ORIGINAL ARTICLE

Association Between Sociodemographic, Child Behaviour and Parent's Child Feeding Practice With Nutritional Status among Standard One School Children in Kota Kinabalu

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ABSTRACT

Introduction: Childhood malnutrition, caused by multiple factors and linked to various health issues, is a significant public health concern. Therefore, this study aimed to estimate the prevalence of malnutrition among primary school children in Kota Kinabalu and its associated factors. **Methods:** This cross-sectional study was conducted among Standard One primary school children (7 years old). The BMI-for-age was calculated, the Child Physical Activity Questionnaire (CPAQ) and the Child Feeding Questionnaire (CFQ) were utilised to assess the contributing factors. While multinomial regression is used to predict the probability of different outcomes. **Results:** In this study, 35.5% of children were underweight and 13.2% were overweight. Boys (OR 0.7; 95% CI 0.522-0.931) and children without a TV in view during meals (OR 0.740; 95% CI 0.549-0.997) were less likely to be underweight. Children of Kadazan ethnicity (OR 1.964; 95% CI 1.055-3.658) were more likely to be overweight than others. Parents of overweight children felt less responsible for their child's feeding (OR 0.67; 95% CI 0.521-0.863) and perceived their child (OR 3.245; 95% CI 1.745-6.034) and themselves as heavier (OR 1.822; 95% CI 1.023-3.244). In contrast, parents of underweight children perceived their children to be lighter (OR 0.425; 95% CI 0.284-0.637). Finally, parents of overweight children put less pressure on their children to eat (OR 0.584; 95% CI 0.448-0.761) than parents of normal and underweight children. **Conclusion:** Addressing the complex interplay between socio-cultural factors and parental attitudes in childhood malnutrition is crucial in designing effective interventions to combat malnutrition and promote healthier lifestyles.

Keywords: Malnutrition; Sociodemographic; Child behaviour; Parent's child feeding practice; Child feeding questionnaire

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INTRODUCTION

According to the sustainable developmental goal (SDG) two, improving nutrition is critical in creating better health for future generations. It all starts with food from an early age to make a healthy adult productive and beneficial (1)(2). Childhood nutrition problem is a serious global concern, especially when facing the double burden of underweight and obesity. Substantial steps must be taken to lessen the double burden of disease before it threatens the growth and development of children and young people (3)(4). A child's nutritional awareness and eating habits are shaped by various factors, including the dietary environment at home, food availability, feeding guidelines, parental role modelling in food choices, and food preparation skills. Therefore, it is important to address these modifiable factors to prevent malnutrition in children (5).

The intricate interplay of availability, accessibility, and utilisation of food and healthcare services has led to malnutrition becoming a worldwide epidemic that impacts individuals in every country (6). The World Health Organization (WHO) database shows around 1.9 billion adults are overweight, while 462 million are underweight. Approximately 41 million children under 5 are overweight or obese, 159 million are stunted, and 50 million are wasted (7). In Malaysia, for children aged five to ten, the prevalence of underweight and overweight stand at 15.4% and 9% respectively (8). According to the most recent data, the percentage of overweight and obesity among children in Sabah, particularly in Kota Kinabalu, is 13.9% (9). Both undernutrition and overnutrition are becoming more

of a problem for the country as it faces the double burden of disease (10)(11).

Despite numerous targets that have been set under the Malaysian National Plan of Action for Nutrition (12), the prevalence of childhood malnutrition continues to rise yearly (13). Obesity is associated with various health problems such as hypertension, diabetes, and obstructive sleep apnoea, all of which may start in early childhood before progressing into more severe illnesses (3)(4)(14). Similarly, undernutrition can also make children vulnerable to disease and death (7). Due to this alarming increase, malnutrition must be tackled appropriately as failure to prevent childhood malnutrition in the early years may lead to various non-communicable diseases in the future (3)(4)(15). Hence, there is a pressing need to investigate the factors contributing to child malnutrition in an effort to improve the current situation. For instance, identifying and understanding the level of knowledge and behavioural practices in children that predispose to malnutrition is the first step towards instituting the best preventive efforts to address malnutrition problems (16)(17).

