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Association between Sociodemographic Factors with Nutritional Status among Primary School Children in Setiu, Terengganu, Malaysia

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ABSTRACT

This study aims to determine the association between sociodemographic aspects and nutritional status among rural Setiu, Terengganu schoolchildren. A cross-sectional study using convenience sampling was conducted among 269 primary school children. Sociodemographic information was obtained from parents or guardians through face-to-face interviews, and standardized techniques and calibration were adopted for anthropometric measurements. The World Health Organization Anthro Plus was used to generate the z-scores for Weight-for-Age (WAZ), Height-for-Age (HAZ), and Body Mass Index-for-Age (BAZ) to indicate underweight, stunting, and obesity among the children. Chi-squared test was used to determine the association between sociodemographic factors and nutritional status. The children exhibited mean WAZ, HAZ, and BAZ scores of -0.66, -0.82, and -0.00, respectively. Approximately 13.8% of schoolchildren in this study were stunted, 16.7% were underweight, 8.9% were overweight, and 11.5% were obese. Age and the father's education level were significantly associated with WAZ (p=0.02 and p=0.001), household size was associated with HAZ (p=0.029), and BAZ was found to be associated with the father's income factor (p=0.03). This study discovered that the majority of results from the measurement of WAZ, HAZ and BAZ were in normal growth with 81 (79.4%), 230 (85.5%) and 196 (72.9%), respectively. In conclusion, this study indicates that most of the sociodemographic factors were not associated with nutritional status and the prevalence of malnutrition among primary school children in the rural areas of Setiu, Terengganu was lower than in the other rural areas.

Keywords: anthropometric, nutritional status, rural areas, school-aged children, sociodemographic

INTRODUCTION

Better strategies for enhancing early childhood nutrition may result from an understanding of early-life complementary feeding dietary patterns and their underlying causes. Sociodemographic and economic aspects have been linked to the nutritional condition of young children, including adolescent age, mother's age, income, parent's employment, and literacy level (Arage *et al.* 2019), specifically in rural areas (Hoang *et al.* 2018). There are several known risk factors for malnutrition, including nutritional status, poverty, ignorance, inappropriate feeding, parental separation, multiple pregnancies and the mother's health. (Shafqat *et al.* 2013). Previous studies have demonstrated gradients between food and socioeconomic status across all stages of human development, and that bad eating habits are substantially associated with lower socioeconomic status (WHO 2020). Malnutrition trends among children older than 5 years old, nevertheless, are a problem that is being ignored. The World Health Organisation (WHO 2021) reported that 90% of the world's 1.8 billion children between the ages of 5 and 15, live in Low- and Middle-Income Countries (LMICs) and simultaneously the rates of childhood overweight and obesity are also rising.

In Malaysia, primary school children suffer from overnutrition and malnutrition (Poh *et al.* 2013). On the other hand, Malaysia has transitioned from relative undernutrition to overnutrition. The percentage of underweight children fell from 55% to 14% in just ten years. In Malaysian children aged 10 to 12, the prevalence of overweight and obesity was 16.3% and 17.4%, respectively. These rates were twice as high as those of undernutrition (7%) and stunting (7.8%) (IPH 2018). Primary school children (33.7%) had a higher prevalence of overnutrition than secondary school adolescents (28.5%) (Teo *et al.*

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2019). Along with socioeconomic and lifestyle changes, which are frequently attributed to a combination of globalization and urbanization, the obesity pandemic in Malaysia grew. Regardless of age, race, or social position, changes in eating habits and sedentary lifestyles have been linked to an increase in obesity (Wafa & Ghazalli 2020). Meanwhile, in children aged six months to 12 years, it appeared that overweight (9.8%) and obesity (11.8%) are more common than stunting (8.4%) and thinness (5.4%) (Poh *et al.* 2013). Children stunted at school age are likely to have been exposed to poor nutrition since early childhood. In Brazil, school-age boys had a much higher rate of stunting than school-age girls. It was indicated that 13% of school-age children were underweight and that 21% of them were stunted. As the research population aged, both nutritional status indices declined, notably in boys (Mwaniki & Makokha 2013). Malnutrition in rural areas mainly manifests as being underweight, while wasting is more common in urban areas. The problem affects different ages and socioeconomic statuses (Abdel Wahed *et al.* 2017). However, there needs to be more research and data on the nutritional status among school children aged 7 to 12 years old in Malaysia, particularly in rural areas in Terengganu. Many studies have reported that sociodemographic factors are associated with children's nutritional status in urban areas. Therefore, in this study, we aim to determine the nutritional status of school children in rural Setiu and its association with the sociodemographic condition.

