gain
Global Alliance for Improved Nutrition

LANDSCAPE REPORT ON

ADOLESCENT AND MATERNAL NUTRITION IN INDONESIA

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EXECUTIVE SUMMARY

Indonesia still faces a large malnutrition burden and over one-third of underfives are stunted. While contributing to improved complementary feeding practices and access to nutritious complementary foods, GAIN sees the importance of intervening earlier in the lifecycle: during pregnancy or even before conception. Poor pregnancy outcomes are associated with pre-conceptual anemia and young age, which is why adolescents are included in this report.

Indonesian women generally don't get pregnant until they are married and the median age of marriage is 20 years. Undernutrition is common: 25% of adult women is stunted, 20% of non-pregnant and 25% or pregnant women are undernourished. A quarter of non-pregnant women and over a third of pregnant women are anemic. Among adolescent girls, prevalence ranges from 22 to 44%.

The Indonesian habitual diet is high in carbohydrates and low in animal-source foods. Nutrition is very much associated with quantity of food, rather than with quality. The main sources of protein are tofu/tempe and eggs. Pregnant women tend to reduce the amount of calories they consume but it is not clear whether this is based on food-taboos or on food availability issues. Many studies find the diet of pregnant women to be deficient in iron and calcium, in addition to other nutrients. Over one third of the population of East Java province is considered food insecure, with regard to access and utilization. There is no evidence of gender bias in intra-household food allocation, and indeed most women are empowered to make decisions about health and household expenditures. This does not mean there is gender equality. Married women are less often employed and are paid less than men. Domestic violence is considered acceptable by 40% of married women and 22% of married men.

Coverage of ANC is high and mostly obtained from the midwife (88%) at her private practice (63%). However, about 20% of women only seek ANC when they are in the second trimester. Iron tablets are rarely consumed for the full 90 days of the government program due to lack of awareness of the dangers of anemia, the importance of the iron tablets, the side effects and how to overcome them. Information materials and counseling skills of health professionals are in need of improvement. Over 90% of births is assisted by a health professional, mostly a midwife.

About 2/3 of the urban and half the rural population has access to improved sanitation. However the habit of handwashing with soap is not widespread: less than 50% wash their hands at all necessary moments.
School enrolment in East Java is high: over 60% of adolescents 16-18 years old are still in school. However there are large differences between the districts of interest (43% in Malang and 80% in Sidoarjo). Efforts to keep girls in school will increase their access to information and delay first marriage.

Fortified foods for pregnant women, and in particular non pregnant women are very rare. Powdered milk products are the only commercial option available to women (whether pregnant or not), while the government provides fortified sandwich biscuits to malnourished pregnant women only. Vitamins and minerals are considered healthy and nutritious and there is a potential market for fortified products for these groups. Currently no legislation is in place to regulate fortified products.

Channels to reach adolescent girls include schools, factories, television and cell phones. Adult women are easily reached through existing groups (savings groups, prayer groups), television and cell phones. Where appropriate also through factories or other workplaces. The health system is most suitable to reach married women, although the government has set up adolescent-friendly health centers.

Gaps in the knowledge include: actual nutrition intake and attitudes towards nutrition and reproductive health, actual activity patterns/most appropriate channels, local beliefs related to food in and around pregnancy, to what extent dietary behavior is related to beliefs or to food security issues. These issues should be addressed in in-depth formative research.

GLOSSARY[1]

Adolescence: period in human growth and development that occurs after childhood and before adulthood, from ages 10 to19 (WHO 1986).

Adolescent-friendly Health Services: Health services suitable for adolescents: easily accessed with adjusted operating hours, providing affordable services that appeal to young people. They are easily accessed and open at times when adolescents can use them, and provide services at affordable prices (if needed for free). Equally important is that they appeal to young clients and are delivered using a style that is acceptable to them (WHO 2006)

Anemia: Characterized by reduction in hemoglobin levels or red blood cells that impairs the ability to supply oxygen to the body's tissues, anemia is caused by inadequate intake and/or poor absorption of iron, folate, vitamin B12 and other nutrients. It is also caused by infectious diseases such as malaria, hookworm infestation and schistosomiasis; and genetic diseases. Women and children are high-risk populations, including adolescent girls. Clinical signs include fatigue, pallor (paleness), breathlessness and headaches.

Arisan: 'Savings group'

Body mass index (BMI): Defined as an individual's body mass (in kilograms) divided by height (in meters squared): BMI units = kg/m^2. Acute malnutrition in adults is assessed using BMI. In Asia, a BMI of at least 18.5 is considered normal, while a lower BMI is indicative of undernutrition. A BMI of more than 25 indicates overweight and more than 30 indicates obesity. For adolescents, a BMI $<15^{th}$ percentile of what is normal for their age indicates undernutrition, $>85^{th}$ percentile indicates overweight and $>95^{th}$ percentile obesity. (WHO 1995)

Double burden of malnutrition: The coexistence of undernutrition and overweight within a household.

First 1,000 days: From a life-cycle perspective, the most crucial time to meet a child's nutritional requirements is in the 1,000 days including the period of pregnancy and ending with the child's second birthday. During this time, the child has increased nutritional needs to support rapid growth and development, is more susceptible to infections, has heightened sensitivity to biological programming, and is totally dependent on others for nutrition, care and social interactions. (UNICEF 2013)

Food fortification: The addition of micronutrients to a food during or after processing to amounts greater than were present in the original food product. This is also known as enrichment.

Iodine deficiency disorders: A range of abnormalities, which result from iodine deficiency, including reduction of IQ (on average a 10 to15 per cent reduction), goiter and cretinism.

Low birth weight: A birth weight of less than 2,500 grams. This can be due to preterm birth (< 37 weeks of pregnancy), SGA or both.

Macronutrients: Fat, protein and carbohydrates that are needed for a wide range of body functions and processes.

[1] All nutrition definitions are from the UNICEF glossary unless otherwise stated. The glossary is available online at http://www.unicef. org/lac/Nutrition_Glossary_(3).pdf

Malnutrition: Malnutrition refers to both undernutrition and overnutrition. Undernutrition is indicated by stunting (shortness) and wasting (thinness), which are due to inadequate nutrient intakes, in both macronutrients such as energy, protein, or micronutrients, and can also be combined with illnesses. Overweight and obesity are referred to as 'overnutrition' and are related to the intake of too much energy in the form of fats and carbohydrates, including sugar. Micronutrient deficiencies can also occur amongst people suffering from overweight or obesity. Traditionally, undernutrition has been prevalent in developing countries while obesity was an epidemic primarily in developed countries. However, overweight and obesity have been increasing in developing and emerging countries, leading to a double burden of malnutrition. (Moench-Pfanner 2012)

Micronutrients: Essential vitamins and minerals required by the body in miniscule amounts throughout the life cycle.

Non-communicable diseases: NCDs, also known as chronic diseases, are not passed from person to person. They are of long duration and generally slow progression. The four main types of non-communicable diseases are cardiovascular diseases (like heart attacks and stroke), cancers, chronic respiratory diseases (such as chronic obstructed pulmonary disease and asthma) and diabetes. (WHO 2013)

***Pengajian*:** Qur'an recital and prayer group

***Poskesdes*:** Pos Kesehatan Desa (Village Health Post)

***Polindes*:** Pos Persalinan Desa (Village Birthing Post)

***Posyandu*:** Pos Pelayanan Terpadu (Integrated Service Post), a monthly activity at the sub-village level which is mostly used for growth monitoring although officially it also includes immunization, health education and pregnancy care

***Puskesmas*:** Pusat Kesehatan Masyarakat (Public Health Center) at the sub-district level

***Pustu*:** Puskesmas Pembantu (Sub-Public Health Center) at the sub-district or village level

Recommended daily allowance: The average daily dietary intake of nutrients that is sufficient to meet the nutrient requirements of nearly all (approximately 98 per cent of) healthy individuals in a given population. For calories, the recommended daily allowance is based on the mean for a given population.

Reference population: Also known as 'growth standards'; based on surveys of healthy children, whose measurements represent an international reference for deriving an individual's anthropometric status.

School feeding: Provision of meals or snacks to schoolchildren to improve nutrition and promote school attendance.

Small for Gestational Age: infants below the 10th centile of a birthweight-for-gestational-age, gender-specific reference population. (WHO 1995, de Onis 1996)

Stunting and chronic malnutrition: Stunting, defined as low height for age, is caused by insufficient nutrition to support the rapid growth of a child during pregnancy and during the first two years after birth. Factors such as maternal anemia, tobacco use during pregnancy and indoor air pollution can also contribute to poor fetal growth and subsequent stunting. Stunting is generally irreversible and is linked with delayed motor development, diminished intellectual functioning, reduced earnings and lower birth weights of children born to women who themselves were stunted in childhood.

Undernutrition: An insufficient intake and/or inadequate absorption of energy, protein or micronutrients that in turn leads to nutritional deficiency.

Underweight: Wasting or stunting or a combination of both, measured through the weight-for-age nutritional index.

Wasting and acute malnutrition: Wasting, measured by low weight for height, is usually a result of very low food intake and/ or disease. Children who are suffering from moderate and severe acute malnutrition require urgent treatment in order to prevent death. When compared with well-nourished children, severely malnourished children are five to 20 times more likely to die. Wasting is often used to assess the severity of emergencies because it is strongly related to mortality. (SUN 2013a)

LIST OF ABBREVIATIONS

ADB	Asian Development Bank
AFHS	Adolescent-friendly Health Services
ANC	Ante-natal Care
BCC	Behavior Change Communication
BMI	Body Mass Index
CDC	Centers for Disease Control
CF	Complementary Food
CIE	Communication, Information and Education
DHS	Demographic Health Survey
EAR	Estimated Average Requirements
FGD	Focus Group Discussion
IFA	iron folic acid
IPC	Interpersonal communication
LBW	Low Birth Weight
MCH	Mother and Child Health
MNP	Micronutrient Powder
MOH	Ministry of Health
MOR	Ministry of Religion
MUAC	Mid-upper arm circumference
NGO	Non-governmental organization
NMR	Neonatal mortality rate
PKK	Program Kesejahteraan Keluarga (women's organization)
RDA	Recommended Daily Allowance
Riskesdas	Riset Kesehatan Dasar (Basic Health Research)
SGA	Small for Gestational Age
SUN	Scaling Up Nutrition
TBA	Traditional Birth Attendant
UN	United Nations
WASH	Water Sanitation Hygiene
WFP	World Food Programme
WHO	World Health Organization
WRA	Women of Reproductive Age (in this report defined as women aged (10-44 years)

1. Background and Scope of this Report

Indonesia has the fourth largest population in the world, estimated at close to a quarter billion people (World Population Review, World Bank). Its economic development has moved it up to the ranks of lower middle-income countries (World Bank), but this does not mean there are no nutritional problems. The prevalence of stunting found in last year's Basic Health Research (Riskesdas 2013) was 37.2%, which means there has been no reduction since 2007 (Balitbangkes 2013).

Since 2009, nutrition is back on Indonesia's political agenda and improving the nutritional status of young children is one of the goals the government has set in its five-year development plan (RPJM: Rencana Pembangunan Jangka Menengah 2010-2014)[2].

Indonesia is a prominent member of the global SUN movement (SUN2013b) (locally called "Gerakan Nasional Percepatan Perbaikan Gizi (GNPPG) dalam rangka Seribu Hari Pertama Kehidupan" or "Gerakan 1000 Hari Pertama Kehidupan" (1000 HPK) for short (Bappenas 2013) and national policy is in place in the form of the Presidential Decree No 42 (2013) (Presiden Republik Indonesia 2013). This Decree covers the national strategy, target beneficiaries and program activities, as well as organizational aspects including funding. The goals of the SUN Movement are

1. Increased access to affordable nutritious food, clean water, sanitation, healthcare and social protection;
2. Optimal growth of children, demonstrated as reduced levels of stunting (low height for age) and wasting (low weight for height);
3. Improved micronutrient status, especially in women and children, demonstrated as reduced levels of micronutrient deficiency;
4. Increased adoption of practices that contribute to good nutrition (such as exclusive breastfeeding in the first six months of life)." (SUN 2012)

In an effort to contribute to the reduction of the high stunting rates in Indonesia, the Global Alliance for Improved Nutrition (GAIN) has been active in the Maternal Infant and Young Child Nutrition sphere in Indonesia since 2010. A large multi-layered project will be implemented in Sidoarjo and Malang districts in East Java province, including increased access to improved complementary foods (CF) and behavior change communication (BCC). While stunted children need urgent interventions, around half of all stunting happens before the child is even born (UN SCN 2010). Therefore, GAIN will expand its activities to include

[2] English version accessible via http://theredddesk.org/sites/default/files/rpjmn-2010-2014-english-version__20100521111052__2608__0.pdf

pregnant women and adolescent girls. As the first step in the design process of the new program activities, GAIN has requested Savica to produce a landscape report on Adolescent and Maternal Nutrition in Indonesia, with special focus on East Java province.