In addition, the child-feeding practice of the parents also plays a vital role in shaping children's eating habits. Positive feeding practice is helpful in cultivating a healthy diet centred around food intake (18)(17). Each distinct feeding approach can facilitate the development of unique characteristics that influence children's behaviour toward food and shape their future nutritional statuses (19). Therefore, it is crucial to identify and recognise the significant concerns surrounding the design of dietary practices so that effective prevention strategies can be planned (17). Furthermore, by identifying these factors in the local setting, customised intervention and prevention programmes can be designed to establish a healthy diet and living from childhood (2)(20). This way, health promotion programmes to impart health awareness will be more suitable for those children and parents in need (16)(18). In this study, we aimed to study the health determinants linked to child malnutrition. The evidence garnered will be used to support the policy and guideline development to tackle both underweight and obesity in children.

MATERIALS AND METHODS

A cross-sectional study was conducted among school children in Kota Kinabalu between 1st May 2021 and 31st July 2021. The sampling frame consisted of government primary schools in the Kota Kinabalu district based on the list provided by the Sabah State Education Department. Since pubertal changes in females begin as early as eight years old (21) and may increase adipose tissue deposition in females, younger age participants were chosen to avoid the potential link between early puberty and overweight (22)(23). Therefore, we recruited students in government primary schools who were enrolled in Standard One in 2021 together with their parents. Those with medical conditions such as type 1 diabetes, renal/heart disease, and other underlying medical conditions necessitating special diets (low protein, phosphorus, and sodium diets) were excluded.

Two-staged cluster sampling was applied in this study to recruit the students (24). At the first level, the schools in the list provided were clustered into similar zones according to the health clinics that the schools were assigned to. Thus, a total of seven clusters was identified: Klinik Kesihatan Ibu & Anak (KKIA) Pekan, KKIA Jalan Kebajikan, Klinik Kesihatan (KK) Likas, KK Luyang, KK Inanam, KK Menggatal, and KK Telipok. Subsequently, using a simple random sampling method, the schools in each zone were chosen using a randomiser until the required sample size was obtained. The sample size was calculated using the simple proportion sample size formula. In this formula, the area under the curve, Z, was a constant value of 1.96, similar to the precision value (0.02). The prevalence value used was 0.139 or 13.9% from a previous study that reported the prevalence of overweight and obesity in children in Kota Kinabalu (9). This value was chosen as there is no other documentation of the local prevalence of underweight among the target population and the closest value available was the underweight prevalence of Bumiputera Sabah of 11.4% reported in a national survey (8).

$$n = \frac{Z2p\,(1-p)}{d2}$$

n = sample size
Z = area under normal curve corresponding to the desire
p = prevalence of overweight/obese children in the population
d = precision (difference between a sample mean and population mean = ±2%)

n =1.962(0.139) (1–0.139)/0.022
= 1149 (Drop-out rate = 10 % ~ 115)
n = 1264

Standard One students from 22 government primary schools were recruited to reflect the whole population of children in Kota Kinabalu. Anthropometry measurements of participants were obtained via two methods. In the first method, the children's weight and height were measured using a measuring scale available at school following standard procedures. The standardised measuring scale used was provided for every school by the Ministry of Health for measurement purposes. The operator, i.e. teacher

must calibrate the scale before usage based on the procedure that had been both explained and shown to them. For the second method, parents were encouraged to take the weight and height of the children using a scale at home, especially when the school could not perform the measurement. Parents were given a manual with simple guidelines to calibrate the scale before measuring. Each measurement was taken twice at the same time and documented in the questionnaire. Parents must also attach a picture of their child standing on the scale to verify the measurements.

