

Knowledge and Dietary Adherence of Caregivers on Malaysian Dietary Guidelines and Their Relationship to The Nutritional Status of Young Children in Kelantan

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ABSTRACT

Background: Malaysia is facing dual challenges of stunting and obesity among young children. To address these issues, the Malaysian Dietary Guideline (MDG) was introduced. This study evaluates the knowledge and dietary adherence of caregivers to the MDG and its impact on the nutritional status of young children. **Methods:** A cross-sectional study was conducted among selected kindergartens in Kelantan, whereby children's height and weight were measured, and caregivers were interviewed on knowledge of MDG. The correlation between caregivers' knowledge, adherence to MDG, and their children's nutritional status was evaluated using the Spearman correlation and Chi-square test. **Results:** A total of 60 pairs of caregivers and their children participated in the study. The prevalence of underweight, stunting, obesity, and wasting was 17%, 23%, 10%, and 7%, respectively. Caregivers demonstrated a moderate level of knowledge regarding the MDG. Adherence to the MDG for vegetables and fruit was poor and none adhered to the fat recommendation. Nevertheless, most of them (83%) followed sugar recommendations. No significant correlation was observed between caregivers' knowledge of MDG and the children's status of underweight ($p=0.693$), stunting ($p=0.652$), or wasting ($p=0.240$). However, a significant correlation was identified between caregiver sugar consumption and their children's stunting status ($p<0.05$). **Conclusion:** Stunting remains the most common nutritional problem among young children. Caregivers exhibit a moderate knowledge level and poor adherence towards MDG. Hence, further exploration is required to facilitate practical strategies for improving diet quality among young children.

Keywords:

MDG; nutritional status; knowledge; dietary adherence; young children

INTRODUCTION

Malnutrition in all its forms raises the dangers of morbidity and mortality throughout life. Children typically suffer from this because they do not consume or do not take enough proper foods. Children who are overweight may not obtain adequate micronutrients while stunted children more likely to become obese.

The issue of malnutrition is a growing concern, especially in low- and middle-income countries. According to a survey conducted in NHMS 2015, the prevalence of underweight was 12.4%, stunting was 17.7%, and wasting was 8.1% among children under 5 years old. However, in 2019, these numbers increased to 14.1% for underweight, 21.8% for stunting, and 9.1% for wasting (IPH, 2019). The prevalence of overweight and obesity among children below 5 years old is 5.6%. According to the WHO (2021), undernutrition is a contributing factor in about 45% of fatalities in children under the age of five. The number of cases of malnutrition has been increasing over the years up until now.

In Malaysia, the National Plan of Action for Nutrition includes the development of the Malaysian Dietary Guidelines (MDG) as part of its efforts to prevent nutrition-related disorders. The original MDG was published in 1999 and consisted of eight key messages. Subsequently, the

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MDG underwent several revisions, resulting in MDG 2010, and the latest version, MDG 2020, which includes 14 key messages and 52 key recommendations. These revisions were made to address the challenges of both undernutrition and overnutrition.

All of the aforementioned MDGs are aimed at individuals aged 18 to 59 years old. Meanwhile, in 2013, the Ministry of Health published the Malaysian Dietary Guidelines for Children and Adolescents (MDGCA). MDGCA is appropriate for healthy children and adolescents from birth to the age of 18. It is made up of 15 key messages to serve as a complete resource for Malaysian children and adolescents in ensuring optimal growth.

Nonetheless, although the MDG has been in place since 1999, Malaysians are still unaware of them (Norimah et al., 2010). There are various limitations faced by Malaysians to understand and practise MDG in their daily life. Hence, this study aims to evaluate the knowledge and dietary adherence to Malaysian Dietary Guidelines (MDG) and its associated factors among caregivers of young children in Kelantan.

