

Nutritional status of primary school children in Malaysia

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Outline

1. Aim
2. Four (4) main areas on nutritional status
3. Four (4) nation-wide studies
4. Findings
5. Conclusions

Aim & Areas

- Current **nutritional status** of primary school children in Malaysia
- Aged 6-12 years
- Four (4) main areas on nutritional status:
 1. Body weight/height status
 2. Dietary intake
 3. Biochemical assessment
 4. Physical activity level

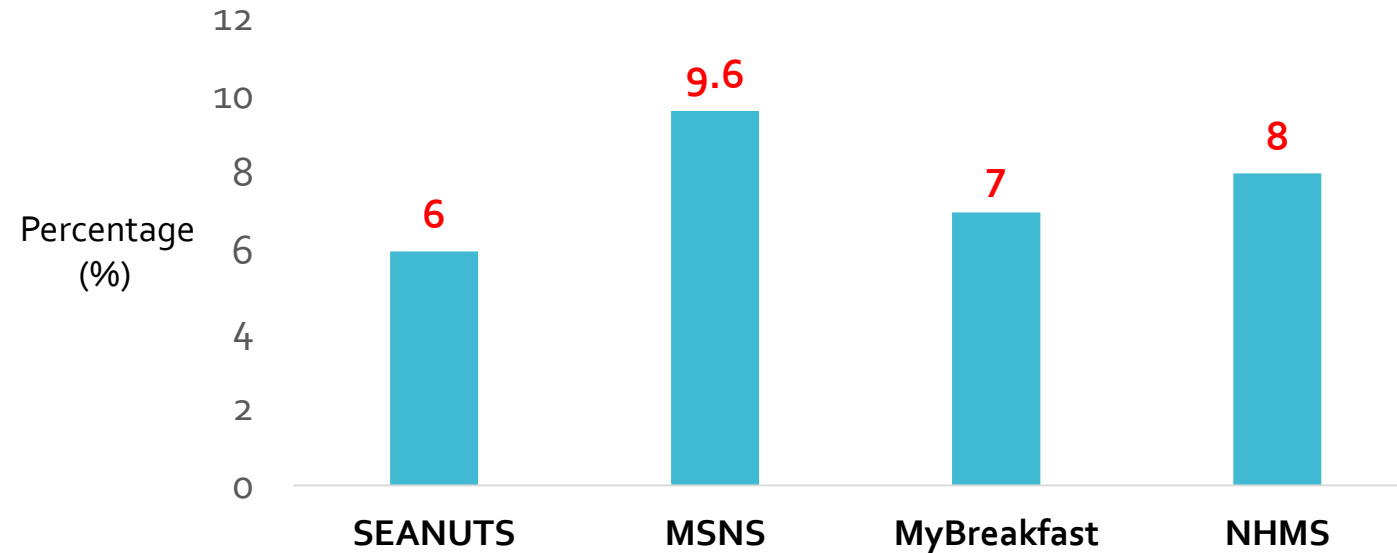
Four (4) Nation-wide surveys

1. Southeast Asia Nutrition Survey (SEANUTS) Malaysia 2013 †
 - **1969** children (7-12 years)
 2. Malaysian School-Based Nutrition Survey (MSNS) 2012
 - **2235** children (10-12 years)
 3. MyBreakfast study 2015 ‡
 - **5567** children (6-12 years)
 4. National Health and Morbidity Survey (NHMS 2017) on adolescents
 - **12,599** (10-12 years)
- All included height/weight status and physical activity level
 - ‡ Without dietary intake (nutrients/food groups) information
 - † Included biochemical assessment