METHODS

Design, location, and time

A cross-sectional study involving 269 schoolchildren aged 7 to 12 years old in rural areas of Setiu District, Terengganu, Malaysia. This study was conducted from 1st August 2022 until 18th February 2023. The interview was conducted at their houses to gather information for sociodemographic profiles using questionnaires and anthropometric measurements (height and weight).

The ethics with a study protocol (UniSZA/UHREC/2022/411) was granted by the UniSZA Human Research Ethics Committee (UHREC). Information sheets about the study and consent forms were disseminated to the school-aged children and their parents or guardians who met the criteria before collecting data.

Sampling

Study participants were selected based on the inclusion and exclusion criteria at the point of data regardless of ethnicity. Participants must be Malaysian citizens and are literate in the Malay language. In Malaysia, rural areas are defined as areas with a population of less than 10,000 people, having agriculture and natural resources as the main population income and in which its population is either clustered, linear, or scattered. The Setiu district was chosen as its population density was 52 per km^2 (Terengganu Basic Data 2020). The villages were identified as rural areas based on the total population and the main jobs of residents were self-work and self-employed.

The sample size was calculated by using a single and two-proportion formula (5% margin of error, a 95% confidence level, and a 20% for non-response rate). A convenience sampling technique was used to choose the school children from six selected villages in the Setiu district. The study excluded schoolchildren with chronic diseases, non-Malaysian citizens, and living outside the selected area.

Data collection

A structured interviewer-administered questionnaire was used and adopted from Poh *et al.* (2019), considered the associated nutritional status factors and covered various sociodemographic characteristics. The interview session took about 20 minutes on average. The school-aged children's anthropometry (weight and height) was measured by a trained researcher using a well-calibrated SECA scale and a height measuring board of a stadiometer, respectively. Every measurement was made thrice, and the mean was recorded.

Anthropometric measurements of school aged children were converted to Weight-for-Age Z-Scores (WAZ), Height-for-Age Z-Scores (HAZ), and Body Mass Index-for-Age Z-Scores (BAZ) using the WHO AnthroPlus software (WHO 2009). The age- and sex-specified z-scores were then classified according to the WHO growth reference for school aged children and adolescents (de Onis *et al.* 2007). Underweight, stunting and thinness for school children were defined as WAZ, HAZ and BAZ<-2 Standard

Deviation (SD) whereas overweight for children were defined as BAZ>1 SD and obesity as BAZ>2 SD. For weight-for-age, only a sample of 102 school children aged 10 years and younger was analyzed, excluding 167 school children aged 11 years and above.

Data analysis

The data were analysed using IBM SPSS version 26.0 for Windows (IBM Corporation, New York, USA). Descriptive analysis was used to determine the sociodemographic patterns and nutritional status (WAZ, HAZ and BAZ) of school aged children. Normality tests were applied by using the Kolmogorov-Smirnov criterion. The Pearson Chi-square test and Fisher's Exact test were used to assess the significance of the association between sociodemographic factors and nutritional status among school aged children. Results from all statistical analyses were considered significant associations if the p-values were less than 0.05.

RESULTS AND DISCUSSION

Distribution of sociodemographic characteristics

The mean age was 10.0±1.57 years and the majority age was 10 to 12 years (68.4%) (Table 1). About 52.8% were boys and 47.2% were girls, with only one Malay ethnicity identified. The data from The Population and Housing Census of Malaysia (2020), reported that Malay was the main ethnic with 99.5% and others were 0.45%. Most respondents (97%) were living in a household with at least 4 members, 56.5% had 4 to 6 members in the household and 40.5% had a household size >7 members. Most of the parents of the respondents have received secondary education, which was 65.8% among fathers and 72.9% among mothers. This household income in Malaysian Ringgit (MYR) was divided into four groups, using criteria set forth in the Tenth Malaysia Plan. About 55.8% of respondents' fathers had an income <MYR1,500 while 71.0% of mothers had no income. So that, it was noted that most of them were in the category of very low income.