MATERIALS AND METHODS

Participants

A cross-sectional study was conducted among caregivers with children aged below 5 years old, whereby stratified random sampling was used to recruit the participants. In particular, 9 kindergartens were randomly selected from 5 districts in Kelantan, Malaysia. Data were collected between February 2023 and April 2023 in 5 districts of Kelantan, Malaysia. A total of 90 caregivers who registered their children at 9 kindergartens were selected from the list using simple random sampling, whereby their numbers in the list were randomly picked using a number generator application. They were recruited if their children were 5 years old and below. Caregivers of children with chronic illnesses that can affect their eating habits were excluded from the study.

Anthropometric measurements

Anthropometric measurements include the height and weight of the children. The height was measured in centimetres (cm) using SECA roll-up measuring tape with wall attachment (SECA 206), while the weight was measured in kilograms (kg) using SECA weighing scale. For children who cannot stand independently, knee height was measured, and their height was estimated using the Stevenson equation (Haapala et al., 2015). Meanwhile, for children who could not stand independently, the weight

was taken along with the caregiver, then subtracted by the caregiver weight to get the children's weight. The nutritional status of the children was categorised using the WHO classification (WHO, 2008).

Knowledge on the Malaysian Dietary Guideline (MDG) Questionnaire

The knowledge on MDG was assessed using a validated questionnaire by Norimah et al., (2021) which contains 20 questions that assessed the knowledge of MDG 2020 and the Malaysian Food Pyramid 2020. Caregivers were required to choose one answer and be given one point for a correct answer. The total score of this questionnaire is 100 with the following categories: <50% indicate poor MDG knowledge, 51% to 74% moderate MDG knowledge, and > 75% good MDG knowledge.

Dietary Adherence towards MDG Questionnaire

Dietary adherence towards MDG was assessed using a validated questionnaire by Mohd Shukri & Karami, (2023) which consists of 9 questions on respondents' intake of 9 food groups according to the requirements guided by the MDG 2020 and Malaysian Food Pyramid 2020. The respondents are required to report the number of servings they consumed daily for the nine food groups. Respondents who followed the suggested serving sizes were marked as adhering whereas those who did not follow the recommendations were marked as non-adherence.

Statistical Analysis

A descriptive analysis was conducted to describe the participant's characteristics and the nutritional status of young children. Spearman correlation test was used to evaluate the correlation between caregivers' knowledge of MDG and their children's nutritional status. Meanwhile, the Chi-square test was used to investigate the association between caregivers' dietary adherence to MDG and the children's nutritional status. The chi-square test was also used to evaluate the association between household income and children's nutritional status and caregiver's adherence to MDG. Significant values were determined using a p-value <0.05. All analyses were conducted using the Statistical Package for the Social Sciences (SPSS) version 26.0.

Ethical Approval

This study has been granted ethical approval by the International Islamic University Malaysia Research Ethical Committee (IREC) (KAHS 3/23).

RESULTS

Characteristics of participants

In Table 1, 60 caregivers and their children participated in this study. There was a moderate response rate (63.2%) as only 60 out of 90 distributed questionnaires were returned. Most participating caregivers were female (73.3%), those aged between 30 to 39 years old (68.3%), having the highest level of education (38.3%), and were employed (80%). On average, the monthly household income is RM 4935.35 (SD±3447.78). Nonetheless, most caregivers (33.3%, n = 20) have an income between RM 1000 and RM 2500 monthly.

Sixty participating children aged one to five years old, of which 56.7% were males and 43.3% were females. The mean age of the children was 3.48 years (SD±1.36), with the majority aged 4 years old (21.7%).

