

## Proceedings of the ILSI SEA Region 4<sup>th</sup> Expert Consultation and Planning Meeting on Maternal, Infant and Young Child Nutrition: Nutrition of Pregnant Adolescents in Southeast Asia

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### ABSTRACT

**Introduction:** In August 2014, the ILSI SEAR Infant and Early Childhood Nutrition Task Force held the 4<sup>th</sup> Expert Consultation and Planning Meeting on Maternal, Infant, and Young Child Nutrition (MIYCN) in Jakarta, Indonesia. **Methods:** The consultation focused on the nutrition and health situation of pregnant adolescents. The objectives were therefore to: (1) discuss the current nutrition and health situation of pregnant and non-pregnant adolescent girls in six Southeast Asian countries (Brunei, Indonesia, Laos, the Philippines, Thailand, and Vietnam); (2) generate recommendations for teenage pregnancies in the region; and (3) identify regional issues, knowledge gaps and research priorities in order to improve adolescent health in Southeast Asia. **Results:** There is very little information on the health and nutrition status of pregnant and non-pregnant adolescent girls (aged 10 to 19 years old) in Southeast Asia. In most countries, teenage pregnancy rates are higher in rural areas than in urban areas. Anaemia has been shown to be prevalent among reproductive aged females (15 to 49 years old). Indonesia, the Philippines and Vietnam have high levels of underweight adolescent girls. An increasing prevalence of overweight adolescent girls has been found in Indonesia, Thailand and Vietnam. **Conclusion:** There is a need for increased knowledge and understanding with regard to the health and nutrition status of female adolescents in the region (including micronutrient status and requirements), and factors that predispose girls to early pregnancy. Two types of program packages should be developed - one for adolescent girls who are not pregnant (aimed at promoting health and preventing early pregnancy) and another for those who are pregnant, including post-natal parenting support.

**Keywords:** Adolescent, nutrition, pregnancy, Southeast Asia, teenage

### INTRODUCTION

In August 2014, the International Life Sciences Institute (ILSI) Southeast Asian Region (SEAR) Infant and Early Childhood Nutrition Task Force held the 4<sup>th</sup> Expert

Consultation and Planning Meeting on Maternal, Infant, and Young Child Nutrition (MIYCN) in Jakarta, Indonesia. The consultation was part of a series which aimed to “generate and promote relevant science-

based information that will improve the nutritional status, growth and development of infants and young children in Southeast Asia." The present consultation focused on the nutrition and health status of pregnant adolescents, in line with the previous consultation's recommendation that improved maternal health is a high priority issue in Southeast Asia.

The World Health Organisation (WHO) (2005) defines adolescents as those aged between 10 to 19 years. There are currently 1.2 billion adolescents globally, and 90% of them live in low and middle-income countries (LMICs) (Black *et al.*, 2013). WHO (2005) has identified the following main nutritional issues of adolescents in LMICs:

- Under nutrition and associated deficiencies, often originating earlier in life
- Iron deficiency anaemia and other micronutrient deficiencies
- Obesity and associated cardiovascular disease risk markers
- Early pregnancy
- Inadequate or unhealthy diets and lifestyles

A report on worldwide adolescent health (Patton *et al.*, 2012) emphasised that risks for non-communicable diseases are increasing rapidly among adolescents living in LMICs, with this group having the highest rates of tobacco use, lowest rates of physical activity and being overweight. Gore *et al.* (2011) examined data from the WHO 2004 Global Burden of Disease study, and found that iron deficiency anaemia was a major cause of lost years due to disability and premature death among females aged 10-19 years worldwide. Other major causes were abortion and maternal sepsis.

Good adolescent health impacts the future economic development of poorer countries by ensuring a supply of adults who are educated, healthy, and economically productive (WHO, 2005). This cannot be achieved if early pregnancies become prevalent in a society, as unplanned early

pregnancies are associated with negative health, and economic, social and psychological outcomes for both women and children (Sedgh, Singh & Hussain, 2014; Sawyer *et al.*, 2012). Preventing unintended pregnancies is an integral component of achieving the United Nations Millennium Development Goal of improving maternal health (Goal 5) (Sedgh *et al.*, 2014).