Nutritional status

Table 2 shows the anthropometric assessment with the mean height was 135.4±11.8 cm and the mean weight was 33.4±12.6 kg. The average values of WAZ, HAZ and BAZ were −0.66 and -0.82, and -0.00, respectively, all within the normal range of the WHO growth standard. The majority of respondents were normal in height (85.5%), body weight (79.4%) and BAZ (72.9%). However, about 13.8%, 16.7%, and 20.4% of the respondents were stunted, underweight and overweight/obese, which means that there is a double-burden malnutrition among the school aged children in this rural Setiu. These findings were differed from the national prevalence reported in the National Health Morbidity Survey 2019, where the prevalence of underweight, stunting, overweight and obesity among children aged 5 to 17 years in rural areas were 14.2%, 17.1%, 13.7% and 13.2%, respectively (IPH 2020). A study of fishermen's school children aged 7 to 11 years in Terengganu also showed varying prevalence of stunting (9.9%), overweight (12.9%) and obesity (2.0%) (Hashim *et al.* 2021).

Association between sociodemographic characteristics and nutritional status

Gender and nutritional status. This study, however, failed to demonstrate any significant association between gender and WAZ, HAZ and BAZ ($p<0.05$) (Table 3). Similar findings were observed in the nation-based surveys of children aged 6 to 17 years in Malaysia, in that secular changes in overweight and obesity did not differ significantly by gender (Mohamad *et al.* 2021). However, a local study conducted in seven districts in Terengganu revealed that female children aged 13 to 17 years had significantly higher BMI than male children, but did not show significant difference in BMI of children aged 10 to 12 years (Zulaily *et al.* 2017). Different finding was found in a rural setting in Fayoum Governorate, Egypt, where Abdel Wahed (2017) reported that male children (6 to 17 years) were significantly more obese than female children, but stunting and underweight did not differ significantly between gender. A plausible explanation for the inconsistent findings is that there may be gender and child nutritional status differences across regions and countries. Different socio-demographic backgrounds have different cultural influences on feeding and caregiving attitudes and practices due to power relations and social norms (Monterrosa *et al.* 2020).

Table 1. Socio-demographic pattern of school children aged 7 to 12 years at Rural Setiu, Terengganu (n=269)

Characteristics	Frequency (n)	Percentage (%)
Gender		
Male	142	52.8
Female	127	47.2
Age (years)		
7–9	85	31.6
10–12	184	68.4
Household size		
1–3	8	3.0
4–6	152	56.5
>7	109	40.5
Father's education level		
No schooling	2	0.7
Primary school	53	19.7
Secondary school	177	65.8
Tertiary school I	23	8.6
Tertiary school II	14	5.2
Mother's education level		
No schooling	4	1.5
Primary school	31	11.5
Secondary school	196	72.9
Tertiary school I	38	14.1
Father's income (per month)		
No income	21	7.8
<MYR1,500	150	55.8
MYR1,500–RM2,299	65	24.2
MYR2,300–RM5,599	27	10.0
>MYR5,600	6	2.2
Mother's income (per month)		
No income	191	71.0
<MYR1,500.00	37	13.8
MYR1,500.–RMYR2,299	18	6.7
MYR2,300–MYR5,599	18	6.7
>MYR5,600	5	1.9

MYR: Malaysian Ringgit; MYR1.00=USD0.21
Tertiary school I represents Diploma and Degree
Tertiary school II represents Master and PhD Degree
Household income adopted from the fourth criteria, Tenth Malaysia Plan (Poh *et al.* 2019)

Table 2. Nutritional status among school children aged 7 to 12 years in rural Setiu, Terengganu

Nutritional status	Mean±SD	n (%)
Height (cm)	135.37±11.84	
Weight (kg)	33.37±12.55	
WAZ	-0.66±1.33	n=102
Severe underweight		2 (2.0)
Moderate underweight		15 (14.7)
Normal		81 (79.4)
Overweight		4 (3.9)
HAZ	-0.82±1.10	n=269
Severe stunting		4 (1.5)
Moderate stunting		33 (12.3)
Normal		230 (85.5)
Tall		2 (0.7)
BAZ	-0.00±1.46	n=269
Severe thinness		2 (0.7)
Moderate thinness		16 (5.9)
Normal		196 (72.9)
Overweight		24 (8.9)
Obesity		31 (11.5)

BAZ: Body Mass Index for Age (7 to 12 years); HAZ: Height for Age (7 to 12 years); WAZ: Weight for Age (7 to 10 years)