Table 1: Sociodemographic characteristics and anthropometric measurement of children (N=60)

Characteristics	n (%)	Mean ±SD
Caregivers		
Age		
21-29 years	5 (8.4)	36 ±6.65
30-39 years	41(68.3)	
40-49 years	14(23.3)	
Gender		
Male	16(26.7)	
Female	44(73.3)	
Educational level		
Degree/Master/PhD	23 (38.3)	
Diploma	21 (35.0)	
SPM	16 (26.7)	
Occupation status		
Employed	48 (80.0)	
Self-employed	10 (16.7)	
Not working	2 (3.3)	
Household income		
≤ RM 1000	2 (3.3)	4935.35
RM 1001- RM 2500	20(33.3)	±3447.78
RM 2501 - RM 5000	18 (30.0)	
RM 5001 - RM 7500	6 (10.0)	
RM7501 - RM 10000	10(16.7)	
≥ RM 10000	4 (6.7)	

Children		
Age of child		
1 year	6 (10.0)	3.48±1.36
2 years	10(16.7)	
3 years	12(20.0)	
4 years	13(21.7)	
5 years	19(31.7)	
Gender		
Male	34(56.7)	
Female	26(43.3)	
Child's weight (kg)		13.05±3.30
Child's height (cm)		93.49±12.04
BMI (kg/m²)		13.39±3.01
Nutritional status		
Weight-for-age (WAZ-score)		
		-0.91±1.19
Normal	50 (83.3)	
Underweight	10 (16.7)	
Height-for-age (HAZ-score)		
		-1.19±1.20
Normal	46 (76.7)	
Stunting	14 (23.3)	
Weight-for-height (WHZ-score)		
		-0.38±1.31
Normal	50 (83.3)	
Overweight	6 (10.0)	
Wasting	4 (6.7)	

Nutritional status of young children

On average, children weighed 13.05kg (SD±3.30), with 93.4cm height (SD±12.04), and had a BMI of 13.39kg/m² (SD±3.01). Regarding their mean z-scores for weight-age, height-age, and weight-height-age, the children's scores were -0.91 (SD±1.19), -1.19 (SD±1.20), and -0.38 (SD±1.31) respectively. In terms of their nutritional status, 16.7% were underweight, 23.3% were stunted, 6.7% were wasted and 10% were overweight (Table 1).

Caregiver knowledge and dietary adherence to the Malaysian Dietary Guideline (MDG)

Most caregivers (53.3%) have moderate knowledge of MDG, while 6.7% of caregivers have poor knowledge.

In Table 2, the majority did not adhere to the recommendation for fat (100%), vegetables (95%), fruits (81.7%), milk (73.7%) and cereals intake (68.3%). Caregiver

dietary adherence was shown in sugar (83.3%) and protein-based food intake i.e., poultry (78.3%), fish (70%), and legumes (71.7%).

Table 2: Dietary adherence to MDG (N=60)

Food groups	Adhere		Not adhere		Mean ±SD
	n	(%)	n	(%)	
Vegetable	3	(5.0)	57	(95.0)	1.43±0.60
Fruit	11	(18.3)	49	(81.7)	1.52±1.05
Cereals	19	(31.7)	41	(68.3)	2.05±1.02
Poultry	47	(78.3)	13	(21.7)	1.88±0.78
Fish	42	(70.0)	18	(30.0)	1.28±0.72
Legumes	43	(71.7)	17	(28.3)	1.13±0.75
Milk	16	(26.7)	44	(73.7)	1.42±0.81
Fats	0	(0.0)	100	(100.0)	1.60±0.92
Sugar	50	(83.3)	10	(16.7)	1.57±1.03

Correlation between caregivers’ knowledge of MDG and their children’s nutritional status

The children’s status for underweight [r (10) = -0.052, p=0.693], stunting [r (14) = 0.059, p=0.652], and wasting [r (4) = -0.154, p =0.240] did not significantly correlate with the caregiver’s knowledge of the MDG.

Association between caregivers’ dietary adherence to MDG and nutritional status of their children

In this study, no association was found between caregivers’ dietary adherence and children’s underweight status. However, a higher prevalence of non-adherence in vegetables, fruits, rice/cereal and milk/milk products intakes was observed among caregivers with underweight children.

Similarly, no significant association was found between caregivers’ dietary adherence and the children’s overweight and wasting status. However, a higher prevalence of non-adherence in vegetables and rice/cereal intakes was observed among caregivers with overweight children.