The nutritional status of women at the time of conception, as well as prior to and during pregnancy, is important for foetal growth and development. Maternal stunting is associated with small pelvises in women, an important risk factor for obstructed labour (WHO, 2005). The risk rises sharply when the stature is below 1.45 m, which is the case for 16 to 18% of women in Asia (WHO, 2005). On the other hand, maternal overweight and obesity are associated with maternal morbidity, preterm birth, and increased infant mortality (Black *et al.*, 2013). Wise *et al.* (2010) found that underweight (pre-pregnancy BMI < 18.5) increased the risk of both spontaneous and medically-indicated preterm births among women aged 21-44 years, while obesity (pre-pregnancy BMI ≥ 30) greatly increased the risk of medically-indicated preterm births and very early (< 32 weeks gestation) spontaneous preterm births. Maternal obesity is also associated with an increase in BMI in the offspring during infancy, childhood, and later life, with a subsequent concomitant increase in risk of gestational diabetes among overweight child-bearing females that can lead to a vicious cycle of obesity in succeeding generations (Zhang *et al.*, 2011).

Iron deficiency increases the risk of maternal mortality (Black *et al.*, 2013). An analysis of the WHO Multicountry Survey on Maternal and Newborn Health (Lumbiganon *et al.*, 2014) found that anaemia was the most common indirect cause of obstetric complications and severe maternal and perinatal outcomes in mothers from 29 countries, although there are other causes of anaemia aside from iron deficiency.

Adolescent pregnancy creates a double burden in that the needs of the growing foetus compete with the normal needs of the growing adolescent. Hence, poor nutrition during adolescence, accompanied by the increased nutritional needs of pregnancy, affects both present and future generations. In terms of offspring health, studies have shown that adolescence is a risk factor for adverse pregnancy outcomes particularly low birth weight babies, preterm birth, and severe neonatal conditions (Ganchimeg *et al.*, 2014; Yadav *et al.*, 2008). In terms of maternal health, it was shown that adolescents aged 10 to 19 years had higher risks of eclampsia, puerperal endometritis, and systemic infections (Ganchimeg *et al.*, 2014) compared with adult mothers, and that mothers  $\leq$  15 years old living in LMICs had higher risk of caesarean section (Ganchimeg *et al.*, 2012). Young maternal age increases the risk for maternal anaemia (Gibbs *et al.*, 2012), whilst preterm birth increases the risk for high blood pressure after delivery, which increases subsequent risk for cardiovascular diseases (Catov *et al.*, 2013; Perng *et al.*, 2015). Besides these risks, adolescent mothers also experience emotional consequences such as poorer maternal mental health and lower quality mother-child relationships (Logan *et al.*, 2007 in Sedgh *et al.*, 2014)

Adolescent fertility is three times higher in LMICs than in high income countries (Black *et al.*, 2013), making it a major issue in the region. In 2012, it was estimated that 44% of pregnancies in Southeast Asia were unintended (Sedgh *et al.*, 2014). Approximately 28% of unintended pregnancies end in abortion (Guttmacher Institute, 2009a). Almost two-thirds of abortions in the region are unsafe (Guttmacher Institute, 2009a). The most common complications from unsafe abortion are incomplete abortion, excessive blood loss, and infection. WHO estimates that almost one in eight maternal deaths in Asia result from

unsafe abortions, and that about 2.3 million women in the region are hospitalised annually for treatment of complications from unsafe abortions (Guttmacher Institute, 2009b).

The objectives of the 4<sup>th</sup> MIYCN Consultation were as follows:

1. Discuss the current nutrition and health status of pregnant and non-pregnant adolescent girls in six Southeast Asian countries – Brunei, Indonesia, Laos, the Philippines, Thailand, and Vietnam
2. Generate recommendations for teenage pregnancies in the region
3. Identify regional issues, knowledge gaps and research priorities in order to improve adolescent health in Southeast Asia

## REVIEW OF SECONDARY DATA

### Current health and nutrition status of non-pregnant adolescent girls

Table 1 shows adolescent birth rates in Southeast Asia for the period 2008 to 2011 and age-specific fertility rates based on recent surveys. Laos had the highest birth rates in the region while Singapore had the lowest. In general, fertility rates were higher in rural areas than in urban areas.