Once both height and weight measurements were obtained, BMI was calculated. WHO developed the BMI-for-Age Growth Chart in 2007 as the standard reference to classify children's nutritional status as underweight, normal weight, overweight, and obese. A child is considered underweight if his BMI-for-age <-2SD on the growth chart. Meanwhile, children are labelled as overweight or obese if their BMI-for-age is greater than +1 SD on the graph. Lastly, BMI-for-age between -2SD and +1SD is considered as normal (25) (26).

Data collection was performed using a self-administered online survey created on Google Forms. The link to the Google Form was distributed to the participants via WhatsApp. The online survey included a participant information sheet and an implied consent form. If the parents or guardians decided to participate, they would be directed to Section A on sociodemographic characteristics (gender, ethnicity, number of siblings, parent's monthly income) and child behaviours. Section B surveyed the child's general physical activity level using the Children's Physical Activity Questionnaire (CPAQ) (27), whereas Section C assessed the parent's child feeding practices using the Child Feeding Questionnaire (CFQ) (19).

CPAQ is calculated by taking the mean scores of nine items from the valued items 1 to 5 for each of the nine items (item 1 – spare time activity, item 2 to 8 - PE, recess, lunch, right after school, evening, weekends, and describes you best, item 9 - take the mean of all days of the week ("none" being a 1, "very often" being a 5) to form a composite score for item 9 as a final summary score. A score of one indicates low physical activity while a score of five indicates high physical activity (28). The CFQ consists of seven subscales – (i) perceived responsibility (ii) perceived parent weight, (iii) perceived child weight, (iv) concern about child weight, (v) restriction, (vi) pressure to eat, and (vii) monitoring, all scored on a five-point Likert scale ranging from 1-never to 5-always. The score of each item will be summed up to generate the mean score for each subscale. Factors with higher mean scores indicate stronger or more prominent feeding practices (20).

All data from the Google Form was downloaded in Microsoft Excel format and analysed using SPSS version 27. Descriptive statistics and interferential statistics, such as the Chi-square test or ANOVA, were used to examine the independent and dependent variables. Multinomial logistic regression was performed to determine the predictor variables of nutritional status. Statistical significance was taken as p-values of less than 0.05 with a 95% confidence interval. All data were kept private in an encrypted data storage medium to ensure the confidentiality of the information.

RESULTS

A total of 979 respondents from 22 primary schools in the Kota Kinabalu district participated in the study. The majority of the children recorded normal weight (51.3%), followed by underweight (35.5%) and overweight (13.2%). About 55 % of the respondents were males, with most of them being Bajau (21%) ethnicity. The majority of the parents were in the B40 income category (85%) and most of the children were from a two-parent family (88.9%) with other siblings (90.7%). Four of five (81.3%) of the children had no family history of obesity (81.3%). Gender, ethnicity, maternal education, paternal education, and family history of obesity were found to be significantly associated with children's BMI status.

From Table II, most children consumed food prepared by their parents at school (57.2%). Most of the children spent less than two hours per day watching TV (64.4%) and slept eight hours or less per day (70.7%). The majority of them did not have a TV in view during mealtime (63.5%) or in their bedrooms (92.1%). Furthermore, they consumed fast food less than three times per week (88.6%). More than half of them were breastfed for more than six months (59.2%). The presence of TV where the family ate most meals was significantly associated with children's BMI status. Lastly, the mean score of physical activity was 2.63±0.61, indicating nearly moderate physical activity.

In Table III, a vast number of parents showed concerns regarding the food choices of their children (94.4%). For parent's child feeding practice, perceived responsibility had the highest mean score of 4.26±0.81, i.e. parents were perceived to have a high responsibility towards children feeding practice. In contrast, perceived child weight had the lowest mean score (2.91±0.43), indicating that parents lacked a good perception of their children's weight.