This report aims to answer the following questions:

1. What is known about the nutritional status of adolescent girls and pregnant women in Indonesia, with a focus on Sidoarjo and Malang districts, East Java province?
2. What is known about underlying factors of undernutrition among adolescent girls, pregnant women in Indonesia, with a focus on Sidoarjo and Malang districts, East Java province?
3. At what age do adolescent girls in Sidoarjo and Malang districts, East Java province get married and have their first child?
4. What can be found in the literature about their eating behaviors?
5. What types of nutritious products for adolescents and pregnant women are available?
6. What are potential delivery channels of behavior change messages? (e.g., arisan, pengajian, health system, education system)
7. What current interventions address undernutrition among adolescent girls and pregnant women?

Many data in Indonesia are only available at national level. It is essential to acknowledge the great diversity within the country, which spans an area as large as Europe plus the ex-USSR, due to large geographical, language, cultural, as well as huge socio-economic differences. The accelerated economic growth and development that has taken place in the last few decades has made some of these differences more striking. Wherever possible, this report focuses on the Baduta project areas of Sidoarjo and Malang districts in East Java province.

2. Nutrition in the lifecycle and the position of adolescent girls

Optimal nutrition during the first 1,000 days of a child's life, from conception to the child's second birthday, is essential to help it reach its full potential. However, throughout their life, girls and women face specific nutrition challenges. They are at a higher risk of malnutrition, not only because of inadequate food intake and care, but also because of their higher nutritional needs for iron due to menstruation, and for a range of nutrients during pregnancy and lactation. In addition, they carry the responsibility for the next generation.

Figure 1 depicts the inter-generational vicious cycle of malnutrition. Babies who are born small for gestational age (SGA) are at risk of impaired mental development and inadequate growth, particularly when caring practices are sub-optimal. Frequent infections due to poor hygiene and inappropriate complementary feeding practices leave the child stunted, both physically and mentally. Many of these children will become stunted adolescents (Aldeman&Behrman 2006), and many girls get pregnant while they are still young and have not yet reached their adult height. When they become pregnant, they tend to gain less weight (Kusin&Kardjati 1994), can't provide their fetus with adequate nutrition and therefore give birth to SGA infants with low birth weight (Tinker&Epp 2000; Kusin&Kardjati 1994) and suboptimal brain development (Victora 2008). A stunted woman (height <150 cm) is at higher risk of experiencing complications during childbirth Dumundsson 2005, Merchant 2013). According to the latest Indonesian Basic Health Research (Riskesdas

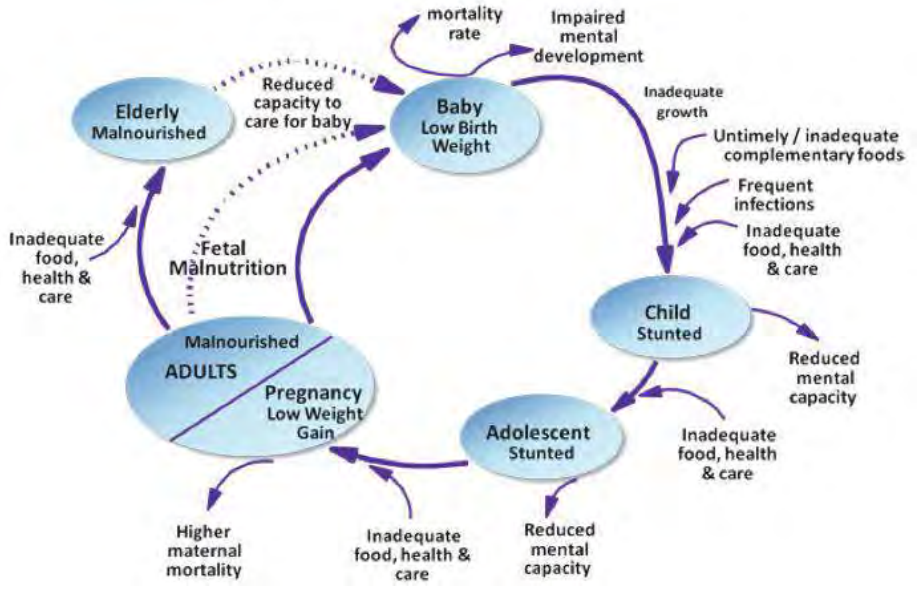


Figure 1. The intergenerational cycle of malnutrition (adapted from ACC/SCN 2000)

2013) in 2013, 10.2% of Indonesian infants are born with a low birth-weight, compared to around 7% in developed countries (UNICEF 2004). However, the actual prevalence is probably higher as 47.4% of infants are not weighed at birth (39.8% in East Java) (Riskesdas 2013), and these are likely to be among the poorest and most at risk of malnutrition.

The term "adolescent girls" is used rather loosely in this report. Adolescence is typically defined as the period beginning with the onset of biological puberty and ending with adulthood and is generally divided into two stages: early (10-14 years) and late (15-19 years) adolescence. However, for the purpose of this report, which is primarily concerned with the period just before pregnancy occurs, data on slightly older girls and young women are included as appropriate.

Adolescence is a very suitable time for nutrition interventions. The rapid growth and development that teenagers go through increase their nutritional needs, in particular for calcium (50% of adult bone mass is accumulated in adolescence) and iron (for muscle and blood volume expansion and to compensate for menstrual losses). Adolescent girls are also preparing themselves for their reproductive role. In Indonesia, many girls get married and give birth while their own bodies are still growing and maturing, causing increased nutritional demands and competition for nutrients between the fetus and its still developing young mother. The formation most body organs happen during the first trimester, and adequate nutrition of the woman prior to conception and throughout pregnancy is essential for the newborn to start life with an optimal start (UNICEF 2009). Poor pregnancy outcomes are associated with preconception anemia (Ronnenberg 2004) and young age at first pregnancy (Bhutta 2013). Where pregnancy mostly occurs in a marital relationship, such as in Indonesia (BPS/BKKBN/MOH/ICF 2013), postponing first marriage is very important (UNFPA 2012, Bhutta 2013).

In addition, during this time life-long habits are formed. Interventions during this period provide an opportunity to shape these habits in a healthier direction. Many behaviors are often rooted in childhood and adolescence (Craigie 2011), including the kind of food one eats, meal frequency (Pedersen 2013) and even how and with whom meals are consumed (Merten 2009).

The large increases in nutritional needs that occur during pregnancy make nutrition interventions difficult and often they are "too little, too late". The 2013 Lancet series clearly stressed the importance of expanding the target groups for interventions to reduce stunting to adolescent girls to maximize the impact of interventions (**figure 2**). So far largely a neglected group, not much is known about the nutritional situation, reproductive health and food habits of adolescents.

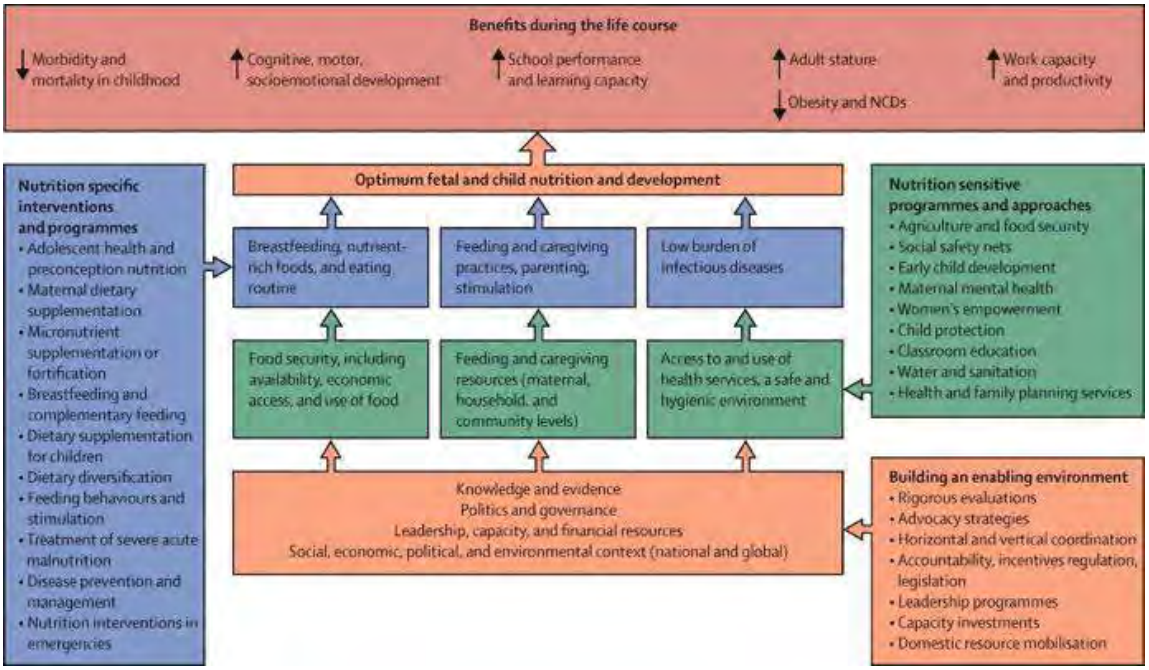


Figure 2: Lancet framework of Nutrition-specific and Nutrition-sensitive interventions (Ruel 2013)

3. Demography and Nutritional status

3.1. Demographics

Population data in Indonesia are extrapolated from the official census. The most recent one in 2010 found 237,424,363 people (BPS). Approximately 60% live on the island of Java, the most densely population island in the world.

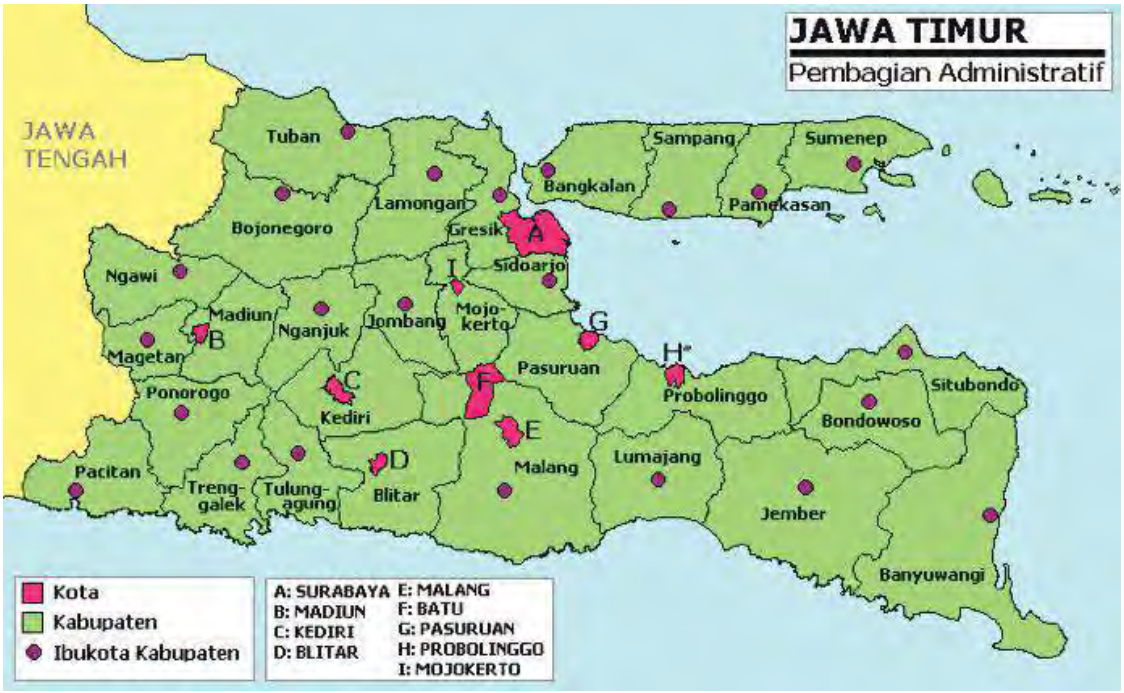


Figure 3: Map of East Java province (source: Mahardika 2013)

East Java (**figure 3**) is the second most populous province and had a population size of 37,476,757 in the 2010 census (BPS). In 2012, of a total estimated population of around 38 million, about 1.5 million were girls and women in each of the seven 5-year age groups between 10-44y (a total of approximately 10.5 million women or reproductive age (WRA)) (BPS Jatim 2013, Dinkes Jatim 2013). The districts of Malang[3] and Sidoarjo had estimated populations of 2,480,790 and 1,968,936, respectively, with about 196,000 teenage girls and 670,000 WRA in Malang and 217,000 teenage girls and 605,000 WRA in Sidoarjo.

