Nutrition and health status of children in South East Asia

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Introduction

The South East Asian Nutrition Surveys is a large nutritional study - commonly referred to as SEANUTS - initiated by Friesland Campina and conducted by leading universities in four Southeast Asian countries: Malaysia, Indonesia, Vietnam and Thailand. This study investigated the dietary intake, nutritional status and physical and cognitive activity levels of more than 16,744 children aged 6 months to 12 years in these four countries.

The preliminary results of the study were presented at the regional SEANUTS congress entitled "Current Updates on Childhood Nutrition & Development". This congress was jointly organised by the Friesland Campina Institute (FCI), the Nutrition Society of Malaysia (NSM) and the University Kebangsaan Maylasia (UKM) on 6 - 7 November 2012.

Full articles have been accepted and will be published soon. A brief overview of the lectures given at the conference along with the interviews of the Principle Investigators is given here.

Commenting on the conference, NSM president Dr Tee E Siong said: "It is important that the results and insights from SEANUTS will be shared with healthcare professionals, policymakers and parents in order to make a significant difference in our children's lives. As such, NSM is very happy to host this conference to kick-start a much needed national dialogue around the nutritional needs of our children with some of the leading experts in nutrition from across the region."

We hope you enjoy reading this proceedings. Should you have any questions or comments, please mail institute@frieslandcampina.com.

Kind regards,
On behalf of the SEANUTS team;

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Nipa Rojoongwasinkul, Institute of Nutrition Mahidol University, Thailand
Le Nguyen Bao Khanh, National Institute of Nutrition, Vietnam
Sandaja, Center for Applied Health Technology and Clinical Epidemiology (CAHT-CE), Indonesia
Panam Parikh, senior scientist at FrieslandCampina Innovation, The Netherlands
Before the SEANUTS study was performed, several large nutrition surveys had been conducted across the Southeast Asian region. Unfortunately however, they each relied on a different set of indicators to assess the nutritional status of children. In addition, these studies also presented an information gap, as data for certain indicators was unavailable in several Southeast Asian countries.

In recent years, a variety of large nutrition surveys have been conducted in Southeast Asia, including the Multiple Indicators Cluster Survey (MICS), the Demographic and Health Survey (DHS) and national household surveys in - for instance - The Philippines. These surveys relied on a different set of indicators to address the various parameters relating to the health status of children under the age of five (Table 1).

### Table 1 - Different indicators used to assess the health status of children under the age of five

<table>
<thead>
<tr>
<th>Type of survey</th>
<th>Indicators used</th>
</tr>
</thead>
<tbody>
<tr>
<td>MICS</td>
<td>Child mortality, birth weight, nutritional status (underweight, stunting, wasting, overweight), infant feeding, nutritional interventions, vaccination, care of illness</td>
</tr>
<tr>
<td>DHS</td>
<td>Birth weight, nutritional status (stunted, wasted, anaemic), child mortality, infant feeding, care for illness, maternal and child care, nutritional interventions</td>
</tr>
<tr>
<td>Philippines' National Nutrition Survey</td>
<td>Anthropometrics, biochemical parameters, clinical (e.g. blood pressure) and health (e.g. lifestyle), dietary, socio-economic, food insecurity, participation in government programmes</td>
</tr>
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</table>

**Nutritional status from SOWC 2012**

Data relating to the status indicators for Southeast Asian children under the age of five was included in the UNICEF’s latest flagship publication – The State of the World’s Children (SOWC) 2012: Children in an Urban World.¹

**Underweight, stunting, wasting and low birth weight**

Thailand presents the lowest prevalence of underweight (7%), wasting (5%) and stunting (16%) among Southeast Asian countries, while Timor-Leste presents the highest rates (45%, 19% and 58% for underweight, wasting and stunting, respectively). The percentage of low-birth-weight infants is highest in Philippines (21%) and lowest in Vietnam (5%). No data is available for Brunei and Singapore.
There is insufficient information on the nutritional status of young children living in South East Asia. Therefore, there is an urgent need for qualitative data that would allow a better understanding of the challenges associated with optimising the nutritional status of young children. Additional data is essential, not only for academic purposes, but also to serve as the basis for evidence-based policies and programmes – both new and existing.