Findings: 1. Height & Weight status

Stunting

- Overall prevalence < 10%



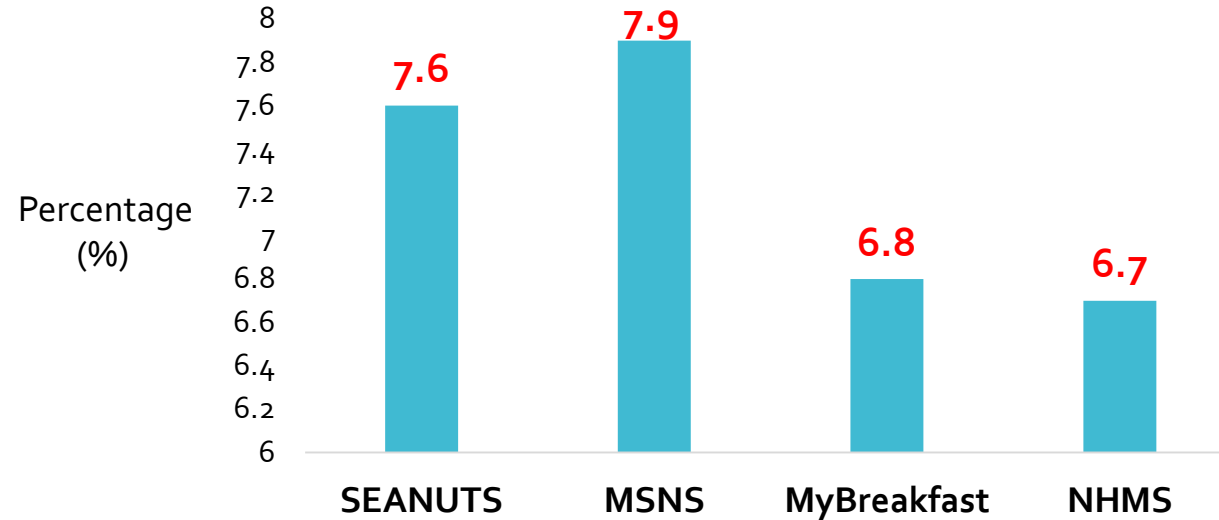
- **Gender:** Girls > Boys
- **Ethnic group:** Bumiputera Sabah/Sarawak (**highest**) and Chinese (**lowest**)
- **Location:** Rural > Urban

*Height-for-Age z score (WHO 2007)

Findings: 1. Height & Weight status

Thinness

- Overall prevalence also < 10%



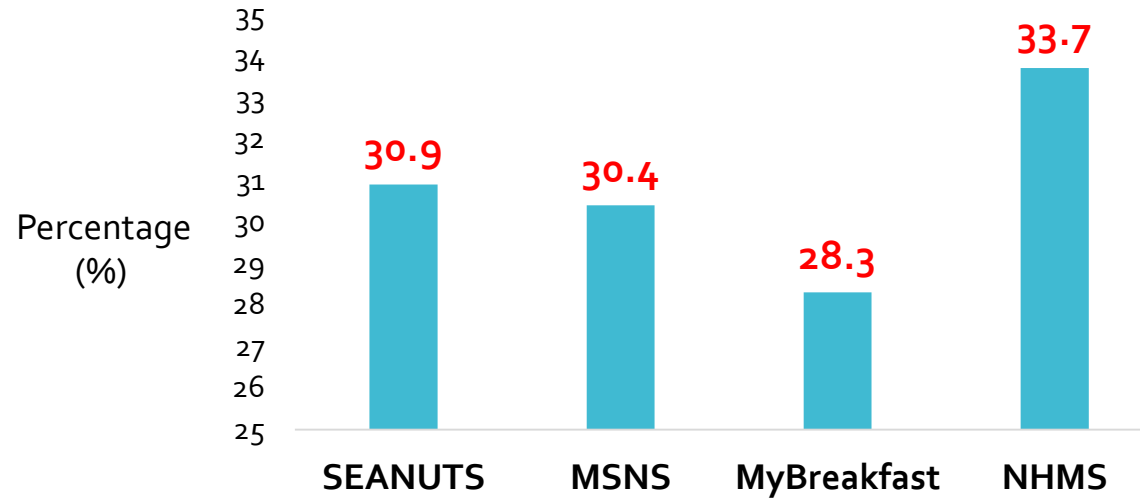
- **Gender:** Boys > Girls
- **Ethnic group:** Indian (**highest**) and Bumiputera Sabah/Sarawak (**lowest**)
- **Location:** Rural = Urban

*BMI-for-Age z score (WHO 2007)