[3] Note that there is also a city called Malang, which is a separate administrative unit from Malang district

According to data from the Provincial Health Office (Dinkes Jatim 2013a), in 2012, 679,460 women in East Java were pregnant, of whom 45,387 in Malang and 37,126 in Sidoarjo district. 84.4% had at least 4 ANC visits (80.9% in Sidoarjo and 94.6% in Malang) (Dinkes Jatim 2013). A total of 601,266 infants were born in East Java in the same year, 587,378 of those were livebirths. In Malang district there were 40,792 livebirths and in Sidoarjo 30,123 (Dinkes Jatim 2013) (table 1).

Table 1. Selected demographic indicators in East Java province, Malang and Sidoarjo districts (2012 data; source: Dinkes Jatim 2013)

	Malang	Sidoarjo	East Java
Sub-districts	33	18	662
Health Centers	39	26	960
Total population	2,487,120	2,024,678	38,052,950
Households (n)	702677	454,692	10,946,320
Persons/household	3.54	4.45	3.48
Girls 10-19y	196,321	160,531	3,047,844
Women 20-24y	90,840	81,315	1,444,438
Women 25-29y	94,098	88,753	1,502,092
Women 30-34y	96,631	95,516	1,547,163
Infant mortality (n)	199	314	5904
Under-5 mortality (n)	4	21	430
Pregnant women	45,387	37,126	679,460
ANC 4x	94.6%	80.9%	84.4%
Iron folate 30 tabs	92.4	81.5	87.7
Iron folate 90 tabs	89	75.8	81.8
Delivery assisted health professional	93.1	84.9	89.1
Vitamin A Capsule post-partum	91.5	75.5	82.5
Infant weighed at birth	71.2	59.6	72.4
Livebirths	40,792	30,123	597,378
Stillbirths	63	85	3,888
Total births	40,855	30,208	601,266

In Indonesia, the median age at first marriage among ever married women aged 20-49y is 19.9 years, and this is inversely associated with poverty and lack of education (BPS/BKKBN/MOH/ICF 2013). As Indonesian women generally have their first child after they are married, most children are born of women aged 25-29 years old (BPS/BKKBN/MOH/ICF 2013). The median age at first birth is 22.0 years, and poorer and less educated women have their first child at a younger age than more affluent and better-educated women (BPS/BKKBN/MOH/ICF 2013).

The vast majority of Indonesian women, based on religious beliefs and traditional value, postpone their first sexual intercourse until after marriage (BPS/BKKBN/MOH/ICF 2013). If however a girl becomes pregnant before she is married,

whether in a mutually consenting relationship or through rape, her family will seek marriage with the boy or man involved. Children born out of wedlock face many problems in life, not only social stigma but also administratively (birth certificate, identity card etc), so this is something to be avoided at all cost. Abortion is illegal in Indonesia, and therefore either dangerous or expensive – and often both.

A huge social burden is placed on girls who get pregnant without being married, while often the boys walk away (literally). For instance, a pregnant schoolgirl will be expelled from most schools (including state-run school), even if she is on the verge of graduation, leaving her with no diploma and less chances in life for herself and her child.

Therefore, reaching girls before they get married is crucial, not only to delay first pregnancy (and marriage – or the other way around) but also to ensure they are reached before they get pregnant.

Pregnancy outcomes

A number of complications and negative pregnancy outcomes can occur. Death of the mother during pregnancy, delivery or during the first six weeks post-partum (maternal mortality), pre-term delivery (at a pregnancy duration of less than 37 weeks), intra-uterine growth failure which can lead to low birth weight (infant born weighing less than 2,500 grams) and babies that are small (<10th percentile) for gestational age, still-births and neonatal deaths.

Maternal mortality is a difficult indicator to measure because the denominator is so large and because death registration systems are not fully functional. Estimated maternal mortality cases and rates from 2012 (Dinkes Jatim 2013) are shown in **table 2**

Table 2. Maternal mortality in East Java

	# Livebirths	# Maternal deaths				
		During pregnancy	During delivery	< 6 weeks post-partum	Total	Maternal Mortality Rate (MMR)
East Java Province	597,378	115	148	319	582	97
Malang	40,792	1	8	16	25	61
Sidoarjo	30,123	6	2	21	29	96

Pre-term delivery

Data on low birth-weight naturally only cover those infants that were weighed at birth. Thus, deliveries without a health professional present are not included in the estimates although these children are often more at risk as the main reason for delivery without a health professional are related to poverty (lack of access). In East Java, 3.3% of the infants that were weighed at birth had a birth weight <2500g (3.4% in Malang and 1.6% in Sidoarjo) (Dinkes Jatim 2013).

Table 3: Estimates for birth outcomes in Indonesia in 2010 (adapted from Lee 2013)

	Numbers	Percentage
Live births	4,400,000	
Low birth weight	485,300	11.0
Preterm births	675,700	15.4
Term SGA babies	891,600	20.3
Pre-term SGA babies	150,700	3.4
SGA births (uncertainty interval)	1,042,300 (814,800–1,309,300)	23.7

Lee et al (2013) estimated a national neonatal mortality rate (NMR) of 15.9/1000 live births. They estimated the prevalence of SGA in Indonesia at 23.8% (about the same as Nigeria and worse than the Congo and China).

A study in Lombok (Sebayang 2012) on a cohort of 14,040 singleton births found that only 33% of LBW, 13% of SGA and 13% of preterm births were preventable through improving women's education, maternal nutrition, household wealth and family planning.

3.2. Socio-economic status

Socio-economic status in Indonesia is usually expressed through quintiles of an index of possession of certain items (house, car, motorcycle, tv, sanitation etc). However, these quintiles do not precisely contain 20% of the population (**figure 4**), for reasons outside the scope of this report.

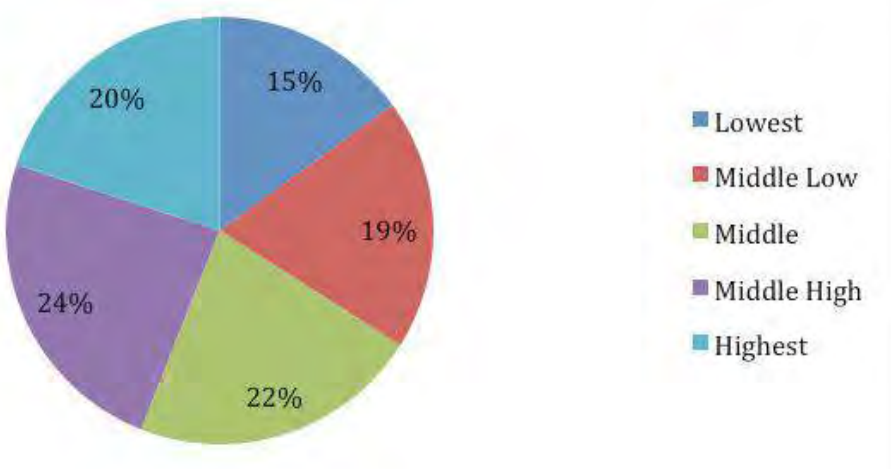


Figure 4: Distribution of possession quintiles in the Indonesian population (Riskesdas 2013).

Not surprisingly, most wealth is concentrated in urban areas and a larger proportion of the poor live in rural areas (**figure 5**)

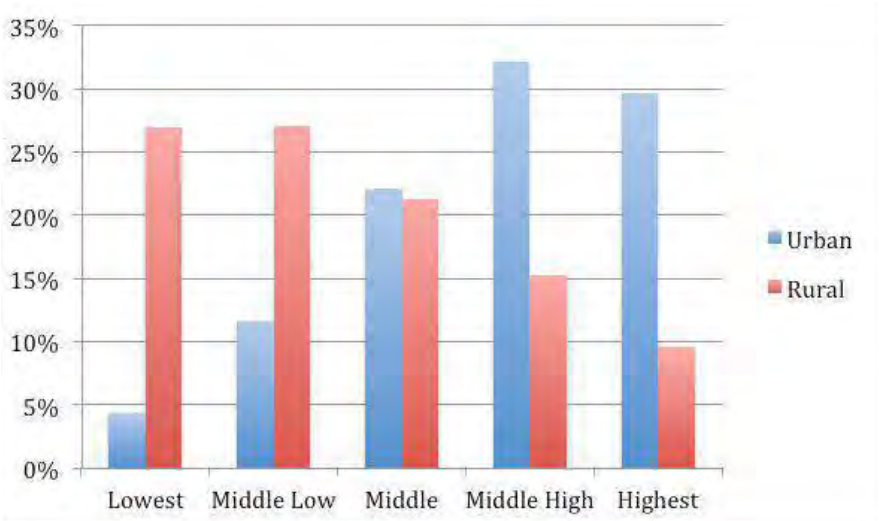


Figure 5: Quintiles of possession index in Indonesia (data source: Riskesdas 2013)

Every year the Governor sets the minimum monthly wage for each district. For 2014, in Sidoarjo this is Rp 2,190,000 (~USD200) and in Malang 1,635,000 (~USD150) (Jatimprov 2013). However, as many people work in non-formal jobs, this is not guaranteed for everyone and it is only enforced for civil servants and large companies.

3.3. Nutritional status of women and adolescent girls in Indonesia

Stunting

Not only does stunting occur during the first 1000 days, but also many Indonesian adolescents do not have the opportunity to catch up during their growth spurt. The height deficiency of Indonesian 18-year old girls is 9.8 cm, compared to well-nourished reference populations (figure 6) (Balitbangkes 2013).

Among 16-18 year olds of both sexes in East Java, 31.2% (which is the same as national level) is stunted but girls are less stunted (25.1%) than boys (37.6%). Older urban adolescents are less (25.8%) stunted than their rural peers (37.2%) (Balitbangkes 2013).

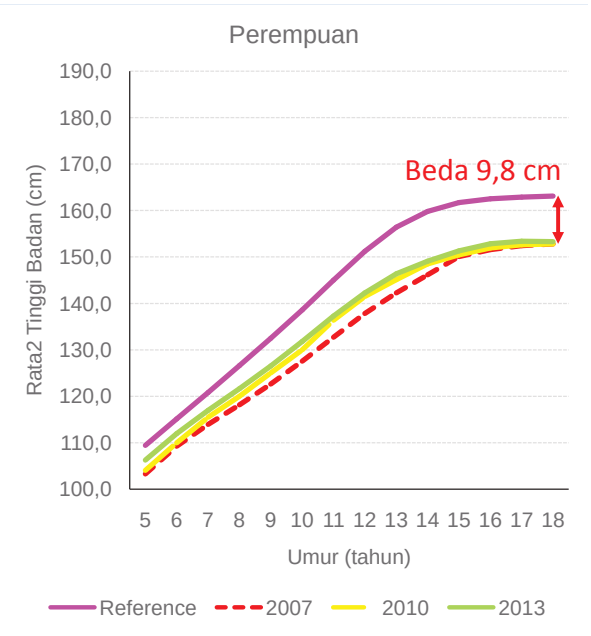


Figure 6: Mean height by age of Indonesian girls compared to reference population (data Riskesdas 2007-2013)

Table 4: BMI Cut-offs for undernutrition (15th percentile) for female adolescents (WHO 1995)

Age	15th percentile / underweight
10	15.1
11	15.5
12	16.0
13	16.4
14	16.8
15	17.2
16	17.5
17	17.8
18	18.0
19	18.2
20-24	18.6

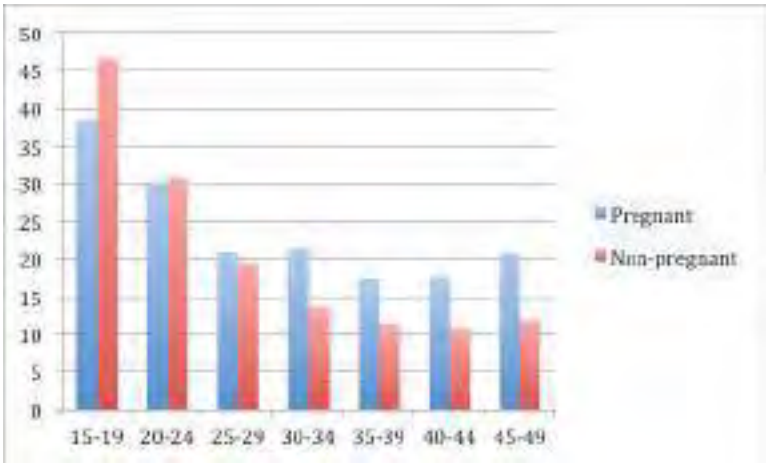
Underweight

Underweight (thinness) occurs when nutrient intake is not sufficient to support the body's needs. For non-pregnant individuals this can be determined using age-specific body mass index (BMI) (**table 4**). Because BMI is not a useful indicator in pregnancy, mid-upper arm circumference (MUAC) is used. A MUAC <23.5cm is considered a sign of undernutrition and a risk factor during pregnancy. Overall in Indonesia, % low MUAC is 24.2% among pregnant women and 20.8% among non-pregnant women (29.8% and 21.8%, respectively, in East Java). **Table 5** shows mean MUAC by age and pregnancy status, while the prevalence of thinness among pregnant and non-pregnant women by age is depicted in **figure 7**. Mean MUAC increases with age and is similar among pregnant and non-pregnant women. However, the prevalence of thinness based on low MUAC, is much higher among non-pregnant adolescents than among those who are pregnant. Among pregnant women 25 years or older, the prevalence of thinness increases and is significantly higher than among their non-pregnant peers.