Age and nutritional status. Age was significantly associated with the WAZ ($p<0.05$); significantly more children aged 7 to 9 years were malnourished than those aged 10 to 12 years. This result is similar to a study in Palestinian by Al-Lahham *et al.* (2019) in which age (6 to 12 years) of being underweight was found to be significantly associated ($p<0.001$). A previous study reported that age was among the risk factors for being underweight. Stunting in school-age children may be linked to early exposure to poor nutrition, besides recent advances in maternal and child care practices may help to reduce the prevalence of stunting in younger children. The (IPH 2018) reported that the prevalence of overnutrition, among Malaysian children aged 10 to 12 years (overweight 16.3% and obesity 17.4%) was two times higher than undernutrition which is 6.7% and stunting 7.8%.

Household size and nutritional status. An association was found between household size and HAZ of children as depicted in Table 3. There were more malnourished children (56.4%) than normal children (37.8%) in households of >7 members. Similar findings were reported in school aged children in Ethiopia (Argaw *et al.* 2022; Berhanu *et al.* 2022) and Egypt (Abdel Wahed *et al.* 2017). Argaw *et al.* (2022) reported that children who had household members >5 were 2.1 times more likely to be stunted than those living in households of <5 members. More cases of stunting were seen in the big family members as compared to small family members. Household size has an impact on food scarcity, particularly in households of rural areas and with non-fixed income sources. As compared to smaller families with the same level of economic power, the larger family size would indicate less food being available for each family member,

Table 3. Association between sociodemographic characteristics and nutritional status (WAZ, HAZ and BAZ) among school-aged children in rural Setiu, Terengganu

Sociodemographic	WAZ (n=102)				HAZ (n=269)				BAZ (n=269)			
	Normal (n=81)	Others (n=21)	X^2/ Fisher's exact test	*p*	Normal (n=230)	Others (n=39)	X^2/ Fisher's exact test	*p*	Normal (n=196)	Others (n=73)	X^2/ Fisher's exact test	*p*
Gender												
Male	41 (50.6)	11 (52.4)	0.021[a]	0.885	120 (52.2)	22 (56.4)	0.240[a]	0.624	110 (56.1)	32 (43.8)	3.222[a]	0.073
Female	40 (49.4)	10 (47.6)			110 (47.8)	17 (43.6)			86 (43.9)	41 (56.2)		
Age												
7–9 years	63 (77.8)	21 (100.0)	_[b]	0.020*	72 (31.3)	13 (33.3)	0.064[a]	0.801	63 (32.1)	22 (30.1)	0.157[a]	0.780
10–12 years	18 (22.2)	0 (0.0)			158 (68.7)	26 (66.7)			133 (67.9)	51 (69.9)		
Household size												
<7	47 (58.0)	9 (42.9)	1.549[a]	0.213	143 (62.2)	17 (43.6)	4.778[a]	0.029*	118 (60.2)	42 (57.5)	0.314[a]	0.575
≥7	34 (42.0)	12 (57.1)			87 (37.8)	22 (56.4)			78 (39.8)	31 (42.5)		
Father's educational level												
No to primary	22 (27.1)	3 (14.3)	13.427[a]	0.001**	49 (21.3)	6 (15.4)	1.160[a]	0.560	45 (23.0)	10 (13.7)	4.400[a]	0.111
Secondary education	53 (65.4)	10 (47.6)			151 (65.7)	26 (66.7)			128 (65.3)	49 (67.1)		
Tertiary education	6 (7.4)	8 (38.1)			30 (13.0)	7 (17.9)			23 (11.7)	14 (19.2)		
Mother's educational level												
No to primary n	9 (11.1)	2 (9.5)	3.504[b]	0.196	28 (12.2)	7 (17.9)	0.992[a]	0.609	27 (13.8)	8 (11.0)	0.322[a]	0.516
Secondary education	65 (80.2)	14 (66.7)			169 (73.5)	27 (69.2)			144 (73.5)	52 (71.2)		
Tertiary education	7 (8.6)	5 (23.8)			33 (14.3)	5 (12.8)			25 (12.8)	13 (17.8)		
Father's income (per month)												
<MYR1,500	50 (61.7)	11 (52.4)	0.606[a]	0.436	145 (63.0)	26 (66.7)	0.189[a]	0.664	135 (68.9)	36 (49.3)	8.789[a]	0.030*
≥MYR1,500	31 (38.3)	10 (47.6)			85 (37.0)	13 (33.3)			61 (31.1)	37 (50.7)		
Mother's income (per month)												
<MYR1,500	70 (86.4)	17 (81.0)	_[b]	0.504	192 (83.5)	36 (93.3)	_[b]	0.227	168 (85.7)	60 (82.2)	0.511[a]	0.475
≥MYR1,500	11 (13.6)	4 (19.0)			38 (16.5)	3 (7.7)			28 (14.3)	13 (17.8)		

*p<0.05; ** p<0.01; [a]Pearson chi-square test; [b]Fisher's Exact test

which can lead to stunting (Herrera-Cuenca *et al.* 2021).