Reference

Infant feeding
Of all Southeast Asian countries, Thailand presents the lowest rate of breastfeeding as an exclusive means of nourishment (15%). This is mainly the result of the country’s common social and cultural practices, which - among others - include rinsing the mouths of infants with water. When this is the case, breastfeeding is no longer considered to be the exclusive means of nourishment. Exclusive breastfeeding is most common in Cambodia (74%), while uninterrupted breastfeeding for up to 23 months is most prevalent in Myanmar (65%) and less so in Vietnam (23%). The rate of complementary feeding (weaning) introduced when infants are approximately six months of age is highest in Cambodia (82%) and lowest in the Philippines (58%). Mothers in the Philippines introduce complementary feeding at a much earlier age. No data is available for Malaysia, Brunei and Singapore.

Nutritional intervention
Universal vitamin A supplementation is not common practice in all Southeast Asian countries, and this is especially true in countries such as Malaysia and Thailand. In countries where vitamin A supplementation has been introduced, coverage rate is highest in Vietnam (95%) and lowest in Timor-Leste (48%). No data is available for Cambodia and the Philippines. The rate of iodised salt consumption at household level is lowest in Malaysia (18%) and highest in Myanmar (93%). No data is available for Singapore and Brunei.

Mortality rates
Singapore has the lowest rates of neonatal and infant mortality (1% and 2% respectively), while mortality under the age of five is situated at approximately 3%. Mortality rates are highest in Myanmar, with neonatal and infant mortality at 32% and 50% respectively, while mortality under the age of five is situated at 66%.

Conclusion
There is insufficient information on the nutritional status of young children living in South East Asia. Therefore, there is an urgent need for qualitative data that would allow a better understanding of the challenges associated with optimising the nutritional status of young children. Additional data is essential, not only for academic purposes, but also to serve as the basis for evidence-based policies and programmes – both new and existing.
Dr Nipa Rojroongwasinkul is the Head of the Biostatistics Unit and former Deputy Director of the Institute of Nutrition, Mahidol University, Thailand. She holds a Bachelor of Science in Statistics from Kasetsart University, a Master of Science in Biostatistics and PhD in Demography from Mahidol University and has over 30 years’ experience in studying nutrition in children.

Statistics are Dr Rojroongwasinkul’s specialism. ‘I helped to calculate the sample size and sampling scheme of the SEANUTS study. In Thailand, with its population of 10 million children aged six months to 12 years, we investigated approximately 3,000 children and used statistical approach to generate results that represent the country information. A total of 16,744 children between six months and 12 years from Thailand, Vietnam, Malaysia and Indonesia were therefore covered in 4 countries. It was the first ever study of children’s nutrition carried out on such a massive scale and in such depth in Southeast Asia.’

Statistics are Dr Rojroongwasinkul’s specialism.

Changes in lifestyle
‘Thailand is changing very fast,’ continues Dr Rojroongwasinkul. ‘More and more people are adopting Western lifestyles, with their computers, internet, soda drinks and fast food. Nearly 80% of Thai people now own a mobile phone. Children play computer games or watch television; they don’t play outside as often as they once did. As a result of all these changes in lifestyle, we are seeing a sharp rise in obesity among children, especially in urban areas. 17.5% of boys and 8.8% of girls in Thai cities are overweight.’

Dr Rojroongwasinkul is concerned about the future: ‘In 2015, Thailand will enter the free trade system by the ASEAN Economic Community (AEC) and the increasing in free trade agreement worldwide. This means that a growing number of people will have easy access to cheap and unhealthy foods such as fast foods and snacks. They will eat fewer vegetables and fruits. I therefore expect to see a significant rise in overweight and obesity, especially among children.’

Vitamin D
Despite strong economic growth, poverty and malnutrition are still a problem in Thailand. Approximately 5-7% of children are underweight. Dr Rojroongwasinkul: ‘We found evidence of malnutrition in both rural and urban areas, but stunting is chiefly a rural problem. We also need to pay attention to children’s uptake of micronutrients. Vitamin D deficiency is widespread. We need to look into this in more detail. A vitamin D deficiency isn’t just due to a poor diet, such as lack of oily fish or dairy products. It is also due to the fact that children now spend most of their time indoors. They live in air-conditioned houses, go to school by car or bus, and even play sports inside. We need more research to clarify vitamin D deficiency or vitamin D insufficiency and related factors in Thai children.’