Table 5: Mean MUAC (cm) of pregnant and non-pregnant Indonesian women by age (Riskesdas 2013)

Age (y)	Mean MUAC ± SD (cm)	
	Pregnant	Non Pregnant
15	23.8 ± 2.7	23.4 ± 3.0
16	23.6 ± 2.7	23.0 ± 3.0
17	24.0 ± 2.5	23.4 ± 3.0
18	24.1 ± 3.0	24.1 ± 3.1
19	24.2 ± 2.3	24.3 ± 3.2
20	24.5 ± 3.3	24.5 ± 3.1
21	24.3 ± 3.2	24.9 ± 3.4
22	25.4 ± 3.3	25.2 ± 3.4
23	24.8 ± 2.8	25.3 ± 3.3
24	25.4 ± 3.3	25.6 ± 3.4
25	25.4 ± 3.3	25.4 ± 3.6

Figure 7: Prevalence of thinness (MUAC <23.5 cm) among pregnant and non-pregnant Indonesian women by age (Riskesdas 2013)



Thinness is strongly correlated with socio-economic factors such as lower education and lower wealth quintile, while more rural women are thin compared to their urban counterparts (22.6% and 22.4% for pregnant women; 22.7% and 19.1% for non-pregnant women). Among all Indonesian adolescent girls 9.1% is thin. This is inversely related to education and wealth, but not much different in urban and rural areas.

Anemia and other micronutrient deficiencies

There is a huge gap in the knowledge on nutritional deficiencies among teenagers and pregnant women, except for anemia. The WHO definition of anemia among non-pregnant girls and women aged ≥10 years is Hb <120g/L and for pregnant women <110g/L (WHO). The Basic Health Survey in 2013 found that 37.1% of pregnant women in Indonesia are anemic (urban 36.4%; rural 37.8%), compared to 22.7% among non-pregnant women. Among adolescents, smaller studies have found prevalences ranging from 22-44% (Permaesih 2003, Angeles-Agdeppa 1997, Soekarjo 2001). These all exceed the WHO cut-off for a public health problem, which is an anemia prevalence of 15% (UNICEF/UNU/WHO/MI 1998).

In 2003, WHO estimated that 17.1% of pregnant women were vitamin A deficient (WHO 2009). Vitamin A deficiency (defined as serum retinol concentration <20 µg/dL or 0.7µmol/L) was found among 5.3% of non-lactating non-pregnant and 10% of pregnant women in a recent study in West Java (Sandjaja 2014). These prevalences are likely to be higher among poorer women, who spend more money on rice and less on vegetable and animal foods (Campbell 2009). In a recent review (WHO 2009), 17.1% of pregnant women in Indonesia were estimated to have vitamin A deficiency. Older studies, also in West Java, found 36-45% of pregnant women had low serum ferritin (<12mcg/l) and 13-17% had low serum retinol concentrations (<0.7mcmol/l) (Muslimatun 2001), while 18% of lactating women were marginally vitamin A deficient, and 25% were zinc deficient (Dijkhuizen 2001).

4. Underlying factors of Undernutrition

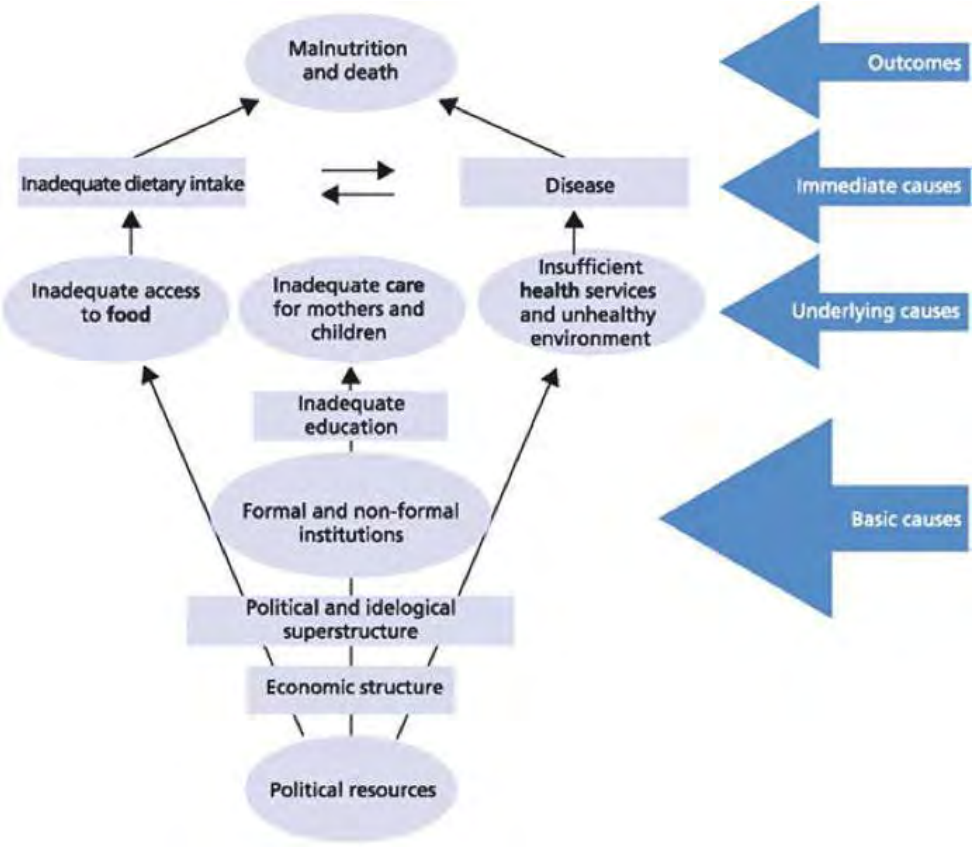


Figure 8: UNICEF Framework of Malnutrition (source: FAO)

Undernutrition is caused by inadequate intake of nutritious foods and increased needs due to disease (FAO). The increased nutritional needs due to growth and maturation they go through make it more difficult to maintain adequate intake. Underlying causes include inadequate care practices, food insecurity as well as lack of access to water, sanitation and health services. Basic causes for undernutrition among adolescent girls and women include poverty, lack of knowledge through insufficient education and gender-bias.

4.1. *Eating behaviors among adolescents and pregnant women*

Eating habits.

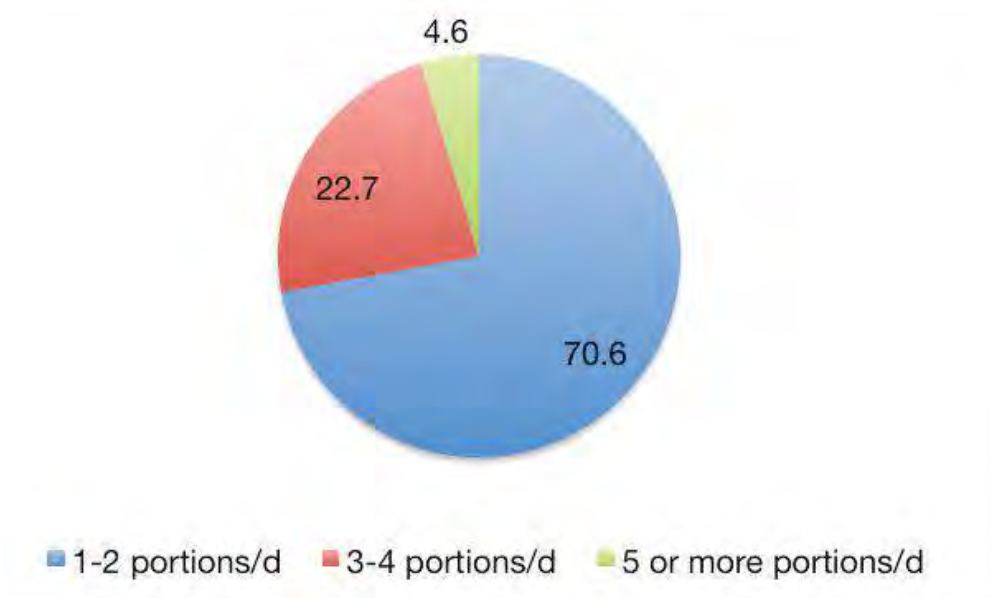
A standard meal for Indonesians from lower income groups consists of plain steamed rice served with chili and some side dish (often tofu or tempe, or fish). Any food that does not contain rice is not considered a meal but a snack. Snacking is a strong and pervasive habit among all age groups in Indonesia. Ranging from the traditional cracker (krupuk) to increasingly popular Western style processed snacks (Austrade 2010). Fast food is also immensely popular among all age groups, with KFC and McDonald's as leading brands.

The main source of dietary energy is rice and the belief that "if you haven't eaten rice you haven't eaten" is very strong and pervasive. The East Javanese diet – in contrast to the diet in West Java for instance – is very low on vegetables. In particular among people of Madurese ethnicity, vegetables are not popular as they are considered food for goats. Main protein sources for the poor are soy products (tofu and tempe) and eggs. Chicken is the most consumed meat as it is the least expensive. Other sources of animal protein include fish and seafood, beef and goat's meat, including offal. Dietary diversity among the lower socio-economic segments is low. Based on observation, a typical daily menu would contain rice, chili, soy sauce, crackers, tofu/tempe or fish and a small amount of vegetables. Fruit is expensive and is not eaten on a daily basis.

Table 6: Percentage of population in East Java that consume foods at least once per day (Riskesdas 2013)

		Notes
sweet food/drink	47.8	men more than women
salty food	24.3	no difference
oily/fatty food	49.5	more women than men
MSG	80.5	
instant noodles	6.7	66.3% consumes at least once a week
biscuits	8.3	42.9% consumes at least once a week

Fruit/vegetable consumption in East Java does not differ between genders or socio-economic classes. On average people consume 0.5 portion of fruit and 1.4 portion of vegetables per day (Riskesdas 2013).



Figures 9: Consumption of fruit and vegetables in East Java (source: Riskesdas 2013)

An old but solid study in Madura, East Java found that although food intakes of non-pregnant women were close to the RDA at 1900 kcal and 44g protein/day, during pregnancy this decreased to only 1600 kcal and 42g (75% of RDA for pregnant women). The authors concluded that this was due not only to traditional food beliefs but also to food insecurity. (Kusin&Kardjati 1994). More recently, a review of studies on adequacy of nutritional intake among Indonesian pregnant women (Hatriyanti 2012) concluded that the intake of a number of nutrients is below the Estimated Average Requirements (EAR). This was in particular true for iron and calcium, but also for energy and protein. None of the studies reviewed showed deficiency in fat or carbohydrate intake.

Food security and intra-household distribution

According to a joint Central Food Security Agency/WFP/UNICEF/ILO food and nutrition security monitoring system in 2009 (Central Food Security Agency 2009), 72% of surveyed households in East Java had access to safe water. Just over half (52%) owned land, but 71% of landowners owned less than 0.5 ha. Based on monthly expenditure, 14% and 34% were classified as poor and near poor, respectively. However, about two-thirds (67%) spent more than 65% of their expenditures on food, which is a proxy for poverty and indicative of poor access to food. Dietary recall data showed that 96% consumed an adequately diversified diet. Over one-third (36%) was vulnerable to food insecurity when assessing a combination of access and utilization. About one-fifth did not have any staple food stock. In general, urban respondents were better off than those in rural areas.