In this study, even though children were from low-income families, they were normal in WAZ, HAZ, and BAZ. This was likely due to the nutritious food availability as some of the children participated in the Food Supplement Programme (*Rancangan Makanan Tambahan*) provided at the school canteen, financially supported by the Ministry of Education, Malaysia. However, this study also involved children from high and medium family income (21%) since the data collection method was collected from all available participants who met the study's criteria and was drawn by a convenience sampling size population.

Parental income and nutritional status. It is observed that most children who came from the low father's income category (less than MYR1,500) were in normal growth (68.9%) whereas more malnourished children (50.7%) had higher fathers' income of >RM1,500 (Table 3). The study by Poh *et al.* (2019) that uses the Malaysian data from the South East Asian Nutrition Surveys (SEANUTS) revealed a similar result where about one-third of subjects were from low-income households (<MYR1,500 per month) and less than one-fifth were from high-income households (≥MYR5,600 per month). Based on the study by Naidu *et al.* (2013), it is found that about 66% of the guardians of 7,749 children aged 7 to 12 years in Malaysia fall into the household income group income that is less than MYR2,000. Households with higher income showed a higher prevalence of overweight than households with lower income. Our study evidenced the association between parental income and nutritional status.

It was postulated that the educational level among the parents contributed as most of them (86%) received the highest education at the secondary level. The demographic of this rural Setiu District area is mainly related to the agricultural and tourism business. Some might have higher incomes and better salaries but with lower education levels. Due to the hustle and job commitment, they may prefer to have outside meals that are considered less healthy food choices. This study was in agreement with Ahmad *et al.* (2018), which highlighted the impact of gender, family factors, and socioeconomic factors on children's eating and physical activity habits. Family members, especially the parents, have important equal roles in the provision of meals as well as shaping their children's eating and physical activity habits. However, further prospective studies should be conducted examining other risk factors to determine the real causes of this situation.

Parental education level and nutritional status. The father's education level was also associated with WAZ ($p<0.001$). More normal weight children (65.4%) lived in households where fathers had received secondary education, while more malnourished children lived in households where fathers (38.1%) had at least tertiary education. Children's initial food experience begins with the parents' diet. This first exposure allows the child to be receptive to new flavours, thus increasing food acceptance for more variety. Thus, parents' education influences their early stages. A Lithuanian COSI study investigated the relationship between parental income, education level, and children's eating habits, and found that parents' higher education and income had a significant impact on their children's daily breakfast and fresh fruit consumption (Petrauskiene *et al.* 2015).

The WAZ results revealed that 79.4% children were normal, moderate underweight (14.7%), and 2.0% were severely underweight. The prevalence in this study was higher than the study by Zainuddin *et al.* (2013) in Malaysia, and the national prevalence of underweight among school children was 13.6%, and it was doubled in rural areas compared to urban areas. An observed outcome for HAZ demonstrates that in most of the children, 85.5% were normal, 12.3% had moderate stunting, 1.5% had severe stunting, and 0.7% were extreme tallness. The study by Tyagi *et al.* (2023), summarized that 1.4% of children (aged 6 to 15 years old) were found to be stunted.

The BAZ also revealed similar outcomes as most children having normal growth (72.9%), followed by obesity (11.5%), overweight (8.9%), moderate thinness (5.9%) and severe thinness (0.7%). This result was consistent with the study in Malaysia by Naidu *et al.* (2013). Even though they were in a rural area, a traditional fishing village, and the villagers lived in long-established ways, the access to processed food was easy. The children in rural areas potentially had higher risk factors for overweight and obesity due to the daily consumption of salty, dried, and snack food products such as artificial fish

and seafood crackers. The findings were in line with previous studies where most rural islanders had a high proportion of consuming fish or/and seafood due to engaging in traditional fishing activity (Farmery *et al.* 2020). A study by Ismail *et al.* (2022) in rural area in Kedah reported that the population lifestyle, availability of fast and processed food, sedentary or less physically active lifestyle, and consumption of an energy-rich but nutrient-poor diet, which results in a high number of obesities among them. As for nutrient components, excessive amounts of fat and sodium from recommendations were due to high consumption of cooking or purchasing more fried foods, coconut milk, and soy sauce dishes.