From the multinomial regression analysis, male students were 30% less likely to become underweight than their female counterparts the female gender (OR 0.7; 95% CI 0.522-0.931). Next, when there was no TV in view where the family ate most of the meals, the odds of becoming underweight were 26% less

Table I : Association between sociodemographic with child BMI status

Variables	Children BMI Status (n=979)				P value
	Underweight n (%)	Normal n (%)	Overweight & Obese n (%)	Cumulative n (%)	
Gender					0.002*
Male	165 (30.7)	297 (55.2)	76 (14.1)	538 (55.0)	
Female	183 (41.5)	205 (46.5)	53 (12.0)	441 (45.0)	
Ethnic					0.012*
Dusun	48 (34.0)	74 (52.5)	19 (13.5)	141 (14.4)	
Kadazan	37 (30.1)	62 (50.4)	24 (19.5)	123 (12.6)	
Bajau	90 (43.7)	89 (43.2)	27 (13.1)	206 (21.0)	
Chinese	9 (17.7)	35 (68.6)	7 (13.7)	51 (5.2)	
Malay	37 (41.1)	41 (45.6)	12 (13.3)	90 (9.2)	
Others	127 (34.5)	201 (54.6)	40 (10.9)	368 (37.6)	
Monthly income					0.148
Bottom 40	309 (37.1)	416 (50.0)	107 (12.9)	832 (85.0)	
Middle 40	34 (26.8)	73 (57.5)	20 (15.7)	127 (13.0)	
Top 20	5 (25.0)	13 (65.0)	<5 (10.0)	20 (2.0)	
Number of siblings					0.802
Single child	32 (35.2)	45 (49.4)	14 (15.4)	91 (9.3)	
Have siblings	316 (35.5)	457 (51.5)	115 (13.0)	888 (90.7)	
Family status					0.969
Single parent family (single, separated, divorced, widowed)	35 (38.0)	45 (49.0)	12 (13.0)	92 (9.4)	
Two parent family	306 (35.2)	448 (51.6)	115 13.2)	869 (88.9)	
Other family tructure	7 (41.2)	8 (47.1)	<5 (11.7)	17 (1.7)	
Maternal education					0.006*
None	30 (48.4)	25 (40.3)	7 (11.3)	62 (6.3)	
Primary	56 (49.1)	50 (43.9)	8 (7.0)	114 (11.6)	
Secondary	171 (33.1)	273 (52.9)	72 (14.0)	516 (52.7)	
Tertiary	91 (31.7)	154 (53.7)	42 (14.6)	287 (29.3)	
Paternal education					0.004 *
None	51 (51.5)	39 (39.4)	9 (9.1)	99 (10.1)	
Primary	49 (45)	48 44.0)	12 (11.0)	109 (11.1)	
Secondary	172 (32.0)	289 (54.0)	75 (14.0)	536 (54.7)	
Tertiary	76 (32.3)	126 (53.6)	33 (14.1)	235 (24.0)	
Family history of obesity					0.001*
Yes	46 (25.1)	101 (55.2)	36 (19.7)	183 (18.7)	
No	302 (38.0)	401 (50.4)	93 (11.6)	796 (81.3)	

