



BACKGROUND

- Stunting occurs when children do not attain their potential height for their age¹.
- Childhood stunting has been linked to **poor health, lower educational performance** and **developmental delays**.
- The prevalence of stunting in Malaysia had **increased** from **17.7%** in 2015 to **21.8%** among children below 5 years in 2019 and **11.0%** to **12.7%** among children aged 5-17 years².
- However, **large-scale studies** reporting on the **factors associated** with childhood stunting among Malaysian children are still **scarce**.



Objective: Thus, this study aims to determine the factors associated with stunting among children aged 4 to 12 years in Peninsular Malaysia.

METHODOLOGY

- This study was part of the South East Asian Nutrition Surveys II (SEANUTS II)
- Ethical approval from UKM Research Ethics Committee and written parental consent were obtained prior to data collection.



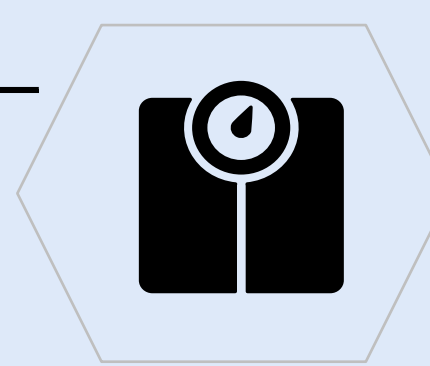
Participants

- 542 children (260 boys, 282 girls)
- Pre-schoolers (4.0–6.9 years): Home-based approach
- School-aged children (7.0–12.0 years): School-based approach
- 4 regions: Central, East Coast, Northern, Southern (Each includes 1 Urban & 1 Rural)
- Multi-stage cluster sampling
- Inclusion criteria:
 - Malaysian children aged 4 – 12 years
 - Parental consent for blood withdrawal
- Exclusion criteria:
 - Have recent medical history (past 3 months) of serious infection, injuries and/or surgeries that required hospitalisation



Physical measurement

- Anthropometry – Height & weight of children
- WHO Anthro Plus software
- Classification of stunting^{3,4}: Height-for-Age z-score < -2SD



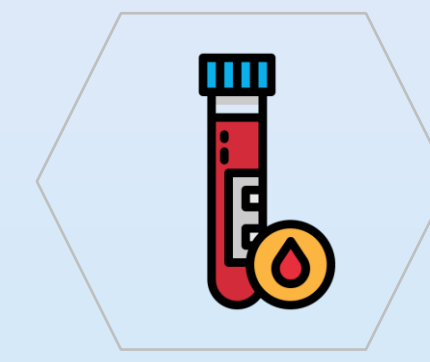
Questionnaires

- Sociodemography
- Child Health & Living Environment - sanitation facility & personal hygiene



Biochemical Analysis

- Venous blood samples taken by phlebotomists
- Haemoglobin levels determined using flow cytometry



Data Analysis

- IBM SPSS Statistics 26
 - Descriptive – Frequency, mean & standard deviation
 - Chi-Square & Binary Logistic Regression (*significant at p<0.05)



