Posbindu, which led to many posbindu under performed (27). So, it is difficult for this program to progress as planned by the MOH.

Table 3 Policy areas that directly influence behavior in Indonesia (modified from (1)

Documents of MOH (89)

Setting	Level of governance				Policies identified
	Central	Provincial	District/City	Organisational	
Worksites	Campaign (GERMAS)	Campaign (GERMAS)	Campaign (GERMAS)	Campaign (GERMAS)	Presidential instruction no.1/2017
				Health promotion and education as part of work health indicator	MOH regulation no.48/2016 on occupational health and safety standard for office
Community	Campaign (GERMAS)	Campaign (GERMAS)	Campaign (GERMAS)	Campaign (GERMAS)	Presidential instruction no.1/2017
	NCD integrated post/Posbindu PTM	MOH technical guidance for NCD integrated post/Posbindu PTM			

3.4.3 Downstream approach: policy action that supports health service

The downstream policy approach that supports health services in obesity prevention in individual (1). In this study policies applied in primary health care are identified and analyzed. Table 4 presented the level of governance of the policy that supports primary health care.

In Indonesia, the primary care is provided by public and private sector. Puskesmas (community health center) is the cornerstone of Indonesia's public health system. According to MOH regulation 75/2014 provides a comprehensive care namely health promotion, disease prevention, and treatment but more emphasis on promotive and preventive effort. While the private sector is focusing on curative care.

According to NCDs control guidelines, Puskesmas has to provide healthy life style counseling in order to reduce the risk factors of NCDs. However, Puskesmas still lack health workers to perform health counseling and promotion. MOH data in 2015 showed that compared to standard requirement there were 25.5%, Puskesmas did not have enough doctor, 42,4% did not have enough nurses, 37% lack of midwives and 16% did not have a nutritionist (97). Therefore Puskesmas can not optimally provide counseling services and health promotion.

Table 4 Policies that support primary health care in Indonesia (modified from (1)

Health sector component	Level of governance			Policies identified
	Central	Provincial	District/Municipality	
Primary care (Community health center/Puskesmas)	Healthy diet and physical activity counseling	Healthy diet and physical activity counseling	Healthy diet and physical activity counseling	MOH regulation no.75/2014 on Puskesmas, MOH guidelines for NCD control in Puskesmas

Chapter 4 Discussion, Conclusion, and Recommendation

4.1 Discussion

Obesity prevalence among adults in Indonesia is rapidly increasing that creates a growing burden for people, for health care system, and societies. The determinants of adult obesity in Indonesia are more influenced by the economic, social and physical environment (upstream determinants) that subsequently shape the population eating and physical activity behavior patterns, not by individual factors such as genetic. Moreover, it is seen now that the vulnerable populations (women and low socioeconomic group) are disproportionately affected by obesity burden. This indicates that a policy approach is required to drive changes in obesogenic environmental and to address the inequality issue related to obesity.

The government through MOH has been trying to prevent obesity as part of its efforts to prevent NCDs with policies and programs. The policy prioritizes efforts to change the behavior (midstream approach) in the form of community-based intervention (i.e. integrated health post/Posbindu PTM). The objective of this program is to empower communities to actively engage in NCDs prevention efforts with health promotion and early detection. However, this program has not been optimal because the level of community participation is still low plus community primary care (Puskesmas) as the main support posbindu PTM are a lack of resources.

But earlier this year the government has shown efforts to address health problems with socioecological approaches (upstream approach). The President has launched a healthy living community movement policy (GERMAS) to address health problems with emphasis on health promotion and disease prevention involving multiple sectors in government institutions in central, province and districts/municipalities level. For the promotion of physical activity and healthy food, government use policies that affect the physical activity environment and food environment. For instance, the provision of bicycle facilities, green open space and mass transportation connectivity to encourage physical activity and increase local vegetable and fruit production to increase healthy food consumption.

Actually, this presidential decree is very important because for the first time Indonesia has a high-level regulation that can synergize various policies from various sectors in government to address public health problems. However, although this policy is very promising and positive, there are some challenges for its implementation. First, multisectoral and coordination in the government is weak. Second, the political situation in Indonesia makes the government agency vulnerable to conflicts of interest. Lastly, obesity prevention is a cross cutting issue that is also prone to policy conflict with existing policies.