A study on double burden households (households with co-existing over- and under-nutrition) did not find any indication for intentional, structural bias in intra-household food distribution (Roemling 2012). No distinct pattern favoring men

over women, income-earners over non-income earners, or children over adults (or the other way around) was found. Thus, they concluded that dietary and lifestyle changes combined with limited nutrition and health knowledge were the underlying factors.

Fortified/functional foods

Indonesians have a strong belief that foods with added nutrients are best. Although very price-sensitive, many consumers are willing to pay more for a product with more nutrients – regardless of the actual amount of those nutrients. This creates market opportunities for fortified products (Euromonitor 2007).
Most popular fortified foods are noodles and dairy products, which contain vitamins and calcium. In (peri-)urban areas, the trend towards convenience is highly felt. While the more affluent choose to eat out and buy convenience foods, those with less disposable income are catered by traditional street carts and warung, and increasingly by fast food restaurants (Euromonitor 2009).

Food taboos

A study in Central Java (Hartini 2005) found that 26% of pregnant women avoid certain, mostly beneficial, foods due to food taboos. Rice is considered to provide strength during pregnancy and delivery. Despite their pregnancy, they were the last priority to eat, after children and husbands.
Food taboos for pregnant women in East Java include goat meat, pineapple and durian, glutinous rice (ketan), spicy foods and coffee, as well as peanuts. Post-partum women are not supposed to eat spicy foods, eggs or pindang (a type of fish). The latter two are believed to cause itch. There are no food taboos among non-pregnant women although many girls avoid foods they believe will make them fat. Adolescents consume supplements, to be healthier, gain or lose weight and to gain height.

Attitudes towards food and messages

WHO reported in 2002 that Indonesian adolescents associate “nutrition” with “quantity of food”. Their access to information on health and nutrition, is very limited, in particular on food supplementation and fortification and they would like to know more, not from teachers, but from media and doctors. Information through mass media should be simple with easily understandable terms, appealing, interesting, with cartoon characters. Any message, including on consumption of healthy food, accompanied with parental pressure is not accepted. However, some adolescents picked up food habits from their parents, including myths (WHO 2002).

Homemade food was considered boring, and they preferred junk food, which was considered better tasting and cool, due to peer pressure and media influence. Consumption of milk (products) was low (WHO 2002).

Table 7. Some of the most popular food and supplement products by category among teenagers (Top Brand Award 2014)

Chocolate bars		
Brand	**Top Brand Index**	**Fortified**
Silver Queen	53,4%	N
Cadbury	18,4%	N
Delfi	9,0%	N
Toblerone	6,2%	N
Chunky Bar	5,3%	N
Powdered milk		
Brand	**Top Brand Index**	**Fortified**
Milo	44,2%	Y
Hilo Teen	20,3%	Y
Boneeto	8,8%	Y
Dancow	8,5%	Y
Ovaltine	8,4%	Y
Zee	7,2%	Y
Supplements		
Vitamin C		
Brand	**Top Brand Index**	**Fortified**
Vitacimin	40,2%	Y
You C1000	10,5%	Y
Vicee	9,2%	Y
CDR	7,9%	Y
Enervon-C	5,9%	Y
Redoxon	5,0%	Y
Fitkom	3,9%	Y
Food supplements		
Brand	**Top Brand Index**	**Fortified**
Curcuma Plus	27,7%	Y
Scott's Emulsion	25,7%	Y
Sakatonik	19,8%	Y
Cerebrovit X-Cel	18,7%	Y
Vitamins to increase height		
Brand	**Top Brand Index**	**Fortified**
Zevit Grow	50,9%	Y
Grow up	12,2%	Y
Tiensi	0,5%	Y

4.2. *Reproductive health system*

Family planning is not available to unmarried women although condoms are freely sold in minimarkets and supermarkets (but the authors have never actually seen anyone purchasing them!). Unmarried women and girls who want to prevent pregnancy are thus fully dependent on the willingness of their partner to use a condom.

Women in East Java mostly seek ANC from midwives (88.1% and higher in rural areas). The most common place they go for ANC is at the private practice of the midwife (62.8%), followed by the village health post (9.0%) and the posyandu (5.2%) (although these latter two are more common in rural areas). For over 2/3 of East Javanese women the highest qualified health professional at their delivery is a midwife, 1/5 go to a specialist and 5% seek help from a traditional birth attendant (TBA) only, although combinations are common as well. Slightly less than 10% of deliveries in East Java do not take place in a health facility but in the own home or other location. Nationwide this is almost 30% and there is a strong inverse relation with socio-economic status (Riskesdas 2013).

4.3. *Teenage marriage and pregnancy*

Table 8. Age at first marriage among Indonesian women compared to men (BPS/BKKBN/MOH/ICF 2013).

Background Characteristics	**Ever-married women age**		**Married men age**
	20-49	25-49	25-54
Residence			
Urban		21.2	
Rural	19	19	23.4
Education			
No education	17.1	17	21.8
Some primary	17.4	17.3	21.9
Completed primary	18.3	18.3	23
Some secondary	19.4	19.6	23.8
Completed secondary		22.6	
Wealth quintile			
Lowest	18.9	18.9	23.4
Second	19.2	19.2	23.7
Middle	19.5	19.5	23.7
Fourth		20.4	24.6
Highest		22.2	
Total	19.9	20.1	24.3

In Indonesia, the mean age at first marriage for girls is 20 years, about 4 years earlier than men. Nationwide, 46.7% of the girls get married during their teenage years, 4.8% even before their 15th birthday, despite the law that dictates 16 as the minimum age for a girl to marry[4]. The situation in East Java is slightly worse, with 50.6% and 6.1% respectively (Balitbangkes 2013). Poverty and low educational levels are associated with higher proportions of teenage marriage. Therefore it is not surprising that a considerable proportion of women give birth before they turn 20 years old. About one in ten women aged 20-24 gave birth before age 20.[5]

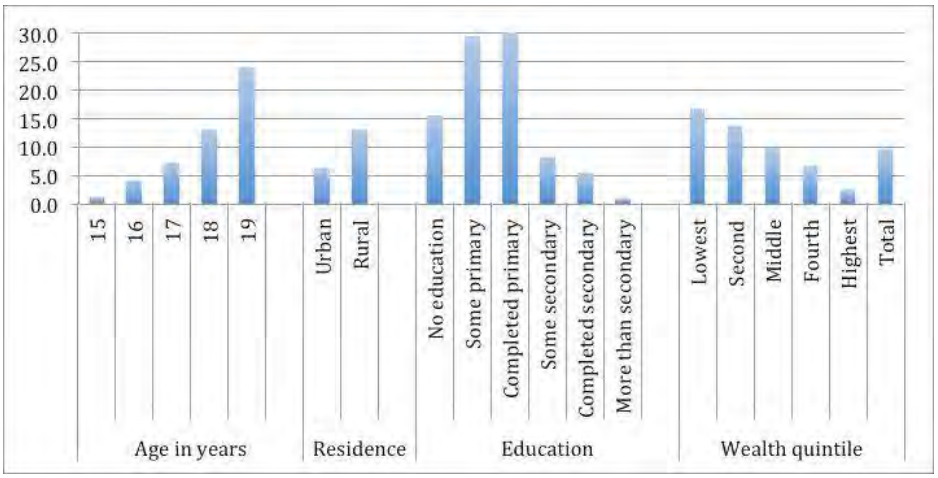


Figure 10: Percentage of teenage girls who have begun childbearing (BPS/BKKBN/MOH/ICF 2013)

The percentage of teenage girls who have begun childbearing (i.e., either have a child or are pregnant) is depicted in figure 9. A quarter of 19-year-old girls has started childbearing, almost twice as many in rural compared to urban areas. Lower education and poverty are related to early marriage.

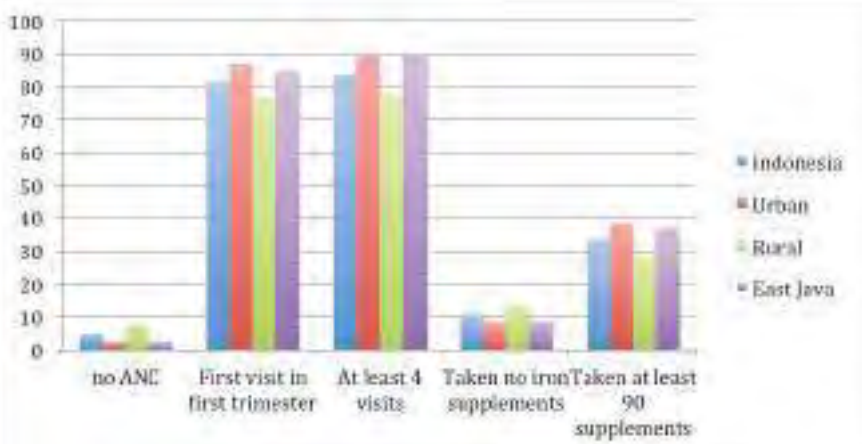


Figure 11: ANC (Riskesdas 2013)

[4] Efforts are underway to change this law to at least 18 years.
[5] Analysis of available country data on http://www.unicef.org/statistics/index_24183.html, which seems to come from DHS surveys from 2002-2012. (in references as UNICEF 2013)

Most pregnant women seek antenatal care (ANC). However, about 1 in 5 pregnant women does not do so until she is in the second trimester of pregnancy, and a similar proportion does not have the required minimum of 4 ANC contacts. Although iron-folate tablets (at least 90 tablets during pregnancy) are a government program, only about a third of women actually consumes that many.

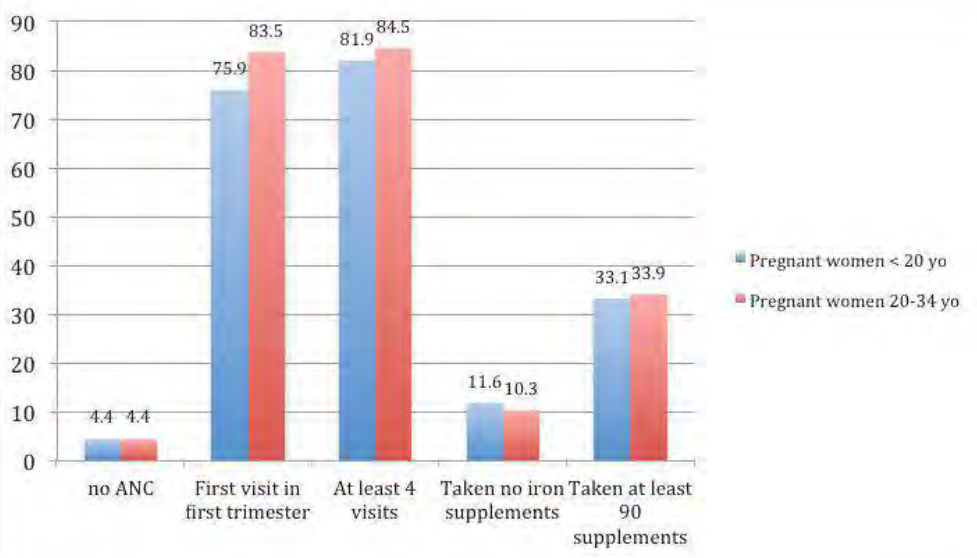


Figure 12: ANC by age of the pregnant woman (Riskesdas 2013)

Younger pregnant women are not only at increased risk for physiological reasons, but they also tend to have less ANC contacts and take less iron-folate tablets than women aged 20 or more.

Compliance with iron folate tablets

Every pregnant women in Indonesia should take at least 90 iron-folate tablets during her pregnancy. These are distributed through the health system at the *Puskesmas* and by government-paid and private-practice midwives. (Those who can afford to see an obstetrician are usually prescribed multi-micronutrient capsules). The government tablets are packed in sachets with 30 tablets containing 60 mg iron (as iron sulfate) and 500 mcg folic acid. The government system only tracks distribution rates. Although in some areas there are issues with stocks, this is not likely to be the case in peri-urban Sidoarjo. More important reasons for non-compliance as consistently found in smaller studies (Kompas 2012) are side effects (nausea, vomiting and constipation). Health professionals in Indonesia are not particularly trained in communication skills and they are reluctant to inform patients of side effects of any intervention, lest they scare them out of compliance. While in fact the opposite is happening: a well-informed pregnant woman will not so easily be put of by the side effects (because she is mentally prepared that they might happen) and find ways to

cope with the side effects, which may include stopping to take the tablets for a few days until side effects subside and then continue, rather than stopping altogether.