Iron deficiency
Anemia and iron deficiency are also widespread in Thailand, especially among children aged up to 24 months. The problem is even more prevalent in rural areas. ‘This could have an effect on brain development and cognition,’ Dr Rojroongwasinkul warns. ‘Iron is a very important micronutrient in early life. Breastfeeding should be encouraged, because that’s best for infants. After breastfeeding, parents should use complementary food that provided an adequate intake of iron. We should protect our children from nutrient deficiencies. Good nutrition, both in the womb and during the early years, is a basic right for every child. Not only is it good for the baby now, it will also influence its health later in life.’

Future
The facts and figures gathered by SEANUTS can be used for further analysis. ‘We now know what the existing situation is, and we have a huge volume of data which we can analyse in the near future. I’m looking forward to that! We need to know more about the causes of malnutrition and the optimum strategies we can employ to improve the nutritional status of Thai children. Looking toward the future, I’d like to conduct a longitudinal study of children in Thailand so that we can really see the cost and effect of our nutrition problems.’
Key findings from SEANUTS on the nutritional status of children

SEANUTS was conducted in response to the need for nationwide surveys and to improve insight on the current nutritional status of children in selected Southeast Asian countries. Preliminary results from SEANUTS highlight how regional differences, a double burden of malnutrition and vitamin D deficiency are increasingly problematic.

SEANUTS assessed children between the ages of six months and twelve years, using a randomised multi-stage cluster design. A total of 16,744 children were evaluated in the four following countries:

- Indonesia  n = 7,211
- Malaysia  n = 3,542
- Thailand  n = 3,119
- Vietnam  n = 2,872

The subjects were nationally representative of children per age group and residence in each country.

Several regional findings from SEANUTS

The prevalence of malnutrition and micronutrient deficiencies differ not only between the four countries, but also within the urban and rural areas of a given country. The type of malnutrition (i.e. underweight, stunting, thinness, overweight and obesity) is defined according to the classification developed by the World Health Organization.

Underweight

Underweight is a far more substantial concern in the rural areas of Indonesia and Vietnam than in Malaysia and Thailand (Figure 1).
Iron deficiency
Based on the level of haemoglobin, the prevalence of anaemia is high among younger children (0.5-1.9 years) in Indonesia, Vietnam and Thailand. It is also more widespread in rural areas. In older children, anaemia persists only as a mild problem.
In Indonesia, the rate of iron deficiency indicated by serum ferritin is very high in children aged 2.0-4.9 years, with levels of 10.0% and 16.5% in urban and rural areas respectively. The prevalence of this deficiency is generally lower in the other countries.

Vitamin A deficiency
While the prevalence of vitamin A deficiency is generally low, a large percentage of children in Malaysia and Vietnam present borderline serum retinol levels.

Vitamin D deficiency
Vitamin D deficiency based on 25-hydroxyvitamin D cut-off point (50 nmol/l) is widespread in all four countries, irrespective of gender and location.

Conclusion
The results derived from SEANUTS reveal a double burden of malnutrition in Southeast Asian children. Malnutrition remains a major problem in Indonesia and rural Vietnam, while over-nourishment is not only a concern in Malaysia and Thailand, but also an emerging problem in urban areas of Vietnam and Indonesia. Micronutrient deficiencies persist among children in Southeast Asia, with vitamin D deficiency should be perceived as a growing problem in this region.
Stunting remains a great burden in developing countries. The Lancet’s Maternal and Child Undernutrition Series addresses the fact that approximately 15% of child mortality can be attributed to stunting, 10% to moderate acute malnutrition (MAM), 10% (among non-stunted, non-wasted children) to micronutrient deficiencies, and 4% to severe acute malnutrition.\(^1\) Stunting or malnutrition in childhood not only represents a temporary problem for the affected child, but it can also have far-reaching effects later in life. Children who experience stunting during the first two years of life, while rapidly putting on weight in later childhood and adolescence, are at a higher risk for nutrition-related chronic diseases, including obesity and diabetes.\(^2\), \(^3\)

### Preventing stunting through nutritional interventions

A child’s future nutritional status depends greatly on the nutritional status of the mother prior to and during pregnancy. If appropriate nutritional interventions are introduced during this period, a child stands the best chance of survival and of optimal growth and development. The underlying causes of malnutrition include environmental and socio-economic factors, with poverty playing a central role. Scarcity of high-quality food (i.e. animal sources of protein, fatty acids, vitamins and minerals) can be a critical contributing factor to stunting. While addressing general poverty could help limit malnutrition, nutrition-specific interventions and health programmes could also greatly reduce the problem.