Nonetheless, there is a significant association found between caregivers’ adherence to sugar intake and the stunting status of their children, ($X^2 (1) = 3.149, p<0.05$). Higher prevalences of non-adherence in vegetables, fruits, and milk/milk products intakes were observed among caregivers with stunting children.

Association between household income and children’s nutritional status and caregivers’ dietary adherence

There is a significant association found between house income and stunting status ($X^2 (1) = 6.051, p<0.05$) (Table 3), whereby a higher prevalence of stunting was observed in those with incomes <RM5000.

Nonetheless, no significant association was found between household income and caregivers’ dietary adherence (Table 3). However, higher prevalences of non-adherence in all food groups were found in those with incomes <RM5000.

DISCUSSION

The study found that stunting was the prevalent nutritional issue among young children in Kelantan. This aligns with previous research, indicating a higher prevalence of stunting among children under 5 years old in Malaysia which may be attributed to early feeding difficulties and poor dietary quality (Lee et.al., 2022). In this study, caregivers showed poor adherence to fats/oils, vegetables, fruits, rice/other cereals/wholegrain products/tuber, and milk/milk products intake. Studies have linked high stunting to poor diet quality, emphasizing the importance of consuming diverse animal-sourced foods for better growth (Krasevec et.al., 2017). Poor diet quality was also associated with an increased risk of childhood obesity (Kranz et.al., 2008).

In this study, most caregivers in Kelantan have moderate MDG awareness. This finding is comparable to Norimah et al. (2010), who found that the majority of Malaysian adults have a moderate understanding of the MDG and asserted that education is strongly correlated with knowledge. This situation can be elucidated by a study conducted in Canada, where the study found a persistently low level of knowledge and understanding of the official dietary guidelines among adults, despite their awareness of the

guidelines (Vanderlee et.al., 2015). This discrepancy can be attributed to the unequal opportunity in accessing and comprehending the guidelines. These findings align with a study, whereby a lack of familiarity with the guidelines hindered participants from fully understanding them (Brown et.al., 2011). Furthermore, Norimah et al. (2010) reported moderate knowledge of dietary guidelines due to a low comprehension of the terms used in the guidelines.

Table 3: Association between household income and children’s nutritional status and caregiver’s dietary adherence (N=60)

Variables	Household Income			n	X ² - statistic (df)	p-value
	< RM5000 n (%)	RM5000 – RM9999 n (%)	>RM10000 n (%)			
Children’s nutritional status						
Wasting status						
Normal	29 (48.3)	11 (18.3)	9 (15)	49	3.677 (4)	0.452
Overweight	4 (6.7)	3 (5)	0 (0)	7		
Wasting	3 (5)	0 (0)	1 (1.7)	3		
Underweight status						
Normal	28 (46.7)	12 (20)	10 (16.7)	50	2.857 (2)	0.240
Underweight	8 (13.3)	2 (3.3)	0 (0)	10		
Stunting status						
Normal	28 (46.7)	8 (13.3)	10 (16.7)	46	6.051 (2)	0.049
Stunting	8 (13.3)	6 (10)	0 (0)	14		
Caregiver’s dietary adherence						
Vegetable						
Adhere	2 (3.3)	0 (0)	1 (1.7)	3	1.287 (2)	0.526
Not adhere	34 (56.7)	14 (23.3)	9 (15.0)	57		
Fruit						
Adhere	7 (11.7)	2 (3.3)	2 (3.3)	11	0.201 (2)	0.904
Not adhere	29 (48.3)	12 (20.0)	8 (13.3)	49		
Rice, other cereals, wholegrain products and tubers						
Adhere	9 (15.0)	5 (8.3)	5 (8.3)	19	2.399 (2)	0.301
Not adhere	27 (45.0)	9 (15.0)	5 (8.3)	41		
Poultry / Meat / Egg						
Adhere	27 (45.0)	13 (21.7)	7 (11.7)	47	2.385 (2)	0.303
Not adhere	9 (15.0)	1 (1.7)	3 (5.0)	13		
Fish						
Adhere	22 (36.7)	13 (21.7)	7 (11.7)	42	4.837 (2)	0.089
Not adhere	14 (23.3)	1 (1.7)	3 (5.0)	18		
Legumes						
Adhere	23 (38.3)	11 (18.3)	9 (15.0)	43	3.056 (2)	0.217
Not adhere	13 (21.7)	3 (5.0)	1 (1.7)	17		
Milk and milk products						
Adhere	9 (15.0)	2 (3.3)	5 (8.3)	16	3.933 (2)	0.140
Not adhere	27 (45.0)	12 (20.0)	5 (8.3)	44		
Sugar						
Adhere	29 (48.3)	11 (18.3)	10 (16.7)	50	2.429 (2)	0.297
Not adhere	7 (11.7)	3 (5.0)	0 (0)	10		