The generic tablets distributed by the government since the 1970s are not of very good quality and cause more side effects than more expensive ones (which are better coated, use other iron compounds with less side effects, are packed in a way that better ensures shelf life). Currently the government is working on changing the tablets (use iron fumarate instead of iron sulphate) and have them packed in blister packs (personal communication from several MOH staff), in an effort to increase compliance. There is no special counseling on the importance of taking the tablets and the risks of not doing so. The "Buku KIA" (MCH Book) that every pregnant woman who visits a government health facility receives, only mentions that "iron tablets are not dangerous for your baby". This could and should be changed to something more informative such as "Iron tablets will help you to not be anemic. If you are anemic during pregnancy your baby runs the risk of become malnourished, stunted, have less cognitive development etc".

The importance of detailed information was confirmed by a small study (n=100) in Surabaya (Adawiyani 2013), which found that providing more detailed information about the importance of the iron tablets, including a booklet to take home, increased compliance based on pill count from 67% to 94%.

It is not directly known why a minority of women (10%) doesn't ever take iron tablets. However, it can be deduced from the available data that about half of these don't seek ANC at all. The other half either doesn't receive the tablets or doesn't take them – both of which are related to a lack of understanding of the importance of these tablets.

There is widespread confusion about the concept of anemia as "kurang darah" (or "not enough blood") and low blood pressure as "low blood". Not only the community but also some health providers are confused (Galloway et al). This is worsened by the fact that the government iron-folate tablets are called "Tablet Tambah Darah" ("Tablets to Increase Blood"). Thus, consumption of iron supplements is understood to "increase the blood" and therefore is associated with hypertension (Galloway et al). Understanding of anemia as a dangerous or serious health problem is low and the signs and symptoms of anemia are considered normal in pregnancy (Galloway et al). Pregnant mothers are concerned that taking iron or vitamin supplements (which are often promoted to increase appetite) will lead to increased birthweight and a difficult delivery (Galloway et al).

4.4. Sanitation and healthy lifestyle

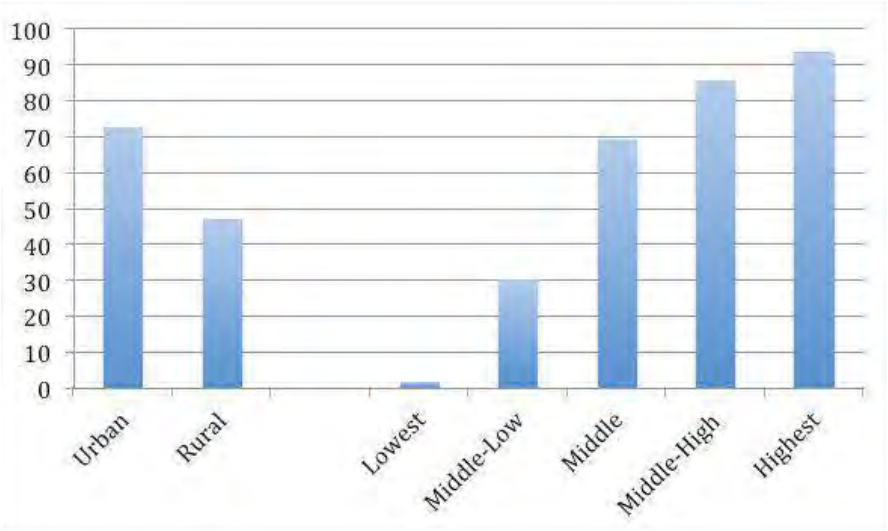


Figure 13: Proportion of households with access to improved sanitation (Balitbangkes 2013).

Water and sanitation are essential for good nutritional status. In urban areas, almost three quarters of households have access to improved sanitation, but this is the case for less than half the rural households.

In 2013, 77% of people in East Java defecated in a latrine (compared to 68.7% in 2007) (Riskesdas 2013). The habit of hand washing with soap is not yet common although in this aspect there has also been improvement: 48.1% (compared to 26.3% in 2007) washed their hands at critical moments (before handling and cooking food, before eating, after defecating, after cleaning a child's feces, after touching an animal or garbage).

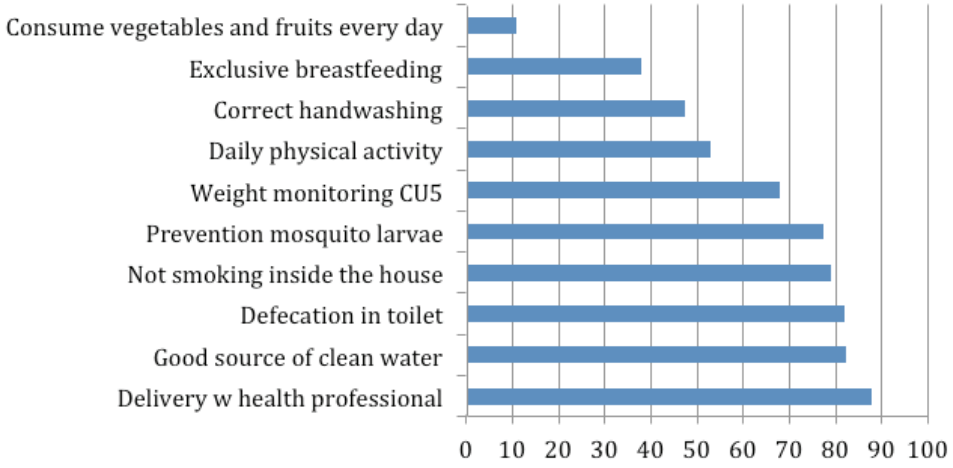


Figure 14: Proportion of Indonesian households with clean and healthy lifestyles (Balitbangkes 2013)

The Indonesian government promotes a so-called clean and healthy lifestyle, which consists of 10 separate aspects. Figure 14 shows the proportion of Indonesian households that display each of these aspects. In East Java, only 46.1% qualify for a clean and healthy lifestyle, but both Malang and Sidoarjo are better off at 57.3% and 56.9%, respectively (Dinkes Jatim 2013a).

4.5. Education

Basic education (defined as 9 years of schooling or primary plus junior high school) is officially compulsory in Indonesia. There are no tuition fees in state-owned schools although there are numerous other fees that parents have to pay (uniforms, exams, books, extra tuition for exams, and so-called "voluntary" contributions), which may pose insurmountable hurdles to education for the poorer segments of society.

Still, school enrolment for the first nine years is over 90% nation-wide (BPS) and slightly higher in East Java. In East Java, 74% of all adolescents are still in school (BPS Jatim 2013). Among older children however, only 63.5% nationally attend school (62.1% in East Java) (BPS Jatim 2012). The difference between districts is quite large: only 42.7% of 16-18 year old girls Malang compared to 79.7 in Sidoarjo are still in school.

With the lower school enrolment rates and higher rates of teenage marriage in rural areas, efforts to keep girls in school longer are essential. This will decrease the gender gap and empower girls, while exposing them to knowledge. If girls are pulled out from school prematurely, they miss out on all education programs provided through the schools. Keeping them in school will delay marriage and childbearing, reduce the risk of delivering a malnourished child, and it provides opportunities for nutrition education and programs to prevent and treat undernutrition in today's adolescents as well as future generations (Semba 2008, Ruel 2013).

School meals

Indonesia has its own program for "Supplementary Food for School Children" but this is limited to primary schools. Funded by the district budgets, mothers provide a snack for the children with a minimal amount of calories and protein. These snacks are not fortified and usually contain only very small amounts of micronutrients.

In effort to reach adolescents, providing high quality nutritious foods at school to improve nutritional status (Sari 2004) and motivate adolescent girls to stay in school and delay marriage, in combination with nutrition messages could be a viable approach. CDC has issued guidelines for effective school programs (CDC).

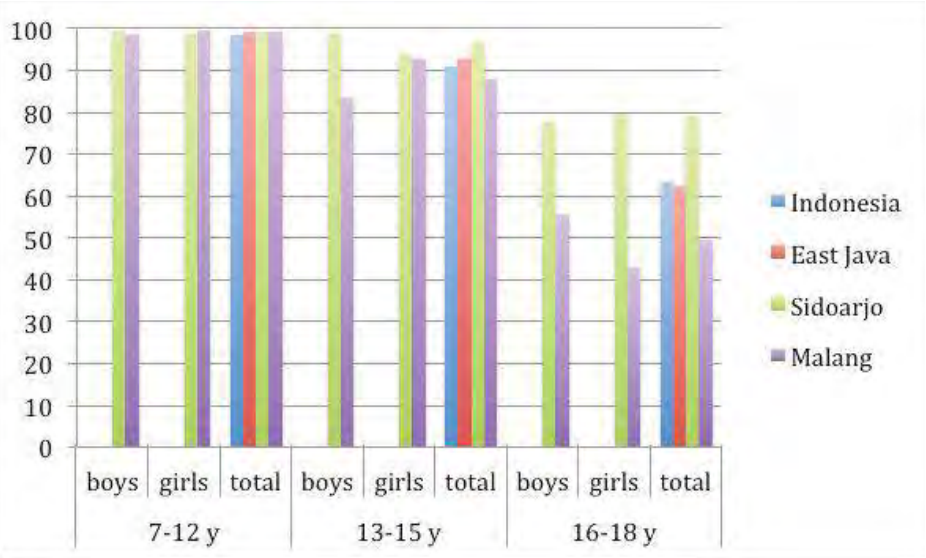


Figure 15: School enrolment (in percentage) by sex, age and location (BPS Jatim 2012, BPS)[6]

4.6. Women's empowerment

A study on intra-household power found that women own about half as many household assets as men (Pangaribowo 2012). When they do have control over resources, they automatically have more power and authority. This in turn is reflected in increased "human-capital enhancing expenditures such as dairy products, meat and fish, and nonfood expenditures" and a reduction in adult goods expenditures. The paper concluded that "women's social capital is closely related to women's authority within the household and may be developed through appropriate policy to strengthen women's status in intra-household power relations. Hence, promoting control over household resources by women should improve public welfare outcomes."

According to the most recent DHS (BPS/BKKBN/MOH/ICF 2013), more than 60% of married women were employed but a quarter of them were unpaid (compared to only 6% of employed men). Women generally earn less than their husbands. Most East Javanese married women make their own decisions on how to spend their earnings (72%) or decide together with their husbands (21%). And they even have a large say in how their husbands' earnings are spent: 44% decide alone and 42% decide together with the husband. Women's decision-making power of women was irrespective of age (except for teenage wives, who were less involved in decisions) or socio-economic status.

Just under half of all women aged 15-49 own a house and 41% of women own land, with the majority sharing ownership with someone else. (Interestingly, more rural and less educated women own land or a house than those with more education. This may be related to "insurance" in case she ends up alone

[6] National data for 2013, provincial data for 2012

so she will have a place to stay or land as source of income).

More than 80% of married women participate in decisions about their own health care, major household decisions, and visits to their family or relatives. However, 40% of married women agree that in some circumstances the husband is allowed to beat his wife (national: 35%) compared to "only" 22% of men (still higher than national average: 17%). In addition, 2.3% of married women who don't use contraception give as reason that their husband doesn't approve (compared to 2.0% nationally) (Riskesdas 2013).

4.7. Health system/environment

Family planning is not available to unmarried women although condoms are freely sold in minimarkets and supermarkets (but the authors have never actually seen anyone purchasing them!). Unmarried women and girls who want to prevent pregnancy are thus fully dependent on the willingness of their partner to use a condom.

Women in East Java mostly seek ANC from midwives (88.1% and higher in rural areas). The most common place they go for ANC is at the private practice of the midwife (62.8%), followed by the village health post (9.0%) and the posyandu (5.2%) (although these latter two are more common in rural areas). For over 2/3 of East Javanese women the highest qualified health professional at their delivery is a midwife, 1/5 go to a specialist and 5% seek help from a TBA only, although combinations are common as well. Slightly less than 10% of deliveries in East Java do not take place in a health facility but in the own home or other location. Nationwide this is almost 30% and there is a strong inverse relation with socio-economic status (Riskesdas 2013).