### Over and undernutrition

As seen in Table 2, little information exists regarding the nutritional status of non-pregnant adolescents in Southeast Asia. Among the six countries, Indonesia (Jaacks, Slining & Popkin, 2014; NIHRD, 2013), the Philippines (FNRI, 2012), Thailand (Yam-borisut & Mo-suwan, 2014), and Vietnam (Jaacks *et al.*, 2014) had some information regarding the prevalence of over and/or under nutrition amongst female adolescents, while Laos and Brunei had no information. Indonesia, the Philippines and Vietnam had high levels of overweight adolescents, ranging from 10 to 36%. In Indonesia and Vietnam, the prevalence of underweight adolescents was higher in urban areas compared with rural areas.

**Table 1.** Adolescent birth rates 2008-2011† and age-specific fertility rates in Southeast Asian countries

Country	Adolescent birth rate† 2008-2011	Age-specific fertility rate (per 1000 women) 15 to 19 years old			Source
		Urban	Rural	Total	
Laos	110x	44	114	94	Lao PDR Social Indicator Survey 2011-2012
Philippines	53x	52	63	57	Philippine National Demographic and Health Survey 2013
Cambodia	48	32	51	47	Cambodia Demographic and Health Survey 2005
Indonesia	48	32	69	48	Indonesia Demographic and Health Survey 2012
Thailand	47	-	-	53.8	Thailand Public Health Statistics 2012 (Sukrat, 2014)
Vietnam	35	10	28	25	Vietnam Demographic and Health Survey 2002
Brunei	18	-	-	-	-
Myanmar	17*	-	-	-	-
Malaysia	15	-	-	-	-
Singapore	4	-	-	-	-

Source: †UNICEF. The state of the world's children 2014 in numbers. (NOT IN BIBLIOGRAPHY)

x Data refer to years or periods other than those specified in the column heading

- No data

High levels of overweight adolescent girls were found in Thailand, followed by Indonesia. A recent study in Vietnam (Nguyen *et al.*, 2013) suggested increasing levels of overweight or obesity among female adolescents in urban areas.

The Philippines and Indonesia had data on chronic undernutrition (stunting). An update survey in 2011 (FNRI, 2012) showed that 33.4% of Filipino adolescent girls aged 10 to 19 years were stunted, based on WHO standard height-for-age z scores. In Indonesia, a recent survey (NIHRD, 2013) showed that the prevalence of stunting among girls aged 13 to 15 and 16 to 18 years was 32.3% and 25.1%, respectively.

#### *Micronutrient deficiency*

In Indonesia, the prevalence of anaemia among girls aged 13 to 18 years was 22.7% in 2013 (NIHRD, 2013). No data was avail-

able on iron deficiency anaemia and other micronutrient deficiencies among female adolescents for other Southeast Asian countries. Available data on anaemia covered the reproductive age group consisting of females aged between 15 to 49 years (WHO, 2008)(Figure 1). Based on existing prevalence, the categories that follow indicate the severity of anaemia as a public health problem:  $\geq 40\%$  (severe), 20-39.9% (moderate), 5-19.9% (mild). It can be seen that, until 2005, anaemia was a severe public health problem among reproductive-age women (15 to 49 years) in Laos and the Philippines, moderate in Indonesia, Vietnam and Brunei, and mild in Thailand.

#### **Current health and nutrition status of pregnant adolescent girls**

There is even less information on the nutrition and health status of pregnant adolescents in Southeast Asian countries.