The ultimate objective is to develop treatment methods (e.g. food products) that are cost-effective, readily available and which contain nutrients targeting the specific nutritional needs of children during their first two years of life. In this regard, the private sector has a substantial role to play. To ensure that nutritional interventions aimed at preventing stunting are sustainable in the long term, effective collaboration between the public and private sectors is essential.
Prevention through nutrition interventions

While addressing general poverty could help limit undernutrition, nutrition-specific interventions and health programmes could also lead to major reductions. For instance, the United Nations and the World Food Program have outlined nutrition-specific interventions based on the strategies below:

- treatment of MAM;
- prevention of acute malnutrition;
- prevention of stunting; and
- treatment and prevention of micronutrient deficiencies.

Studies have also been conducted to determine the efficacy of fortified food or ready-to-use therapeutic food in the treatment of MAM and severely malnourished Malawian children.1,4

The ultimate goal is to find treatment options that are cheaper and more readily available. The treatment options (e.g. food products) not only should contain the right nutrients tailoring to the specific nutritional needs of children in the first 2 years of life, but also be cost-effective.

In this regard, the private sector has a weighty role to play. Effective collaboration between the public and private sectors is vital to ensure that nutrition interventions carried out to prevent stunting are sustainable in the long run.

Conclusions

To reduce childhood mortality and future health problems from malnutrition, there is a clear and urgent need for interventions which target stunting, malnutrition and micronutrient deficiencies. Food and nutrition security is a human right. The “right to nutrients” should therefore be the focus of nutrition interventions during the first 1,000 days of the life cycle. Concerted action aimed at reducing malnutrition is warranted, and public-private sector partnerships are essential for developing sustainable solutions.

References

Micronutrients
Dr Khanh has a particular interest in the data on micronutrient uptake and status. ‘Over 50% of Vietnamese children have a shortage of the vitamin and mineral uptake. Vitamin D deficiency is widespread, affecting more than 50% of children in urban areas and 47% in rural areas. Along with a lack of vitamin D in the diet, children are kept away from sunlight. For example, many mothers tend to keep their babies inside for the first one to three months. There are also many children with a low uptake of iron and vitamin A. Our state-of-the-art knowledge now allows us to evaluate and implement nutrition improvement programmes throughout Vietnam.’

Future
Dr Khanh enjoyed collaborating in the SEANUTS project. ‘I hope that in the future I will have further opportunities to do similar collaborative research. It’s a pleasure exchanging experiences and learning from international colleagues and experts. For me, the SEANUTS study was a great opportunity to acquaint myself with new techniques and research methods relating to my field of work. In the years ahead, we’ll be conducting further analysis of the risk factors and causes of nutritional problems.’
Global data indicates that the double burden of malnutrition has become a major concern for developing countries, including those in Southeast Asia. Underweight and stunting in children occur simultaneously with childhood overweight and obesity.

While data indicates a downward trend in the prevalence of stunting and underweight in all developing countries, the overall prevalence of these conditions remains considerably high. Most children affected by stunting live in Asia. At the other end of the spectrum, the rate of overweight in children under the age of five is increasing. In Asia, the prevalence of overweight has increased from 3.2% in 1990, to 4.9% in 2010. In Southeast Asia, the prevalence of overweight in children has more than doubled (Figure 1), and the growing trend of overweight is expected to continue over the next decade.

Maternal nutrition and outcome at birth

Maternal malnutrition is an added nutritional challenge faced by developing countries. For instance, the National Nutrition Survey of Pakistan shows that 18% of women who have reached the age of reproduction are underweight, while 19% are overweight. A mother's nutritional status can have a great impact on the birth outcome of her infant. Indeed, pre-pregnancy weight and body mass index (BMI), along with weight gain during pregnancy, have a strong impact on foetal growth. It is now recognised that poor maternal nutrition - far even
before conception occurs - increases the risk of intrauterine growth restriction and pre-term birth, producing low birth-weight infants (LBW).\(^4\) Weight at birth is a predictor of infant growth and survival. LBW can result in impaired growth and mental development, and is associated with higher rates of neonatal mortality.\(^5\) Babies born with LBW also face the risk of undergoing very rapid and excessive weight gain in childhood, as opposed to linear growth. This in turn predisposes these children to obesity and metabolic syndrome, as well as other chronic adult diseases (e.g. hypertension, type 2 diabetes and heart diseases) later in life.\(^6\) On the other hand, overweight prior to pregnancy, or obesity during maternity, may cause abnormal foetal growth known as foetal macrosomia, which is also associated with childhood obesity.