5. Nutritious products for adolescents and pregnant women in Indonesia

Theoretically, commercially available fortified foods and beverages could play a role in improving nutrient intake of adolescents. These products should have high content of micronutrients and essential fatty acids, but low in sugar, salt and saturated fat. However, to our knowledge, very few products are currently available that are specifically marketed towards adolescents. Most products are targeted either at younger children or at adults. Moreover, many of the available fortified products are essentially unhealthy snacks, high in salt, sugar and/or saturated fats, to which a small amount of micronutrients is added.

Commercial fortified foods for pregnant women are limited to fortified milk powders. The Ministry of Health distributes a fortified sandwich biscuit to pregnant women at risk of malnutrition, defined as having a MUAC <23.5 cm in certain areas (Gizi Depkes). These consist of rectangular crispy biscuits with a dense and soft layer of cream inside. The biscuits are produced by PT Tiga Pilar Sejahtera and similar biscuits are distributed by the World Food Programme (WFP).

The ingredients are: wheat flour, vegetable fat (non-hydrogenised), sugar, milk, eggs, beans/nuts, dried strawberries, vitamin and mineral premix. One portion (2 biscuits, 50g) contains 290 kcal (with 120 kcal from fat).

The biscuits are distributed through the health system at the village level (*poskesdes* = village health post / *polindes* = village birthing post / *pustu* = sub-health center), by midwives, assisted by caders (village health volunteers). Their task is to distribute the biscuits and educate the women on health and nutrition, including the need for the biscuits as additional food.

In case of insufficient supplies, targeting is focused on malnourished women from poor families.

See annex A for examples of fortified foods for adolescents and pregnant women.

Table 9: Formulation of the biscuits for malnourished pregnant women

	RDA	Content of biscuit (%)	
energy (kcal)	2160	13.4	290
fat (g)	?	22	13
protein (g)	67	10	8
Vit. A (RE)	800	50	400
Thiamin (mg)	1.3	50	0.7
Riflavin (mg)	1.4	55	0.8
Niacin (mg)	18	55	9.9
Vit.B12 (ug)	2.6	50	1.3
Folic Acid (ug)	600	50	300
Vit.C (mg)	85	50	42.5
CalCium (mg)	950	15	142.5
Phosphor (mg)	600	15	90
Iron (mg)	26	20	5.2
Zinc (mg)	11.5	25	2.9
Iodine (ug)	200	25	50
vit D (ug)	5	50	2.5
vit E (mg)	15	55	8.3
vit B6 (pyridoxin) (mg)	1.7	50	0.9
vit B5 (panthotenic acid)		50	
selenium (ug)	35	50	17.5
fluor (mg)	2.9	55	1.6

6. Activities of adolescent girls

As outlined above, most adolescent girls attend school, at least until the age of 15 years. After that, if they don't continue their education, they help with domestic and/or income-generating work at home, get married, and/or find paid employment, often in the informal sector. There are still strong differences, in particular in rural areas, between adolescent boys and girls. There are more rules that girls need to adhere to in order to avoid social stigma, and they are given more domestic responsibilities than their male siblings (Prananta 2010).

Girls (and boys) tend to form social groups and they meet at home or outside. Young people from lower socio-economic levels hang out at minimarkets or in parks.

While older women often attend 'savings groups' (*arisan*), girls who don't have (sufficient) income cannot join these groups, which require their members to pay a regular sum of money. However, there are other organized groups for teenage girls, including prayer groups. These convene regularly for Qur'an recitation and discussion and form a potential channel for health and nutrition messages, if linked to the appropriate Qur'an verses.

Karang Taruna (youth groups)
Karang Taruna is a social organization at sub-village (RW) level for young people to "grow and develop in social responsibility" (Kemensos 2006). These groups are most active in rural areas and urban slums where social cohesion is still strong. Depending on the local situation they may organize clean ups, sports and art activities and assist in local events.

Technology
With the spread of technology, young women have many new avenues for gathering information about health and nutrition. Websites, social media and smart phones allow them to access information privately and confidentially.
In 2010, 67% of East Javanese households owned at least one mobile phone and 30% owned more than one (BPS 2011) and this percentage is likely to have increased since then. For USD30-50 one can purchase a handset with internet access. Penetration was considerably higher in urban (77%) than in rural areas (59%).

Just over 38% of East Javanese adolescents have internet access (BPS Jatim 2013). The most used access channel (64.6%) is at a so-called *warnet* (*warung internet* or internet café), while 41.8% is done through mobile phones and 32% at school. The high percentage of young people who revert to internet cafes shows a low penetration of internet access at home and the vast majority of parents are not internet literate.

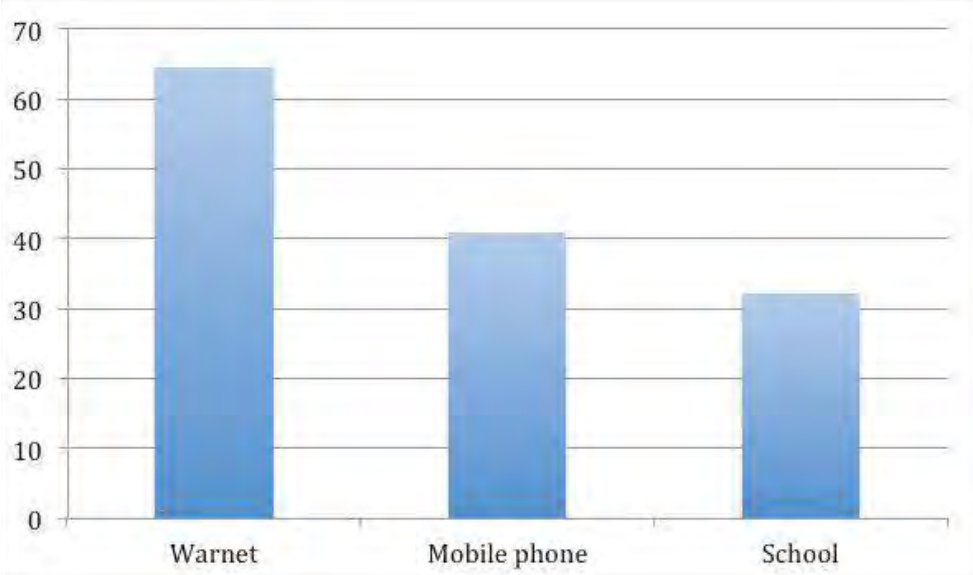


Figure 16: Internet use of adolescents in East Java by way of access (warnet=warung internet or internet café) (BPS Jatim 2013)

7. Activities of married women

The formative research of the Baduta project in 2013 in Sidoarjo found that the majority of married women among the lower middle classes are housewives (internal GAIN report).

Married women especially in semi-urban and rural settings are often active in the local women's group PKK, which organizes social activities at the street- or neighborhood level. These activities include the *posyandu*, *arisan* ('savings' groups) and prayer groups as well as more incidental activities when a neighbor is in need of support. Both *arisan* and *pengajian* are generally same-sex groups. *Arisan* are a social event, usually convening monthly (or as agreed by the members) and members pay a monthly fee. Each month a straw is drawn to determine the winner of that months' combined fees. The winner will host the next month's meeting and more often than not the amount she receives is not sufficient to provide food and drinks for the group. When the fees are high, the *arisan* may serve as a saving system and members who are in need of cash (such as for a wedding or other large event) are often prioritized. One cycle takes as long as there are members in the group (a group with 20 members convening monthly will have a 20-months cycle during which members are not allowed to withdraw). During the monthly meetings, the women discuss neighborhood issues, gossip and sometimes discuss a set topic.

Prayer groups (*pengajian*) are similar groups and indeed are often comprised of the same women. These groups are used for Qur'an recital and religious education of adults. Young, unmarried women rarely attend *pengajian*, unless they come with their mother, or in the rare event there is a special teenager group.

8. Potential channels to reach adolescent girls and married women

A. Formal channels

As a large proportion of younger adolescent girls are still in school, the educational system is the easy access channel for them, as well as for many older adolescents. It has the additional advantage of reaching boys as well, at an age where they are very open to information and are still in the process of forming their attitudes and behaviors. The disadvantage is the need to include the education system and to have the education and health office work together. The Indonesian government system is highly silo-ized, so the best way to go about this would be to involve the District level Planning Board (Bappeda) who coordinates both departments.

Where many women work outside the home, they are potentially reached through their employers. Obviously this is only worthwhile with larger groups of women working in the same place, such as in factories. Sidoarjo has much industry and this is theoretically an option. However, one should keep in mind the fact that most factory owners are not particularly keen in distraction from production activities and it will be important to choose the partner wisely. Potentially a supplier to Indofood, if available in the area) could become a partner should this approach be chosen.

As the vast majority of pregnant women see a midwife for ANC, this is also a good channel to reach pregnant (but not non-pregnant) women. Health professionals are well regarded and a trusted source of health and nutrition information. However, the health professionals are in need of training themselves, in particular in communication and counseling skills. Providing this training in addition to take-home information in the form of a booklet or flyer for the women, is a promising approach.

Potentially the marriage registration is a good starting point to reach women just before they become pregnant. However, this will not provide a large coverage, and it will not reach already married women who are/will be pregnant with their second or third child.

B. Informal channels

The already mentioned *arisan* and *pengajian* provide easy access to women who are in the habit to meet regularly and discuss important issues. Inserting health and nutrition messages, and even selling products during the arisan (rather than the *pengajian*), is highly possible.

The high proportion of cell phone ownership and use also provides an interesting channel. Among C and D women, text messages are most used – rather than internet and social media such as facebook and twitter (which are more commonly used among A and B groups in urban settings). Setting up groups with a midwife in the center and (potential) patients at the receiving end of the text messages would give the women access to continued information. Having the possibility to contact the midwife as well and create two-way traffic will make this more interesting. Clearly, this requires technology-literate and interesting midwives. The risk is that this may lead to (unfair?) competition between midwives involved in this activity and those who are not.

C. Mass media

The most popular mass media is television. In East Java, of the national stations SCTV, established in Surabaya, is the main channel, in addition to a number of local stations. Use of radio and printed media are declining rapidly.

Women usually watch soap opera's ('*sinetron*'), which air almost 24/7.
Expensive but effective is the use of television as a channel to reach women. Advertisements or even a soap opera with a nutrition-theme are options to explore if funding allows.

D. Traditional events related to adolescent girls and women

These are mentioned here, not so much because they are a viable channel, but rather to explain why they are not.

There is no special ritual of passage into womanhood for girls. Although it is becoming increasingly popular among the urban elite to celebrate Sweet Seventeen (legal coming of age), this is not common among the poorer sections of the population.

A series of traditional activities are linked to a girl's preparation for marriage but these are mostly only observed by traditional and well-off Javanese.

Only when a woman is pregnant, and then only in the seventh month (and only for the first child) there is a blessing ceremony called *tingkeban*, which is a combination of ancient traditions and Muslim recitations. However, she will be too far in pregnancy to have an impact on her nutritional status during pregnancy. For preparation of lactation this might be an option, but not easy to implement as one would have to keep surveillance for these women.

9. Current (government) programs for adolescent girls and pregnant women

Government programs for pregnant women consist of ANC, iron-folate tablets (at least 90 tablets throughout pregnancy for all women) and supplementary food for malnourished women (using either fortified milk or the fortified biscuit).

For adolescent girls there are adolescent friendly health services (see below) and iron-folate supplementation in different forms.

Weekly supplementation with Iron and other micronutrients

Not only for their reproductive health (Kurz 2000) but also for the girls themselves, it is important to address their micronutrient deficiencies, in particular iron deficiency anemia. The efficacy of weekly supplementation of adolescent girls with iron-folate supplements has been well documented in small research studies in several countries, including Indonesia (Angeles-Agdeppa 1997). In addition, the effectiveness of weekly iron-folate supplementation with monthly sessions of family life education and bi-annual deworming has also been shown. The intervention resulted in an overall reduction of anemia prevalence from 73.3% to 25.4%, at a cost of US$0.36 per girl per year. Counseling on the positive effect of taking the iron-folate tablets, but not supervision, was crucial for high (85%) compliance rate and anemia reduction (Vir 2008).

In some areas in Indonesia, including in Sidoarjo, adolescent girls are stimulated to purchase commercial iron or multivitamin supplements, a proven sustainable approach (Jus'at 2000, Smitasiri 1999). However, it is essential to combine this with education about the problems of micronutrient deficiencies and the benefits of buying a supplement.

Micronutrient powders (MNP) for adolescents

Although Indonesia developed its own MNP for children under five years of age (Taburia), there are no programs using MNP's among adolescents or adults.