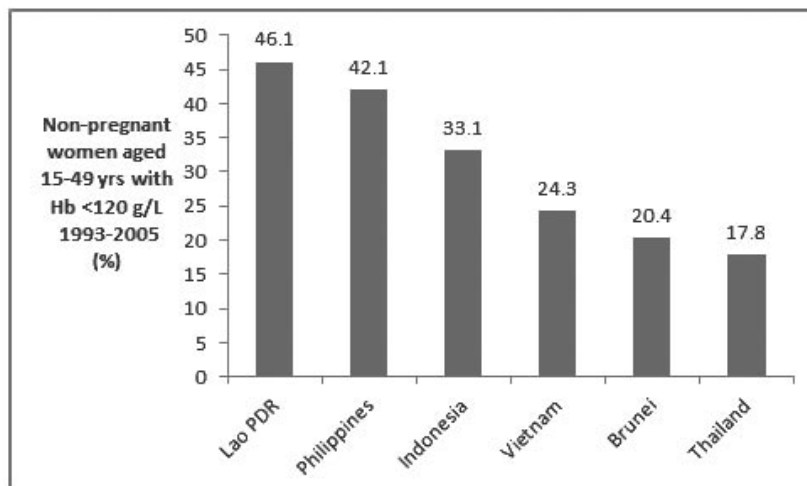


Figure 1. Prevalence of anemia among non-pregnant women of reproductive age (15-49 years) 1993-2005 in selected SEA countries (WHO, 2006)

#### Under nutrition

In the Philippines, national survey data in 2011 showed that the prevalence of nutritionally-at-risk (i.e., below 95<sup>th</sup> percentile weight-for-gestational age based on a local reference standard) pregnant women less than 20 years was 35.7% (FNRI, 2012). In Indonesia, the proportion of pregnant women aged 15 to 19 years at risk of under nutrition (middle upper arm circumference < 23.5 cm) was 38.5% (NIHRD, 2013).

#### Micronutrient deficiency

In Thailand, a retrospective study of 1,354 teenage mothers aged ≤ 19 years old having singleton live births between 2004 and 2006 showed that anaemia was present in 53.2% of mothers aged 11 to 15 years and in 45.3% of mothers aged 16 to 19 years (Thaithae & Thato, 2011). Another cohort study in a Bangkok hospital found a significantly higher prevalence of anaemia amongst mothers aged 16 years or less compared with those aged 20 to 29 years (31.1% vs. 19.5%, respectively,  $p < 0.001$ ) (Chantrapanichkul & Chawanpaiboon, 2013). No data were available for other countries.

#### Birth outcomes among adolescent mothers in Southeast Asia

Few countries in the region have existing studies regarding birth outcomes amongst adolescent mothers. In Thailand, one study (Chawanpaiboon & Hengrasmee, 2013) found that mothers aged ≤ 16 years had significantly higher risk of preterm births, compared with women aged 20 to 29 years. Similar results were found among mothers aged < 20 years (Kovavisarach *et al.*, 2010). An analysis of Thailand's adolescent pregnancy situation showed that abortion was the outcome in 14.4% of adolescent pregnancies, and that adolescents gave birth to 37.2% of the country's preterm infants (Areemit *et al.*, 2012). Using a retrospective case control study design, Thaithae & Thato (2011) found that teenage pregnancy (≤ 19 years) was associated with increased risk of very preterm deliveries (11 to 5 years: AOR = 2.18,  $p < 0.05$ ), very low birth weight babies (11 to 15 years: AOR = 6.98,  $p < 0.05$ ; 16 to 19 years: AOR = 9.86,  $p < 0.01$ ), and new born admission to Intensive Care Unit (11 to 15 years: AOR = 1.93,  $p < 0.01$ ; 16 to 19 years: AOR = 2.10,  $p < 0.01$ ).

In Indonesia, analysis of the 1997 Demographic and Health Survey (DHS) data showed that adolescents aged 18 years or younger were significantly less likely than women aged 19 to 23 years to use skilled maternal health care (Reynolds, Wong & Tucker, 2006). Inadequate antenatal care was seen as a contributing factor to Indonesia's high perinatal mortality rate (Jahja, 2011). An analysis of 2007 DHS data showed that children of women who reported less than three antenatal care visits were at greater risk of suffering a new born death, compared with infants whose mothers had  $\geq 4$  visits (Jahja, 2011). The same analysis showed that having an adolescent age at delivery was a significant risk factor for perinatal mortality, with an increased odds ratio starting at age  $< 16$  years and decreasing risk as age increased.