Conclusion

With emerging data on the double burden of malnutrition, the time has come to address nutritional risks with an approach that promotes health and well-being at every stage of life – from foetus all the way through adult life. Strategies to improve maternal weight and nutritional status prior to conception and during pregnancy are needed to improve birth weight and intrauterine growth, thus providing newborns with optimal levels of health.

References

INTERVIEW

Poh Bee Koon, principal investigator for SEANUTS Malaysia

Poh Bee Koon is Professor of Nutrition at Universiti Kebangsaan Malaysia, Head of the Nutritional Sciences Programme and Leader of the Physical Activity and Energy Metabolism Research Group.

Professor Poh Bee Koon has many years of experience in nutritional research, specialising in childhood nutrition. Her main focus is on childhood obesity and energy expenditure.

Malaysia was the first country to take part in the SEANUTS study, so Professor Poh was involved right from the outset. ‘We compiled many of the questionnaires which were later used in the three other participating countries,’ she explains. ‘Although of course the questionnaires on nutrition did make use of national lists, given that food culture and products differ fairly significantly from country to country.’

Professor Poh is very pleased with the SEANUTS study. ‘This is the first major study on the nutritional status of children in Malaysia. We already had a national survey on the food consumption and nutritional status of adults, but the same data for children was largely absent. Obviously we had an idea of how things stood prior to the study, based on the favourable socioeconomic and social developments in Malaysia. So we already suspected that malnutrition had become a less urgent problem and that tackling obesity was now more imperative. Due to lack of research data, however, we could not confirm these suspicions. The SEANUTS study now provides the evidence we needed, namely that the problem of overweight among children is officially greater than underweight. But that’s by no means all. The good thing about SEANUTS is that we now have a wealth of knowledge at our disposal which will be useful for many years to come.’

National growth

Malaysia is experiencing rapid growth. More and more people are emerging from poverty and can afford to provide themselves with enough to eat. There is a growing middle class and a sharp increase in people on average and above-average incomes. Professor Poh: ‘Improved living standards also mean that people can afford to spend more on food. Food is now available everywhere, 24 hours a day, on every street corner. Most of these outlets are stalls and coffee shops selling traditional dishes, but there are also lots of fast food outlets. The latter are situated mainly in the major cities and in densely-populated regions. All this naturally has consequences for food consumption. Then there is the increased use of computers, televisions and cars. People are becoming less active, and that include children. In large cities, children often are not allowed to play outside because their parents think it is too dangerous.’

Striking incidence of vitamin D deficiency

In a country where the sun shines most of the time, the population tends to try to stay in the shade. This, combined with a diet which is low in vitamin D, is leading to nutrient deficiencies. The SEANUTS survey found evidence of a vitamin D deficiency in a strikingly large number of children. ‘Young girls in particular like their skin to be as light-coloured as possible and therefore try to stay out of the sun,’ explains Professor Poh. ‘This is more true of urban youngsters than it is of their rural counterparts. A vitamin D deficiency is found strikingly often in 56.2% of urban children and in 45.4% of rural children. We did not however see any clinical symptoms of vitamin D deficiency such as rickets. I do however expect that we will be taking these results to the government. This may provide the background information needed for new guidelines or for updating of existing guidelines, for example with regards to the people’s nutrition or dietary habits.’

Obesity: a question for government?

Professor Poh stresses one point, however: ‘The nutritional status of children in Malaysia is not poor. The majority of children in Malaysia are neither overfed nor underfed. But we do have to be alert to their intake of micronutrients. And of course we must keep an eye on the growing problem of overweight, which is an issue here as well as in all other countries that are undergoing rapid economic development. Obesity is a global problem, and, like other regions, Asia must work hard on reducing its prevalence. I am involved with two intervention studies at schools: in my view, this is where we can bring about change.’