Findings: 1. Height & Weight status

Combined overweight and obesity

- Overall prevalence **high** with close to 34%



- **Gender:** **OW**, Girls > Boys while **OB**, Boys > Girls but overall **Boys**
- **Ethnic group:** Varies across studies in which **highest** among Indians and Bumiputera Sarawak and **lowest** among Bumiputera Sabah and Malays
- **Location:** Urban > Rural

*BMI-for-Age z score (WHO 2007)

Findings:

2. Dietary intakes from SEANUTS 2013

- Instrument: Validated 94-item semi-quantitative FFQ
- **Energy** and **macronutrient** intakes: Boys > Girls; Urban = Rural
- **Micronutrient** intakes:
 - Urban girls > Rural girls for mean intakes
 - More of urban boys who did not achieve RNI for **energy and vitamin C** compared to urban girls.
 - More of rural girls who did not achieve RNI for **iron, vitamins A and D** compared to urban girls

Table: Total percentage **NOT** achieving Malaysian RNI (urban vs rural)

Energy/Nutrient	Urban	Rural
Energy	35.7%	38.9%
Protein	0.9%	1.4%
Calcium	65%	70.3%
Iron	11.5%	15.5%
Vitamin C	11.2%	12.8%
Vitamin A	3.7%	9.9%
Vitamin D	52.3%	63.2%

Findings: 2. Dietary intakes from MSNS 2012

- Instrument: Validated 135-item FFO
- **Poor** intakes of **vegetables** and **milk and milk products** daily.

Table: Mean servings per day by food group

Food Group	Mean Servings/day	Meet recommended servings/day
Rice, cereals, grains	8.0	Yes (4-8 servings/day)
Fruits	2.2	Yes (2 servings/day)
Vegetables	1.0	No (3 servings/day)
Milk & milk products	0.6	No (1-3 servings/day)
Poultry, meat, egg	2.2	Yes (1/2 – 2 servings/day)
Fish	1.1	Yes (1 serving/day)
Legumes	0.6	Yes (1/2 – 1 serving/day)

Findings: 2. Dietary intakes from MSNS 2012 (cont'd)

- **More than 50%** consumed less than the recommended servings per day for **majority** of the food groups (fruits, vegetables, milk and milk products, fish and legumes).

Table: Percentages of 3 categories (No, Yes and Exceed) based on the recommended servings for each food group

Food Group	No	Yes	Exceed
Rice, cereals, grains (4-8 servings/day)	11.3	43.0	45.7
Fruits (2 servings/day)	52.5	0.0	47.5
Vegetables (3 servings/day)	93.2	0.1	6.7
Milk & milk products (1-3 servings/day)	80.8	14.9	4.3
Poultry, meat, egg (1/2- 1 serving/day)	10.3	48.2	41.4
Fish (1 serving/day)	52.6	1.4	46.1
Legumes (1/2 – 1 serving/day)	63.3	17.3	19.4

Findings: 2. Dietary intakes from NHMS 2017

- Similarly, **more than 50%** did not meet the recommended servings per day for fruits, vegetables, milk and milk products, and fish.

Table: Percentages of 3 categories (No, Yes and Exceed) for Standard 4,5 and 6 based on the recommended servings for each food group

Food Group	No	Yes	Exceed
Rice, cereals, grains (4-8 servings/day)	23.9	58.1	18.0
Fruits (2 servings/day)	60.9	0.3	38.8
Vegetables (3 servings/day)	91.4	0.0	8.6
Milk & milk products (1-3 servings/day)	64.3 ↓	30.6	5.1
Poultry, meat, egg (1/2- 1 serving/day)	9.7	58.4	31.8
Fish (1 serving/day)	76.3 ↑	2.2	21.5
Legumes (1/2 – 1 serving/day)	44.4 ↓	24.4	31.2

Findings:

3. Biochemical assessment from SEANUTS 2013

- Four (4) blood biomarkers: Hemoglobin, ferritin, vitamins A and D
- Overall, **high vitamin D** insufficiency (> 50%)
- Rural > urban for anaemia & Vitamin A deficiency
- Girls > Boys for iron deficiency and vitamin D insufficiency while Boys > Girls for vitamin A deficiency
- Rural boys > Rural girls for anaemia