RESULTS & DISCUSSION

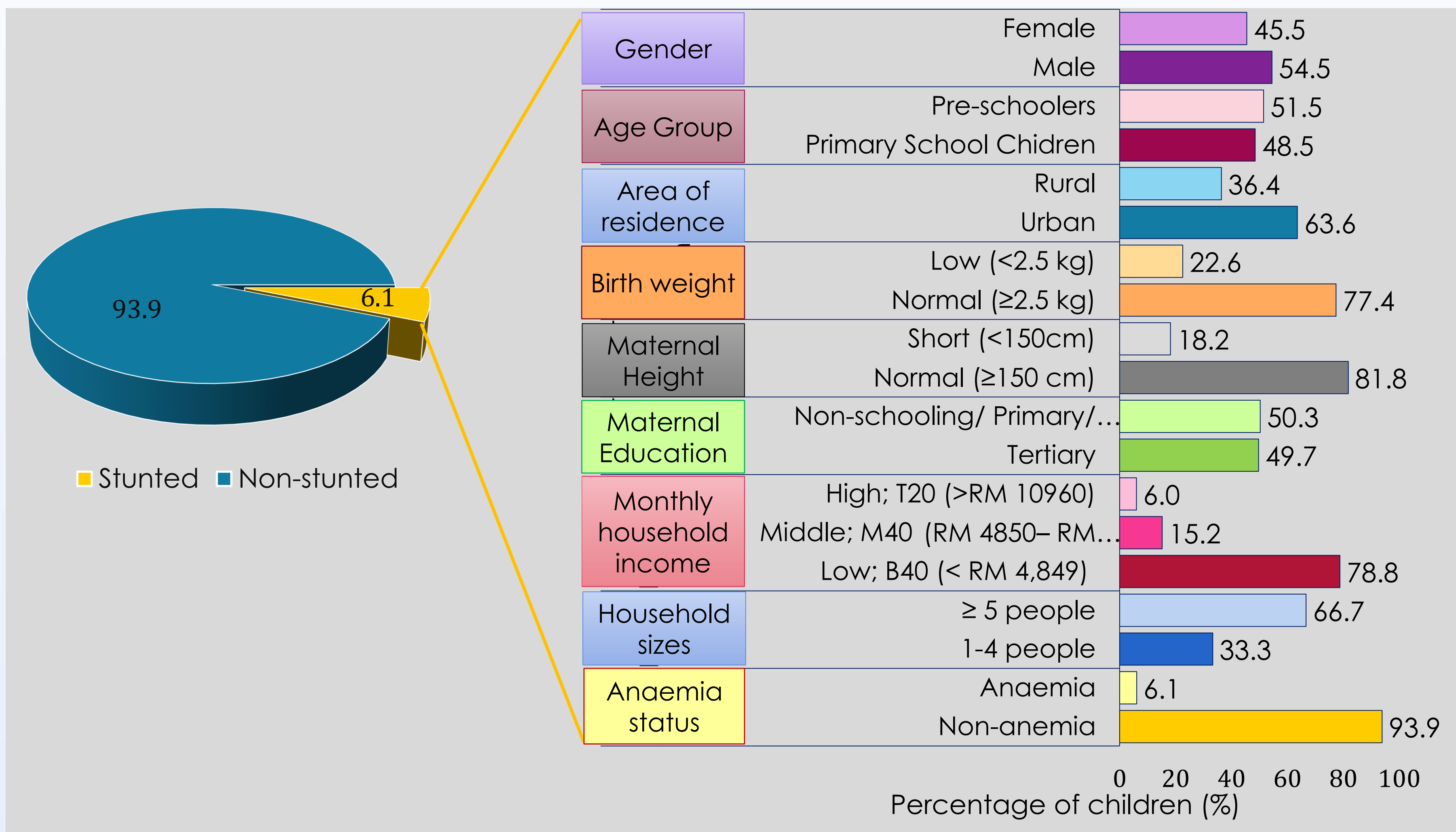


Figure 1 Distribution of children and characteristics of stunted children

- 6.1% of children** in this study were stunted with higher proportions in **boys, pre-schoolers, urban areas, normal birth weight and maternal height, low monthly income, household sizes of 5 people or more and non-anaemic** [Figure 1].
- No association** was found between **area of residence** and **household income** among stunted children (p=0.223), although the **majority** of stunted children were from **low-income families** residing in **urban areas**. Therefore, it is important to also focus on urban poor families when mitigating childhood stunting issues⁵.
- Families who have **higher household size** are more **financially constrained**. Parents often struggle to provide adequate nutrition for their children in order to meet the child's daily nutritional requirements for proper growth development⁵.
- Only **6.1% of children with stunting** appeared to have **anaemia**. However, no significant association was found between anaemia and stunting in this study [Table 1].
- Majority** of stunted children and their mothers **applied good hygiene practices with proper sanitation facilities at home** [Figure 3].