Meta-analysis of data from 14 cohort studies, including one from the Philippines and Thailand, showed that nulliparous women  $< 18$  years of age had the highest odds of adverse neonatal outcomes including small for gestational age infants (AOR 1.80, 95% CI 1.62, 2.01), preterm birth (AOR 1.52, 95% CI 1.40, 1.66), and neonatal and infant mortality (AOR 2.07, 95% CI 1.69, 2.54) (Kozuki *et al.*, 2013).

## DISCUSSION

The 4<sup>th</sup> MIYCN Consultation has shown that there is very little information on the health and nutrition status of adolescents in Southeast Asia, including pregnant adolescents. In a Lancet series on adolescence, Sawyer *et al.* (2012) reported that globally, the health of adolescents has improved to a lesser extent than that of younger children. This observation is consistent with the situation in Southeast Asia, where programs appear more preoccupied with improving the health of mothers and children than on improving the health of adolescent girls. Focusing attention on the adolescent age group is essential for improving maternal

health, as these young girls become future mothers.

The Lancet paper emphasised that good information systems are an essential first step towards making adolescents and their health more visible to policy makers (Sawyer *et al.*, 2012). To achieve this, it was recommended that a consistent definition of the adolescent age group be adopted, wherein data is reported for three categories across adolescence: 10 to 14 years (early adolescence); 15 to 19 years (late adolescence); and 20 to 24 years (young adulthood). This will allow sufficient analysis of the protective and risk factors during each of the different developmental stages of adolescence (Sawyer *et al.*, 2012). In Southeast Asia, such analysis is needed to understand the risk factors for teenage pregnancy in the region, as well as the underlying reasons for its increased incidence in some countries.

The Consultation also identified issues and needs relating to adolescent nutrition and adolescent pregnancy in Southeast Asian countries (Table 3). In all countries, the development of effective educational strategies/messages for this specific age group was considered a major need. In order to be effective, messages should be targeted and culturally sensitive, while programs and strategies should be holistic, covering the physical, mental, and social aspects of the lives of adolescents. Religious beliefs have to be considered, particularly in countries where the dominant religion does not allow use of contraceptive methods of birth control. A major issue was how to develop such strategies and messages that are tailored for each country's own situation, and whether a common strategy could be adopted across Southeast Asia.

Other identified issues were:

- Reaching out-of-school adolescents (particularly in the Philippines) and those liv-

Table 3. Summary of adolescent needs and issues in selected SEA countries

<i>Needs</i>	<i>Issues</i>
<p>1. Education and training</p> <ul style="list-style-type: none"> <li>- Reproductive and health/nutrition education of adolescents in rural areas</li> <li>- Strategies to reach out-of-school youth and those in remote areas</li> <li>- Development of a holistic approach to prevention (should involve family, school, community etc.)</li> <li>- Training of midwives, health workers to help pregnant adolescents in remote areas</li> <li>- Training of teachers, parents, health workers to deal with the issue of pregnancy</li> </ul>	<ul style="list-style-type: none"> <li>- What are the key health messages for the different target audiences and how can these be developed?</li> <li>- How can information be delivered to pregnant adolescents in an effective manner?</li> <li>- Is it possible to develop a common module that is applicable to Southeast Asian countries?</li> <li>- Should these populations be reached before or during pregnancy; where are these populations?</li> </ul>
<p>2. Programs</p> <ul style="list-style-type: none"> <li>- Family planning program for adolescents (e.g., in Indonesia, most of maternal mortality and stunting is from teenage pregnancy)</li> <li>- Child development programs</li> <li>- Programs to address maternal stress (to alleviate effects on adolescent and her offspring)</li> <li>- Psychosocial support to ensure mental health of adolescent mothers</li> <li>- Programs that address the needs of rural vs. urban adolescents</li> <li>- Programs that use new technologies to reach different geographic areas more effectively</li> <li>- Provision of health services focusing on pregnant adolescents</li> <li>- Programs to help adolescents reach their optimal health status</li> </ul>	<ul style="list-style-type: none"> <li>- How can intervention programs be implemented effectively?</li> <li>- How can a culturally specific and sensitive package of interventions be developed for pregnant and non-pregnant adolescents that addresses diverse issues (i.e., mental, physical, nutritional, social, sanitation, gender equity etc.) while using a holistic approach to adolescent pregnancy prevention (involving family, school, community etc.)?</li> </ul>
<p>3. Nutritional needs</p> <ul style="list-style-type: none"> <li>- Weekly iron supplementation for teenagers</li> <li>- Need to increase calcium intakes of adolescents; may need to consider calcium fortification because of low milk intake and lactose intolerance in the region</li> <li>- Need to develop diets for overweight/obese vs. malnourished teenage mothers</li> </ul>	
<p>4. Additional knowledge needs</p> <ul style="list-style-type: none"> <li>- Growth cut-offs and their appropriateness for Southeast Asian children; need for reference percentiles for waist circumference and BMI cut-offs for Southeast Asian adolescents</li> <li>- Effects of being overweight or obese on adolescent pregnancy outcomes</li> <li>- Dietary and nutrient intakes of adolescents before, and during pregnancy</li> </ul>	