Although the Indonesian government has had policies that support obesity prevention for upstream, midstream and downstream approach, these policies are not explicitly stated aim to tackle obesity in Indonesia. This makes the policy direction of preventing obesity becoming unclear. The experience of countries that have successfully implemented obesity prevention policy shows that obesity must be recognized as a national problem and then take appropriate steps to overcome it. The Brazilian government could build a strong multisector collaboration and create supporting policies after obesity in the set as a national issue. Likewise, the Mexican government could develop strong evidence-based policies and gained support from many stakeholders for controversial policies such as SSB taxes after obesity was recognized as a national problem.

To develop an obesity prevention, need a supporting evidence. Studies on obesity prevention intervention showed that there are no one-size-fits all intervention for obesity prevention.

Evidence suggests that to curb obesity required a multi-component and comprehensive approach. There are several choices of interventions that Indonesia government can apply, but in choosing them, the government should consider the context, relevance, implementation, and sustainability of the interventions.

Local governments have an important role in preventing obesity in Indonesia because they can make policies appropriate to local circumstances. Evidence points out that some local government heads can become champions in terms of public health policy. For example, Some regions have issued local regulations governing smoke-free areas and banning cigarette advertisements. However, most of the local governments having difficulty in making local polices due to lack of local data. They refer to national data which can represent the local situations. Besides, knowledge uptake to make policy from local government is still low.

Experience from some countries indicates that developing and implementing a comprehensive obesity prevention policy needs to be based on reliable evidence and collaboration from multisector. Obesity prevention is a cross cutting issue involving many parties with different interests that can raise pros and cons. Having strong evidence and robust cooperation among policy proponents will make it easier to deal with the opponents (in most cases is the industry). Building coalitions from various stakeholders should be initiated by the government first and then all stakeholders from the people, civil society, private sectors, and academia.

This study has attempted to systematically identify areas for obesity prevention policy action in Indonesia and identify the policy gaps, barriers and opportunities using the Obesity Policy Action framework. However, this study also has several limitations. This study did not explore in depth the other dimensions in policy analysis namely the cost, feasibility and unintended effects of obesity prevention policy.

4.2 Conclusion

Adult obesity in Indonesia is a serious public health problem that needs to be addressed by a comprehensive policy approach. Indonesia now has policies that prevent obesity that target determinants in the upstream, midstream and downstream. However, these policies have not been framed as a policy to prevent obesity. This makes the direction of obesity prevention policy unclear.

The existing policies have not been implemented optimally. Midstream approach policy lacks supportive resources. Upstream approach policies are still in the early stages but has the potential to face obstacles in its implementation due to weak multisector collaboration, conflict of interests due to political situation, disconnected policy between central with local government and policy conflicts

4.3. Recommendations

In order to curb the obesity pandemic in Indonesia, this study purpose several recommendations for government:

1. Expand the routine surveillance of obesity determinants in community
MOH has conducted a national survey (Riskesdas) on obesity determinants in 2007, 2010 and 2013. The results of Riskesdas are significant for the central government to establish policies and strategies at the national level.
But to be able to make policy at the local government level, need accurate and timely knowledge/data of local obesity-related conditions and trends over time because they are necessary for planning and managing obesity prevention actions in

the community.

2. Research

Strengthen the research on social determinants of health and research on policy to reduce obesity burden and obesity inequalities. Research is needed particularly to find innovative strategies for preventing obesity in the disadvantaged population. Research should involve disciplines other than public health.

3. Form a task force

A task force is needed in developing policy recommendations and a road map for tackling obesity. A road map is essential for a multi-sector approach strategy such as obesity prevention. A road map can be a powerful tool to attain consensus from various stakeholders on obesity policy implementation as well as communicating plans and coordinating resources among stakeholders. Local governments should be encouraged to create a local road map for obesity prevention.

4. Strengthening the implementation of health in all policy approach

Since obesity prevention involving different sectors, public health sectors need to perform collaborative approach by incorporating health considerations (i.e. obesity) into decision-making across sectors and policy areas in order to advance a comprehensive approach to obesity prevention.

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