Table II : Association between child behavior with child BMI status

Variables	Children BMI Status (n=979)				P value
	Underweight n (%)	Normal n (%)	Overweight & Obese n (%)	Cumulative n (%)	
Food consumed at school [a]					0.333
Prepared by parent	200 (35.7)	290 (51.8)	70 (12.5)	560 (57.2)	
Bought from school canteen	37 (44.6)	37 (44.6)	9 (10.8)	83 (8.5)	
Both	111 (33.0)	175 (52.1)	50 (14.9)	336 (34.3)	
Time spent at home watch TV/day [a]					0.102
< 2 hours per day	239 (37.9)	313 (49.7)	78 (12.4)	630 (64.4)	
>2 hours per day	109 (31.2)	189 (54.2)	51 (14.6)	349 (35.6)	
Night time child sleep duration [a]					0.207
9 hours or more	113 (39.4)	135 (47.0)	39 (13.6)	287 (29.3)	
8 hours and less	235 (34.0)	367 (53.0)	90 (13.0)	692 (70.7)	
TV in view where family eats most of the meals [a]					0.022*
No	202 (36.5)	338 (54.3)	82 (13.2)	622 (63.5)	
Yes	146 (41.0)	164 (46.0)	47 (13.0)	357 (36.5)	
TV in bedroom [a]					0.106
No	329 (36.5)	457 (51.0)	116 (12.9)	902 (92.1)	
Yes	19 (24.7)	45 (58.4)	13 (16.8)	77 (7.9)	
Fast food per/week [a]					0.179
≤ 3x/week	311 (35.9)	448 (51.6)	108 (12.5)	867 (88.6)	
≥ 4x/week	37 (33.0)	54 (48.2)	21 (18.8)	112 (11.4)	
Breastfeeding duration [a]					0.218
Never breastfed	18 (31.0)	27 (46.6)	13 (22.4)	58 (5.9)	
Breastfeed <6 months	118 (34.6)	175 (51.3)	48 (14.1)	341 (34.8)	
Breastfeed >6 month	212 (36.6)	300 (51.7)	68 (11.7)	580 (59.2)	
Physical Activity [b] Mean (SD)	2.61 (0.61)	2.65 (0.59)	2.57 (0.69)		0.298

a. Chi-Square Test

b. One Way ANOVA

compared to normal BMI (OR 0.740; 95% CI 0.549-0.997). For parent's child feeding practice, based on the perceived child weight subscale, 57.5% of parents of underweight BMI children did not think their children were underweight compared to parents of children with normal BMI (OR 0.425; 95% CI 0.284-0.637).

Kadazan ethnic groups were twice as likely (OR 1.964; 95% CI 1.055-3.658) to be overweight rather than having normal BMI. Under the parent's child feeding practice, for the perceived responsibility subscale, parents of overweight and obese children were 33.0% less responsible for their children's feeding time (OR 0.67; 95% CI 0.521-0.863) and 42.6% less likely to exert pressure on their children to complete their meals (OR 0.58; 95% CI 0.448-0.761), compared to normal BMI. While for the perceived parental weight subscale and perceived child weight subscale, there were 1.8 (OR 1.822; 95% CI 1.023-3.244) and 3.2 times (OR 3.245; 95% CI 1.745-6.034) more likely for parents of overweight and obese child to perceive themselves as being heavier and also thought their children to be heavier compared to normal BMI.

DISCUSSION

In this study, the prevalence of overweight and obesity among the children (13.2%) was considerably higher than the national prevalence of 9.0% and

Table III : Association between parent's child feeding practice with child BMI status

Variables	Children BMI Status (n=979)				P value
	Underweight n (%)	Normal n (%)	Overweight & Obese n (%)	Cumulative n (%)	
Parent care on food choice [a]					0.487
Yes	326 (35.3)	478 (51.7)	120 (13.0)	924 (94.4)	
No	22 (40.0)	24 (43.6)	9 (16.4)	55 (5.6)	
	Underweight Mean (SD)	**Normal Mean (SD)**	**Overweight & Obese Mean (SD)**		
Parent's child feeding practice [b]					
Perceived responsibility	4.26 (0.831)	4.32 (0.77)	4.06 (0.87)		0.006*
Perceived parent weight	2.89 (0.47)	3.01 (0.45)	3.14 (0.40)		<0.001*
Perceived child weight	2.77 (0.48)	2.94 (0.36)	3.11 (0.43)		<0.001*
Concern about child weight	3.84 (0.99)	3.91 (0.942)	3.91 (0.93)		0.577
Restriction	3.75 (0.78)	3.82 (0.68)	3.83 (0.68)		0.370
Pressure to eat	4.17 (0.78)	4.15 (0.76)	3.80 (0.84)		<0.001*
Monitoring	3.99 (0.92)	3.99 (0.90)	3.93 (0.99)		0.816