SEANUTS

The SEANUTS project is a unique collaboration between an industry partner (FrieslandCampina) and four international research teams/universities. Professor Poh: ‘It’s an excellent partnership. I have conducted studies with industry sponsors before, but I have never worked with a company that was so committed and helpful. Our cooperation with the other universities was also very enjoyable. I reckon we still have plenty of results to gather, but we have already built up a wealth of data. I would really like to do a longitudinal study in Malaysia: it would be great to be able to monitor children over time.’
Policies and programmes which address the nutritional status of children in Malaysia

Malaysia, with its rapidly expanding economy, has overall relatively positive indicators of child health and nutritional status than most other countries in Southeast Asia (SEA). This could be partly attributed to ease of access to healthcare facilities, as well as efforts of the Malaysian Ministry of Health in establishing policies and programmes to promote health and wellbeing in the younger generation.

Some well known programmes and policies are:

**Healthy Public Policies**
The Country Health Plan (10th Malaysia Plan, 2011-2015) addresses several nutrition-related issues, including:
- National Breastfeeding Policy: to reinforce the recommendation of exclusive breastfeeding during the first six months of a child’s life, and continued for up to two years with the introduction of complementary food at six months of age.
- Food Hygiene and Safety Policy in Schools: to ensure safe food for school children and to prevent food poisoning through its programmes and activities.

**National Plan of Action for Nutrition**
The National Plan of Action for Nutrition in Malaysia (NPANM) II (2006-2015) aims to achieve and maintain the nutritional well-being of Malaysians, and in particular to:
- improve breastfeeding and complementary feeding
- reduce protein-energy malnutrition and micronutrient deficiency
- reduce overweight and obesity
- prevent and control diet-related, non-communicable diseases

**Public nutrition intervention programmes**
Programmes include providing folic acid, multivitamins and full-cream milk powder to pregnant and lactating mothers, and the delivery of monthly food baskets to very poor families with underweight children below the age of six. The Malaysian Ministry of Health has recently introduced legislation on universal salt iodisation for the whole country. According to the National Iodine Deficiency Disorders survey conducted on children between the ages of eight and ten years, many had less than optimum urinary iodine levels (<100 mcg/L). The proportion of adequately iodised household salt (iodine content ≥15ppm) was also low.
School programmes
Milk is given for free to school children from low-income families, while others pay a subsidized price. Free food is also provided daily to primary school children who have been identified as coming from low-income families.

Conclusion
Nutritional interventions and school programmes are some of the strategies put in place by the Malaysian Ministry of Health to help reduce malnutrition and micronutrient deficiencies. Intervention strategies for further improvement of the nutritional status of Malaysian children should continue to target the indigenous and minority groups, and the poor in urban and rural areas.

Reference
INTERVIEW

Sandjaja, principal investigator SEANUTS Indonesia

Dr Sandjaja is a senior researcher and scientist with the Center for Applied Health Technology and Clinical Epidemiology (CAHT-CE), which is part of Indonesia’s Ministry of Health. He is the principal investigator for SEANUTS Indonesia.

In addition to his role as CAHT-CE researcher, from 2006-2011 Dr Sandjaja was also the coordinator for the Division of Science and Publication of PERSAGI, the Indonesian Nutrition Association. He was then asked to become involved with the SEANUTS study. Dr Sandjaja: ‘It was a great opportunity for us to find out more about children’s nutrition and health in our country. We organised a team and worked on a study design that was suitable for Indonesia.’

Vitamins
SEANUTS has provided the four participating countries with a great deal of new facts and figures. What are the most striking results for Indonesia? Dr Sandjaja: ‘In my view, it is the finding that the prevalence of vitamin A deficiency among children under the age of five has declined significantly compared to previous studies from the 1990s and 2000s. That’s good news. On the other hand, we see a high prevalence of vitamin D deficiency among Indonesian children. This is the first study of vitamin D deficiency in Indonesia and the results are critical. Of course this is new evidence so what we need now is to confirm these findings, using larger samples. I would also prefer more research on other micronutrients, such as B vitamins, homocysteine and iodine deficiency disorders. I hope that in future, findings from SEANUTS will be used by stakeholders to redesign nutrition policy and its implementation.’