A recent study in Tangerang (Banten province) found that twice-weekly MNP given mixed with food or drink for 16 weeks to 150 anemic adolescent girls (aged 14-18 years) in religious schools in Indonesia was effective in increasing hemoglobin concentrations and iron stores (Marudut). However, the largest impact was found with the lowest dose of iron (20 mg iron as ferrous fumarate), implying compliance issues with the higher doses MNP (25 and 3-mg iron, respectively).

Fortified foods
Indonesia has recently adopted mandatory fortification of unbranded vegetable oil with vitamin A, which will come into force in 2015. This will provide 70% of the population with vitamin A fortified cooking oil which has been shown to be effective to improve vitamin A status in a pilot study implemented by a local NGO (KFI: Indonesian Nutrition Foundation for Food Fortification) with support from GAIN (Sandjaja 2014).

Specific fortified products for adolescents are a potential solution to micronutrient deficiencies. However, these products are very scarce, and often with low fortification levels, while they contain sugar, salt and unhealthy fats.

Fortified powdered milk, a common component of the diet of young children, is being sold with targeting of youths (15-24 years old), as are some other products. However, this is not yet a fully explored market.

Adolescent-friendly Health Services (AFHS) (Innovation Working Group Asia 2014)
Adolescent-friendly health services are health services that are suitable for adolescents. They are easily accessed and open at times when adolescents can use them, and provide services at affordable prices (if needed for free) (WHO 2006). Equally important is that they appeal to young clients and are delivered using a style that is acceptable to them (WHO 2003), as health care workers often are judgmental and not specifically trained to deal with young people. They should cover the most vulnerable youths and provide a one-stop-shopping experience for integrated and comprehensive services. According to WHO, "the gold standard for AFHS is that they are effective and meet individual needs of young people who return when they need to and recommend these services to friends."(WHO 2003). Rather than setting up specific facilities, AFHS should be integrated in existing services, through clinics, schools or in the community. Communities and adolescents should be well informed about, and actively participate in the design of suitable services.

In Indonesia, this is called PKPR (Pelayanan Kesehatan Peduli Remaja) and is provided through the health center (Puskesmas). Initiated by Presidential Instruction in 2003, this program aims to increase the knowledge and skills of adolescents related to reproductive health and healthy lifestyles, in addition to providing quality healthcare to adolescents. Services are not only provided at the health center, but also at schools and in the community to ensure optimal coverage of 10-19 year olds.

A PKPR Health center has to meet the following criteria:
1. Provide Communication, Information and Education (CIE) to at least one school (general or religious school) at least twice a year;
2. Train at least 10% of the students at these schools to become Adolescent Health Caders (agents of change);
3. Provide counseling to all adolescents who need it and who contact the PKPR officer.

PKPR services form a comprehensive effort focused on health promotion and prevention through health education and increasing psychosocial skills through Healthy Life Skills Education (Pendidikan Keterampilan Hidup Sehat (PKHS)). In East Java 285 health centers implemented this program in 2012 in 37 of the 38 districts and cities (Pusdatin 2013).

An innovative alternative channel to reach adolescents and young women, especially those at particularly high risk for early pregnancy, may be when they register for marriage (Jus'at 2000). At this time they are highly willing to fulfill any requirements, and to prepare themselves well for pregnancy. Behavior change messages, reinforced by vouchers for nutritious foods or supplements or youth-friendly family planning services could be provided at this occasion.

Program Kadarzi (Keluarga Sadar Gizi or Nutrition-aware Family) (Dinkes Jatim)

A "Keluarga Sadar Gizi" is defined as a family that is able to recognize nutrition problems in its members and to take the appropriate steps to overcome these problems, as well as consumes a diversified diet.. Activities include mapping of families that are not yet "Sadar Gizi" and counseling by nutrition officer from health center in the household. In 2010, overall in East Java, only 27.8% of households were found to be 'nutrition-aware' (Malang 18.9%, Sidoarjo 45.6%),

Program Bina Keluarga Setara

A program started in 2010 by BKKB (Badan Koordinasi Keluarga Berencana / Family Planning Coordinating Body) to increase understanding about the roles of husband and wife in the family. Its aim is to reduce the divorce rate, violence within the household, increase household economic status because wives are allowed to work. BPPKB works together with women's organization PKK, Persatuan Serikat Wanita (PSW), local NGO's, courts of justice and Darma Wanita (women's organization of civil servants) (Kominfo Jatim).

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ANNEX A: EXAMPLES OF FORTIFIED FOODS FOR ADOLESCENTS AND PREGNANT WOMEN

A. Fortified dairy products for adolescents

	CalciSkim		Milo		HiLo Teen		Zee Tween	
	Content	% RDA	Content	% RDA	Content	% RDA	Content	% RDA
Total energy (kcal)	100		150		170		150	
Total fat	0 g	0	4 g	6	2.5 g	4	3 g	5
DHA								
Protein	8 g	15	4 g	7	6 g	10	6 g	10
Carb Total	15 g	4	24 g	8	32 g	11	23 g	8
Prebiotic FOS								
Fibers	3 gr	12	1 g	3			1 g	5
Sugar	0 g		14 g		22 g		11 g	
Lactose					9 g			
Natrium	180 mg	8	55 mg	2	100 mg	4	65 mg	2
Vit A		25			1,000 IU	50	640 IU	30
Vit D		30			155 IU	40	150 IU	40
Vit E		15			7.5 mg	50	4.2 mg	30
Vit K		10						
Vit C		30		15	25 mg	30	34 mg	40
Vit B1 (Thiamin)		65		20	0.5 mg	50	0.65 mg	65
Vit B2 (Riboflavin)		6		20	0.6 mg	45	0.78 mg	65
Vit B3 (Niacin)		25		20	7 mg	45	5.4 mcg	35
Vit B5 (Pantothenic Acid)				15	1.75 mg	25	1.6 mg	25
Vit B6 (Pyridoxine)		25		25	0.6 mg	45	0.26 mg	20
Vit B9 (Folic Acid)		6			150 mcg	35	166 mcg	30
Vit B12 (Cobalamin)		25		8	1.5 mcg	60	1.63 mcg	70
Calcium		50		20	600 mg	70	500 mg	65
Phospor		40		25	250 mg	40	250 mg	40
Iron				8	6.5 mg	25	2.5 mg	10
Magnesium		15		15	55 mg	20	45 mg	15
Potassium								
Zinc		60			1.75 mg	15	1.2 mg	10
Iodine		10			26 mcg	15	21 mcg	15
Biotin					20 mcg		2.2 mcg	
Choline					20 mg		70 mg	
Inositol					2 mg			
Selenium					6 mcg	20		
Omega3								
Omega6							0.3 g	
Producer	Indofood		Nestle		Nutrifood		Kalbe	
Taste	**Chocolate, Plain**		Chocolate		Chocolate, Vanilla Caramel, Yoghurt Banana		Strawberry Ice, Chocó Black forest, Vanilla Rich	

B. Fortified non-dairy products for adolescents

	Indomie (noodles)		Fitbar (snack bar)		You C1000 (vit C drink)		Chitato (potato chips)		Lays (potato chips)		Provita (breakfast cereal)		Trendz (snack)		Pop Mie (noodles)		Buahvita (juice)		NutriSari (instant fruit flavored drink)	
	Content	% RDA	Content	% RDA	Content	% RDA	Content	% RDA	Content	% RDA	Content	% RDA	Content	% RDA	Content	% RDA	Content	% RDA	Content	% RDA
Total energy (kcal)	300		90		80		100		90		130		90		360		130		60	
Total fat	11 g	18	2.5 g	4	0 g	0	5 g	8	5 g	8	3 g	5	3 g	5	16 g	25	0 g	0	0 g	0
DHA																				
Protein	7 g	12	3 g	5	0 g	0	1 g	2	1 g	2	2 g	3	1 g	2	9 g	15	0 g	0	0 g	0
Carb Total	43 g	14	15 g	5	20 g	7	11 g	4	11 g	4	23	8	13 g	4	45 g	15	33 g	11	14 g	5
Prebiotic FOS																				
Fibers	2 g	8	1 g	4							2 g	8	1 g	4	2 g	9	2 g	7		
Sugar	3 g		4 g		20 g						15 g		1 g		4 g		20 g		12 g	
Lactose																				
Natrium	1330 mg	58	30 mg	1	60 mg	3	30 mg	1	80 mg	3	140 mg	6	85 mg	4	1130 mg	49	55 mg		20 mg	1
Vit A		20										30						60	255 IU	15
Vit D												10								
Vit E					2 mg	15						20							4 mg	25
Vit K																				
Vit C				15	1,000 mg	1,110						10						115	90 mg	100
Vit B1 (Thiamin)		40										25						10	0.23 mg	25%
Vit B2 (Riboflavin)												25						8		
Vit B3 (Niacin)		25			2 mg	15						25						6	2.40 mg	15
Vit B5 (Pantothenic Acid)		8										25						15		
Vit B6 (Pyridoxine)		20										25							0.40 mcg	10
Vit B9 (Folic Acid)		25										30							40 mcg	10
Vit B12 (Cobalamin)		20										30								
Calcium				10								15								
Phospor																				
Iron		10										8								
Magnesium												10								
Zinc												25								
Omega3																				
Omega6																				
Producer	Indofood		Kalbe		PT Djojonegoro C1000		Indofood		Indofood		Indofood		Indofood		Indofood		Unilever		Nutrifood	

C. Fortified dairy products for pregnant women

	Prenagen Mommy		Anmum Materna		Lactamil		SGM Bunda		Bebemama		Nestle Mom&Me		Lovamil	
	Content	% RDA	Content	% RDA	Content	% RDA	Content	% RDA	Content	% RDA	Content	% RDA	Content	% RDA
Total energy (kcal)	180		190		160		115		160		150		160	
Total fat	2.5 g	4	4.5 g	8	3 g	4	2 g	3	3 g	5	3.5 g	6	2.5 g	5
DHA									41 mg		35 mg			
Protein	10 g	13	10 g	12	10 g	12	6 g	7	10 g	12	8 g	9	8 g	10
Carb Total	26 g	8	27 g	8	27 g	8		6	25 g	8	22 g	7	25 g	8
Prebiotic FOS														
Fibers	4 g	16	3 g	13	3 g	13	300 mg		1 g	5			1 g	
Sugar	16 g		5 g		5 g		10 g	1	7 g		6 g		7 g	
Lactose														
Natrium	140 mg	9	170 mg	11	100 mg	7	80 g	5	105 mg	7	80 mg	5	130 mg	9
Vit A		25	320 mcg	40		30		60		25		15	550 IU	20
Vit D		45	3 mcg	60		70		50		25		40	86 IU	45
Vit E		20	6 mg	35		10		10		35		20	2.7 mg	20
Vit K														
Vit C		40	55 mg	60		40		55		35		30	25 mg	30
Vit B1 (Thiamin)		35	1 mg	80		40		60		20		15	0.34 mg	25
Vit B2 (Riboflavin)			1.2 mg	80		40		55		25		25	0.34 mg	25
Vit B3 (Niacin)		45	9 mg	50		40		15		25		15	3.2 mg	20
Vit B5 (Pantothenic Acid)		35	1.4 mg	20		40		15		20		15	1.95 mg	30
Vit B6 (Pyridoxine)		30	1.2 mg	75		40		95		25		10	0.5 mg	30
Vit B9 (Folic Acid)		65	390 mcg	65		60		80		35		15	150 mcg	25
Vit B12 (Cobalamin)		40	1 mcg	40		40		55		25		10	0.86 mcg	35
Calcium		55	620 mg	65		40		30		30		20	300 mg	30
Phospor		60	460 mg	75		35		25		40		30	200 mg	35
Iron		35	10 mg	30		30		50		25		10	11 mg	35
Magnesium		40	83 mg	30		10		9		10		15	75 mg	30
Zinc		25	5 mg	35		20		30		30		15	54 mcg	25
Iodine		30	44 mcg	20		20		35		30			7.8 mcg	20
Biotin									6.2 mcg		10 mcg			
Choline									27 mg		42 mg			
Selenium										20				
Omega3									23 mg		88 mg			
Omega6														

Producer	Kalbe	Fonterra	Sari Husada	Sari Husada	Nutricia	Nestle	Kalbe
Variant taste	Chocolate, Vanilla, Mocca, Strawberry	Plain, Chocolate, Vanilla Manggo	Vanilla, Chocolate, Strawberry	Orange, Mango, strawberery, Chocolate	Choco breeze, Vanilla Berry	Chocolate, Vanilla	Chocolate, Vanilla

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