a. Chi Square Test

b. One Way ANOVA

local prevalence of 7.8% among Bumiputera Sabah documented in the National Health and Morbidity Survey 2019 (Institute for Public Health, 2019). Furthermore, the prevalence of underweight among children was also much higher in the area of Kota Kinabalu (35.5%) compared to the national prevalence (15.4%) and Sabah prevalence (11.4%) (Institute for Public Health, 2019). Even though urbanisation was supposed to improve the socioeconomic status, the growing number of underweight children in Kota Kinabalu in this study suggests that children's nutritional status may be affected by low family income because the majority of the children were from the B40 socioeconomic background (28). At the same time, limited access to healthy food among such family backgrounds may also contribute to obesity among children as they have to rely on cheaper, calorie-dense, and less nutritious options that predispose them to weight gain (29).

On further analysis, consistent with previous studies, we found that male children were less likely to be underweight (30). Although rapid growth, physical changes, and early sexual maturation of females during puberty are correlated with a higher body mass index than men, these changes are too early to be detected among our 7-year-old study participants (31). Differences in the prevalence of malnutrition between genders may be due to biological influences, physiological changes, and lifestyle differences at this age (32). For mothers, the cultural idealism of body weight may lead to differences in parent's child-feeding practices (33). The finding may also be related to the fact that thinness remains the culturally defined ideal body shape (34).

Furthermore, in this study, the children of Kadazan ethnicity were almost twice as likely to become overweight and obese compared to those with normal BMI. Ethnicity may lead to variation in body fat composition among children with the same body mass index, thus affecting the level of overweight and obesity among children Differences in cultural beliefs, practices, and acculturation levels have been shown to influence obesity disparities among various racial and ethnic groups (35). Additionally, globalisation and modernisation have altered preferences for dietary options, recreation and physical activity forms, as well as educational and economic opportunities, all of which can be associated with poor behaviour and an unhealthy outlook on life (36).

Next, children who did not watch TV during meals were 26% more likely to have a normal weight than those who were underweight. Among the children who watched television while eating, the proportion of underweight children was much higher than normal weight, overweight, and obese children. Depending on previous literature, TV viewing may either increase or decrease children's food intake. TV interferes with children's bodies' natural cues about whether they are full, causing the children to overeat or undereat. Similar to another study, TV viewing causes children to consume slightly fewer snacks and approximately

Table IV : Predictor for BMI status among study population

Variable	Multinomial logistic regression	
	OR (95% CI)	p-value
Underweight		
Gender		
Male	0.7 (0.522-0.931)	0.014*
Female	Ref[b]	
TV in view where family eats most of the meals		
No	0.740 (0.549-0.997)	0.048*
Yes	Ref[b]	
Parent's child feeding practice		
Perceived child weight	0.425 (0.284-0.637)	<0.001*
Overweight & obesity		
Ethnic		
Dusun	1.357 (0.715-2.576)	0.351
Kadazan	1.964 (1.055-3.658)	0.033*
Bajau	1.476 (0.822-2.650)	0.193
Chinese	0.854 (0.338-2.158)	0.738
Malay	1.722 (0.789-3.759)	0.173
Others	Ref[b]	
Parent's child feeding practice		
Perceived responsibility	0.670 (0.521-0.863)	0.002*
Perceived parental weight	1.822 (1.023-3.244)	0.042*
Perceived child weight	3.245 (1.745-6.034)	<0.001*
Pressure to eat	0.584 (0.448-0.761)	<0.001*

a. The reference category is: NORMAL

b. This parameter Ref b because it is reference between variable

47% fewer lunches than when they were not watching TV (37).