Activity
The World Health Organisation (WHO) recommends that children aged 5-17 years engage in one hour of moderate to vigorous activity per day. Past research showed that children in South East Asia were becoming less active due to an increase in the amount of ‘screen time’, i.e. television, videogames and the internet. Dr Sandjaja: ‘SEANUTS gives us new findings on physical activity patterns. Not surprisingly, we find that rural children are more active than their urban peers. But there has been an overall decrease in physical activity. Going forward, we need to focus on this because being active is very important for future health.’

Intervention
‘This year we must concentrate on exploring the more in-depth findings from SEANUTS,’ Dr Sandjaja says. ‘We need to investigate and explain the nutrition problems in Indonesia, including those associated with over- and undernutrition. Then we want to conduct more in-depth studies on factors associated with the problems. And of course we would like to start an intervention study with a view to improving the nutritional health of Indonesian children. While childhood overweight and obesity are not a problem in Indonesia, we still have a large percentage of children suffering from undernutrition. My research team and I hope we can improve the nutritional health of Indonesian children in the future.’ And what does SEANUTS mean for Dr Sandjaja personally? ‘It is very rewarding to work with this international team. I hope the experiences we have gained through SEANUTS will motivate younger Indonesian scientists in the field of nutrition and health.’
Are Southeast Asian children active enough?

Evidence suggests that a large proportion of Southeast Asian children are not getting enough daily exercise. This raises concern about the current and future health status of children in this region, and underlines how interventions are critical to increasing their physical activity levels.

Regular physical activity offers children and adolescents many health benefits. It not only increases their physical strength and endurance, but it also enhances their psychological well being. Exercise can also help them to maintain a healthy weight and body composition. Indeed, emerging evidence suggests that regular physical activity reduces the risk of childhood obesity. According to the World Health Organization (WHO), physical inactivity is the fourth leading risk factor for global mortality, resulting in an estimated 3.2 million deaths globally.

How much physical activity is needed?
The WHO recommends that children between the ages of five and seventeen should partake in moderate to vigorous daily physical activity for at least 60 minutes. Physical activity of amounts greater than 60 minutes every day will provide additional health benefits. General guidelines also emphasize that the time children spend behind a screen (TV, computer) should be limited to no more than two hours a day, as studies show that sedentary activities, such as watching TV, significantly increase the risk of overweight in children and adults.

Physical activity level of children in Southeast Asia
Data relating to the physical activity levels of Southeast Asian children is limited. The Global School-based Student Health Survey (GSHS) of children between the ages of 13 and 15 was developed by the WHO in collaboration with United Nations’ UNICEF, UNESCO, and UNAIDS, and with technical assistance from Centers for Disease Control and Prevention (CDC). The majority of children aged 13-15 years old in many countries do not adhere to the recommended 60 minutes of daily physical activity. The study, which was conducted across 55 countries, found that less than 20% of SEA children have 60 minutes of activity daily, while 30-40% of children have more than 3 hours of sitting time every day (Figure 1 and Figure 2).
Improving the physical activity levels of children is vital in helping to prevent the development of obesity and other diseases in adulthood. Studies aimed at monitoring trends and patterns of physical activity are essential for guiding the development of public health policies and programmes.

Conclusion
Improving the physical activity levels of children is vital in helping to prevent the development of obesity and other diseases in adulthood. Studies aimed at monitoring trends and patterns of physical activity are essential for guiding the development of public health policies and programmes.

References
Vitamin D deficiency and its consequences

Modern lifestyle increases the risk of vitamin D deficiency and its related diseases. Dietary supplementation can ensure sufficient intake of vitamin D, and seems to have a positive impact on health, has been demonstrated in children and in women of childbearing age.

Although the human body is able to produce vitamin D after adequate exposure to sunlight, modern fashion and lifestyle habits - with reduced outdoor time - have greatly impaired the body’s ability to do so, thus increasing the risk of vitamin D deficiency and its related diseases. Vitamin D is essential to many of the body’s functions, and especially for the muscular-skeletal health of young children and adolescents. The vitamin D level in women during pregnancy is also directly linked to the bone mass of their offspring and to their risk of fractures in adulthood.

The muscular-skeletal effects of vitamin D in children

Vitamin D supplementation has a positive impact on muscular-skeletal parameters in girls between the ages of 10 and 17. A study conducted in Lebanon revealed that lean body mass and total hip bone mineral content increased with weekly oral doses of 1,400 IU (equivalent to 200 IU/d) or 14,000 IU (equivalent to 2,000 IU/d). The effects were significantly greater however in the group receiving the higher dose. Vitamin D also has an impact on muscle power and force. This was demonstrated by a cross-sectional study among 12 to 14 year old girls. Higher serum 25-hydroxyvitamin D (25-(OH)D) concentrations were associated with greater jumping ability.