- Metabolism of nutrients in growing adolescents (pregnant and non-pregnant)
- Assessment of nutritional status, including biochemical status, before and during pregnancy
- Ways to prevent stunting
- Causes of anaemia other than iron deficiency (e.g., in mountain areas in Vietnam, 20% of anaemia is due to thalassemia)
- Approaches to increase calcium intakes (e.g., market driven approach may be better than school programs)

ing in remote areas (particularly in Laos and Vietnam). Most programs targeting the adolescent age group are undertaken in urban areas and within schools. More efforts should focus on rural areas and outside the school setting. There is also a need to find ways to reach adolescents in areas where infrastructure is absent

- Identifying target populations to implement specific strategies. In Thailand, there is little knowledge regarding the areas where programs to prevent teenage pregnancies can be undertaken
- The logistics of program delivery is a problem in Indonesia, as its large population tends to limit whatever resources are available
- Establishing nutritional requirements of pregnant adolescents including calcium and vitamin D, and assessing their micronutrient status needs as part of standard pregnancy care
- Assessing the causes of anaemia (e.g., iron deficiency vs. thalassemia and other causes) in pregnant women, particularly in Vietnam
- Examining the effects of being overweight or obese vs. under nutrition on pregnancy outcomes should be examined, particularly in Thailand and China where increased adolescent body mass is now a problem

- That in the Philippines, teenage pregnancy is associated with poverty. Hence, income-generating activities should accompany interventions to prevent pregnancy and improve adolescent health.

Given the adolescent pregnancy rates in the region, it was suggested that two types of program packages be developed - one for adolescent girls who are not pregnant (aimed at promoting health and preventing early pregnancy) and another for those who are pregnant, including post-natal parenting support.

This study considered the following as priorities for further research:

- Possible differences in calcium requirement across the various populations in Southeast Asia
- Increasing rates of hypertension among adolescents, particularly those born with low birth weight
- Macronutrient/micronutrient levels and metabolism of nutrients during adolescence - the metabolism of fuels (i.e., fuel partitioning) differs during growth and as such the effects on nutrient metabolism of various interventions during pregnancy should be studied
- Needs and issues identified in Table 3
- The cause of anaemia in females - there is an urgent need to determine whether

anaemia is due to iron deficiency, thalassaemia or other genetic disorders, and other causes, as each condition requires a different type of intervention

- Care of adolescents and their infants after delivery - there is a need to determine how young mothers cope with their new responsibility, whether infants become neglected (physically, nutritionally and emotionally), and what measures are needed to ensure optimal care of both mother and child.

## CONCLUSION

Teenage pregnancy is an escalating problem in some Southeast Asian countries, particularly in Laos, the Philippines, Indonesia, and Thailand. There is a need for increased knowledge and understanding regarding the health and nutrition status of adolescent girls in the region (including micronutrient status and requirements), and factors that predispose them to early pregnancy. Educational strategies and messages need to be developed to promote good health and nutrition among adolescents, particularly pregnant adolescents. Interventions that address the socio-economic and emotional problems of adolescents should accompany efforts to improve health.

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## Conflict of interest

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