Apart from that, the perceived responsibility subscale was used to assess a parent's sense of responsibility for feeding and providing a healthy diet for their child. The mean score of this subscale was higher in the normal group (4.32±0.77), compared to the underweight (4.26±0.831) and overweight group (4.06±0.87). Furthermore, parents of obese and overweight children were 33% less responsible for feeding their children than parents of normal-weight children. These could be a result of the incorrect parental perceptions regarding their child's weight and obesity status, thinking that the child was healthy and they need not worry about the food intake (38). Additionally, the growing number of dual-working parents families, especially an increase in maternal employment, has negatively influenced families' commitment to supporting healthy lifestyles for their children, such as a balanced diet and regular mealtimes (39).

Additionally, the perceived parent weight subscale examined the parent's self-perception of their body. Our findings revealed that parents with overweight or obese children rated their weight nearly twice as high as the normal group. Parental obesity is one of the associated factors of childhood obesity whereby children of obese parents are 10 to 12 times more likely to be obese. Furthermore, children of overweight or obese parents, or those born to overweight or obese mothers, are at a significantly higher risk of gaining weight during preschool and kindergarten (ages 3 to 5) (40).

As for the perceived child weight subscale, many parents of overweight or obese children incorrectly estimated their child's weight to be 3.2% heavier than normal weight on average. In contrast, 57.5% of parents with underweight children did not believe that their children were underweight. Recent studies suggested that parents tend to underestimate their children's weight when they become overweight or obese, regardless of societal perceptions of beauty (41). However, this finding is inconsistent with our study and another study in China whereby mothers correctly perceived the overweight status of their children (42). At the same time, parents might also underestimate the weight of underweight children due to cultural and societal practices (43). Therefore, it is essential to evaluate a parent's perception of their child's weight to comprehend the parent's knowledge of nutrition and obesity because this will greatly influence their feeding practices (44).

Lastly, the pressure-to-eat subscale measures parental child-feeding practices. It looks at how much the parent coerces the child into eating by demanding that the child eats everything on the plate. This study highlighted that parents of overweight and obese children put 42.6% less pressure on their children to complete their meals than parents of normal BMI. Parental desire to improve their child's underweight status may be one of the reasons for them to exert pressure to eat among underweight children (45), whereas less pressure to eat may aid in weight loss among obese children (46).

Limitations

There are certain limitations to this study. Firstly, the sample size could not be achieved as planned due to Movement Control Orders during the COVID-19 pandemic. Due to the aftermath of the pandemic, some daily activities might be affected and the socioeconomic information provided by the parents might not be accurate. In addition, the self-reporting method of weight and height measurement by the parents may cause some measurement bias. Lastly, due to using the cross-sectional study design, the causal relationship between the variables could not be tested. Therefore, the findings may not be generalisable to other populations

CONCLUSION

This study provided an important baseline prevalence (48.7%) of malnutrition among Standard One children in Kota Kinabalu, Sabah. Based on the findings, we can delineate the difference in prevalence and other associated factors of malnutrition among Sabahan as compared to their West Malaysian counterparts. The results showed that Sabah is facing a higher burden of undernutrition concurrently with an increasing burden of overnutrition. With an alarming increase in the prevalence of undernutrition and overnutrition, it is essential to combat this double disease burden to safeguard the health of our children. Modifiable factors such as the presence of TV in view during meals and parent's child feeding practice should be given focus in future prevention or intervention strategies. The parental role should be emphasised when designing health intervention programmes to combat malnutrition among children. More importantly, to mitigate childhood nutritional concerns in Sabah, it is crucial to undertake additional research that focuses on modifiable health determinants. In summary, understanding parental perspectives is crucial to aid stakeholders and policymakers in promoting targeted health-conscious behaviours. Effective interventions necessitate the immediate implementation of multidimensional community-wide approaches involving families, society, and authorities to ensure the health and wellbeing of future generations.

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