The effects of vitamin D supplementation on immune function

Two randomised trials have demonstrated the benefits of vitamin D supplementation in reducing the risk of acute respiratory infections in winter among Mongolian children with vitamin D deficiency, and in the prevention of influenza A in school children.
Vitamin D supplementation during pregnancy

Studies have demonstrated that childhood bone mass could be affected by the maternal vitamin D status during the intrauterine period.\(^1\) Data from Malaysia shows that women of childbearing age have generally low 25-(OH)D levels (36.2 nmol/L), while men have a slightly higher concentration (56.2 nmol/L).\(^2\) In Kuala Lumpur, almost 25% of women are severely vitamin D deficient. Vitamin D supplementation during pregnancy helps optimise bone-mineral accrual in the offspring, and reduces the risk of osteoporotic fracture in adulthood. As vitamin D deficiency is frequent during pregnancy, ensuring an adequate maternal vitamin D status is essential.

What is the optimal level of vitamin D?

The most widely accepted, evidence-based threshold for vitamin D deficiency is a concentration of 25-(OH)D of 50 nmol/L, recommended by the Institute of Medicine and the World Health Organization. However, this cut-off concentration of 25-(OH)D may be too low. Medical organizations, including the Endocrine Society, recommend a minimum level of 75 nmol/L for the effective prevention of muscular-skeletal diseases associated with vitamin D deficiency - particularly in older adults.\(^3\)

Conclusion

While 50 nmol/L is the accepted threshold for vitamin D deficiency, this figure may be too low for effectively preventing disease in certain age groups. More studies are needed to determine the optimal 25-(OH)D level.

References

**Interview**

**Panam Parikh, senior scientist at FrieslandCampina**

Innovation and project leader for SEANUTS for FrieslandCampina

The results of SEANUTS depict the current nutrition and health status of children in Southeast Asia. Dr Parikh: ‘It’s the scale and magnitude of SEANUTS which make it unique. Indeed, the assessments in this survey included dietary intakes, food habits, nutritional status, growth, body composition, physical activity, and cognitive development and performance - all in a country-representative sample of infants and children between the ages of six months and twelve years. This information serves not only as a tool to identify areas and age groups most at need of intervention, but also as an evaluation of the ongoing efforts to counter malnutrition in the region.’

**Important issues**

What are the most striking results of SEANUTS according to Dr Parikh? ‘That would be over-nutrition, physical activity levels and nutrient deficiencies. Even countries such as Indonesia and Vietnam with high under-nutrition, reported an increasing prevalence of overweight and/or obesity. Among nutrient deficiencies, percentages for sub-optimal and deficient vitamin D levels are alarming. Based on these results, there is a clear and urgent need programmes and interventions to address these issues. SEANUTS has also taught us that we should not focus solely on children under the age of five, as the nutritional status of school-aged children is often also compromised and therefore requires our attention.’

The future of SEANUTS

The first results of SEANUTS will be published later this year. What can we expect after this? Dr Parikh: ‘Our scientists will continue to explore and delve more deeply into the available data from aspects that are of particular importance for the participating countries. We look forward to sharing these new results with a wider audience through publications, presentations at conferences, nutrition awareness campaigns and so forth. Ultimately, the purpose of SEANUTS is to provide information that will be relevant and useful for the countries, and the team is dedicated in making that happen.

SEANUTS has provided a medium for collaboration and exchange of knowledge between the Institutes of the four countries. SEANUTS was made possible through a concerted effort between the four Institutes and the FrieslandCampina Institute.’

**Government**

‘We believe that the information generated by SEANUTS can be useful for the local governments and policymakers to address the health of these nations’ youth’, says Dr Parikh: ‘Going forward, we are aiming at working with the governments and health organisations wherever possible, in order to develop strategies and programmes that have a beneficial influence on the health of children. To make this happen, we’re working to establish dialogue with relevant experts and stakeholders.’
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CURRENT UPDATES ON CHILDHOOD NUTRITION & DEVELOPMENT

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Proceedings of the Regional Conference
‘Current Updates on Childhood Nutrition & Development’

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