*Notes: The chi-square test was used to evaluate the association between household income and children’s nutritional status and caregiver adherence to MDG.

In this study, most caregivers did not follow recommendations for vegetable (1.43 servings per day) and fruit (1.52 servings per day) intake. Our findings were similar to the prior study that factors such as habit, attitude, societal influence, and limited availability of fruits and vegetables at home may contribute to this inadequacy (Koo et.al., 2016). According to McIvar et al. (2021), caregivers’ consumption of fruits and vegetables was

found to significantly predict their children’s intake.

All caregivers did not adhere to fat intake recommendations, reporting an average intake of only 1.6 servings, below the recommendation. However, it is uncertain whether this reflects an accurate estimation or if caregivers underestimated their fat intake. Similar findings have been reported in other studies, showing either insufficient or excessive fat consumption depending

on the age range of the children (Monnard & Fleith, 2021). Since caregivers are in charge of cooking and purchasing food at home, their adherence to recommended fat intake will potentially influence the children's consumption.

The study found no correlation between the knowledge of MDG among caregivers and the nutritional status of their children. This is consistent with another study that reported that the possession of nutrition knowledge by caregivers does not seem to have an impact on the nutritional status of children in Ghana. (Forh et.al., 2022). The main factor preventing caregivers from applying nutrition knowledge is financial difficulties caused by unemployment. These difficulties increase malnutrition by reducing the quality of food consumed and leading to "hidden hunger". (Siddiqui et.al., 2020).

This study highlights a significant link between household income and stunting cases among young children. It reports that the prevalence of stunting is higher in the B40 category, which refers to households with an income of less than RM 5000 (Department of Statistics, 2022). A review by Rahma & Mutalazimah (2022) supports this finding, as majority of reviewed articles showed a significant relationship between family income and the incidence of stunting in children under five. An in-depth analysis by Boomers and colleagues (2019) further explains that higher stunting rates were observed in the poorest quartile compared to the richest quartile. Low household income can predispose children to stunting because families may not be able to afford nutritious and diverse foods (Nuraeni & Suharno, 2020). This pattern can be observed from our data even though no statistical significance was found. A large proportion of non-adherence to all food groups was reported from those households with income <RM5000.

The strength of this study lies in its investigation of the nutritional condition of young children in Kelantan and the correlation between caregiver knowledge and dietary adherence to the Malaysian Dietary Guidelines (MDG). While previous research has primarily focused on the impact of the MDG on the lifestyles of adolescents and adults, this study aims to determine whether knowledge of and adherence to the MDG can influence the nutritional status of young children. However, the interpretation of the findings should be with caution due to the small sample size, which may not adequately represent the diverse communities in Kelantan.

CONCLUSION

The findings reveal a concerning prevalence of stunting and most caregivers possess moderate knowledge of the

MDG while not adhering to the recommended vegetable and fruit intakes. Children from lower-income families exhibit lower nutritional status and a higher prevalence of non-adherence to most food groups. Nutritionists and dietitians should prioritize the MDG and raise public awareness about its significance. In order to tackle the issue of moderate knowledge regarding the MDG, the Nutrition Department of the Ministry of Health should consider using simple terms and key messages in the guidelines.

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