Table: Prevalence of micronutrient deficiency by strata and gender

	Overall	Urban	Rural
Anaemia	4.2	3.6 (Boys: 3.7; Girls: 3.5)	5.1 (Boys: 8.0; Girls: 1.9)
Iron deficiency	4.7	6.4 (Boys: 5.3; Girls: 7.6)	2.2 (Boys: 1.2; Girls: 3.2)
Vitamin A deficiency	3.5	2.8 (Boys: 4.5; Girls: 1.1)	4.5 (Boys: 5.6; Girls: 3.4)
Vitamin D insufficiency	52.6	57.3 (Boys: 48.2; Girls: 66.7)	45.6 (Boys: 38.9; Girls: 52.9)

Findings:
4. Physical activity level from SEANUTS 2013

- Sample size: **1702**
- Instrument: Physical Activity Questionnaire for Older Children (Kowalski et al. 1997)
- Three (3) categories for physical activity level:
 - Low (< 2.04)
 - Moderate (2.04 to < 2.9)
 - High (\geq 2.9)

Table: Physical activity categories by % for overall and sex

Categories	Overall	Boys	Girls
Low	24.5	18.1	30.9
Moderate	49.8	50.5	49
High	25.8	31.4	20.1

Findings: 4. Physical activity level from SEANUTS 2013

- Overall score for physical activity is 2.50 (**moderate**)

Table: Overall Physical activity by socio-demographics and weight status

Variable		Overall Physical Activity
1. Sex*	Boys	2.60
	Girls	2.39
2. Age group*	7-9 years	2.59
	10-12 years	2.40
3. Ethnicity*	Malay	2.58
	Chinese	2.23
	Indian	2.56
	Others	2.54
4. Residential area	Urban	2.49
	Rural	2.53
5. Weight status*	Underweight	2.44
	Normal weight	2.54
	Overweight/obese	2.43

* $p < 0.05$

Findings:
4. Physical
activity level
from
MSNS 2012

- Instrument: Adapted Physical Activity Questionnaire for Older Children (Kowalski et al. 2004)
- Three (3) categories for physical activity level:
 - Low (1- 2.33)
 - Moderate (2.34 to 3.66)
 - High (3.67 to 5.00)
- Mean score = 2.49 (**moderate**)
- Active (moderate & high) = 55.6% & **Not active = 44.4%**
- **Similar** – Boys and non-Chinese. Indians (highest)

Findings:
4. Physical activity level from MyBreakfast study 2015

- Instrument: Physical Activity Questionnaire for Children
- Overall - Low= 28.3%; Medium = 62.4%; High = 9.3%

Table: Physical activity categories by sex and location

Variable	Low	Medium	High
Boys	22.2	64.7	13.1
Girls	33.3	60.2	6.3
Urban	23.5	63.7	12.8
Rural	19.1	57.3	13.6

- *Ethnicity* – Similar, in which Indians (highest) and Chinese (lowest)
- *Weight status* – Higher prevalence of low category in overweight/obese children

Findings:

4. Physical activity level from NHMS 2017

- Same Instrument: Adapted Physical Activity Questionnaire for Older Children (Kowalski et al. 2004)
- Three (3) categories for physical activity level:
 - Low (1- 2.33)
 - Moderate (2.34 to 3.66)
 - High (3.67 to 5.00)
- Mean score = 2.50 (moderate)
- Standard 4, 5, and 6 = 2.49, 2.51, 2.49

Table: Physical activity categories by % for overall and by Standard 4, 5 and 6

Physical Activity	Overall	Standard 4	Standard 5	Standard 6
Not active	43%	44%	42%	43%
Active	57% ↑	56%	58%	57%

Conclusions

Summary

Nutritional status	Highlights
1. Height & Weight status	Below 10% for stunting and thinness High (~35%) for overweight and obesity
2. Dietary intakes	> 30% did not meet RNI for energy, calcium and vitamin D Not a balanced diet , failed to meet the recommended servings for all food groups except cereals and meats group
3. Biochemical assessment	High vitamin D insufficiency
4. Physical activity level	Moderate Low for girls, Chinese and overweight/obese children

- Urgent need for comprehensive intervention in the country
- Investing on the nutritional well-being of our children!

References

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Thank You!

By 2022,
more children and adolescents
(aged 5-19) will be obese
than underweight
if current trends continue.