Children's mean daily energy increases were more prevalent when they ate salty snacks (Nurwanti *et al.* 2019). A report by Al-Lahham *et al.* (2019) reviewed that the age of students (6 to 12 years old) and the father's educational level were risk factors and was significantly associated with the WAZ ($p<0.05$). The prevalence of being underweight is higher among children of less educated parents than children of highly educated backgrounds. However, the results show that parental educational level was not significantly associated with BAZ, and the result was in contrast with the studies conducted in Turkey and Malaysia which revealed that children with highly educated parents are more likely to be overweight. Additionally, studies in developed countries have strongly suggested the opposite association, where children of parents with poor levels of education showed an approximately higher risk of obesity by a factor of two to three. Parents with higher levels of education are more likely to be aware of potential health issues and are more likely to protect their children from an unhealthy lifestyle than those in rural areas (Syahrul *et al.* 2016). This study, however, failed to demonstrate any significant association between gender, age, and household size with BAZ as supported by Mohamad *et al.* (2021), as there was no significant association between overweight and obesity between males and females. This finding is also consistent with the study by Adetunji *et al.* (2019), whereby it stated an insignificant difference between the prevalence of overweight and obesity and school age. The present study demonstrates that stunting was higher in both low parental educational levels, with 13.4% and 14.3%, respectively, but had no significant association. Other sociodemographic factors, such as age, gender, and parental income, were not significantly associated with HAZ.

This result was supported by a study by Yefri *et al.* (2022), which indicated no relationship between the parent's age, the father's education level, and the number of children with the risk of stunting. Though, the opposite results from the national survey done by Argaw *et al.* (2022) in Gedeo Zone, South Ethiopia, claimed that the children's stunted growth was significantly correlated with the educational status of mothers. Stunted children were twice as likely to be born to mothers who couldn't read as to mothers with a formal education. In this study, the father's income that was categorized as low income has a significant association with obesity as it was consistent with the result of Reis *et al.* (2020), which reported that children of lower-income families had been significantly affected by obesity. Lower income levels and Socioeconomic Status (SES) lead to low-income communities with substandard food and built environments and low affordability of healthy food. A similar study emphasized that children from low-income families are more likely to be obese for several reasons, including access to affordable and healthy food, participation in recreational activities, or a built environment that discourages physical activity, such as a lack of playgrounds or walkways (Anderson *et al.* 2021). It contrasted with the recent study of rural and urban primary school children's age, which found no significant association between parental income and overweight or obesity (Mesawa *et al.* 2020).

The findings could provide an overview to alert the authorities for future targeted intervention. A more comprehensive study can be explored to gain a deeper understanding of underweight, stunting and obesity among preschool children. However, it was noted that the present work has certain limitations. Since the present work focused on BMI, therefore this study did not report on other household factors that are associated with BMI such as the impact of dietary intake on nutritional status. Hence, the cross-sectional study was unable to assess the causal association between demographic characteristics and nutritional status. In addition to making a substantial contribution to accurate and reliable effect size estimation, the hierarchical

regression approach is important for investigating linked risk factors in the presence of interrelated components at various levels.

CONCLUSION

This study determined the association between sociodemographic factors (gender, age, household size, parent's education level, and income) and nutritional status (underweight, stunting and overweight/obesity) among rural Setiu, Terengganu primary schoolchildren. The majority of results from the measurement of WAZ, HAZ and BAZ were in normal growth. The underweight condition of the children was predominantly associated with the gender of the children and high paternal education levels among the children. This study identified only household size as a derived factor and significantly associated with stunting. A significant association between sociodemographic factors (father's educational level and income) was found with the BAZ. This study discovered that not every sociodemographic factor has a correlation with nutritional status. In conclusion, improvement and detailed research on parents' income, educational level and household size should be emphasized to reduce nutritional problems among primary school children.

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DECLARATION OF CONFLICT OF INTERESTS

The authors have no conflict of interest.

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