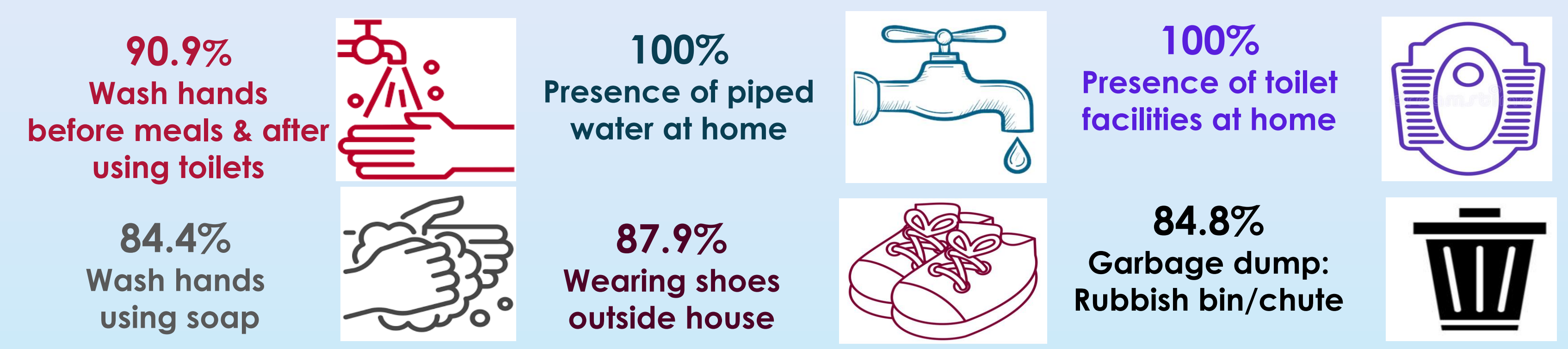


Figure 3 Sanitation and hygiene practices among stunted children (n=33)

Variables	Reference group	Odds Ratio	95% CI	p-value
Gender of child				
Female	Male	0.706	0.33, 1.51	0.372
Age group				
Pre-schoolers	Primary school children	2.14	0.98, 4.65	0.056
Area of residence				
Urban	Rural	0.813	0.37, 1.80	0.608
Child weight during birth				
Low birth weight (< 2.5kg)	Normal (≥2.5 kg)	3.12	1.20, 8.17	0.020*
Maternal height (cm)				
Short (<150 cm)	Normal (≥150 cm)	2.93	1.03, 8.35	0.044*
Maternal education, n (%)				
Non-schooling/ Primary/ Secondary education	Tertiary education	2.01	0.75, 5.34	0.163
Monthly household income^a				
Low; B40 (< RM 4,849)	High: T20 (>RM 10960)	2.34	0.73, 7.53	0.153
Middle; M40 (RM 4850– RM 10959)		0.87	0.10, 7.99	0.383
Monthly household consumption expenditure^b				
<RM783	>RM783	1.18	0.52, 2.66	0.700
Hemoglobin, g/L^c				
Non-anaemia, n (%)	Anaemia, n (%)	0.55	0.11, 2.86	0.479

Binary Logistic Regression Test: *p<0.05
^aSource: Household Income and Basic Amenities Survey Report 2019, Department of Statistics Malaysia; ^bSource: Household Expenditure Survey Report 2019, Department of Statistics Malaysia; ^cSource: WHO (2011) Cut off anaemia: < 110g/L (< 5 years), <115 g/L (5-11 years), < 120 g/L (12-14 years)

- Factors including **birth weight** and **maternal height** were **significantly associated** with **stunting** [Table 1].
- Low birth weight** infants are more likely to be **stunted** as they tend to have growth faltering compared with babies born with normal weight⁶.
- The significant association between **maternal and child stature** may reflect their shared genetics. Children born to short stature mothers are prone to be stunted due to mother's insufficient supply of nutrients⁶.

CONCLUSION

- Birth weight and maternal height are the two main factors identified as being associated with stunting among Malaysian children.
- Strategies to address childhood stunting should aim to ensure good nutritional status among girls and healthy pregnancies with good gestational weight gain.

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