CHILDREN'S NUTRITIONAL STATUS AND THEIR PARENTS' FEEDING PRACTICES, SHOPPING MOTIVATION, AND STRESS AT MEALTIME DURING THE PANDEMIC COVID-19

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ABSTRACT

Introduction: The COVID-19 pandemic has affected a variety of demographic groups, from infants to the elderly, particularly in their psychosocial, economic, and educational systems. This study examined the nutritional status of children and their parents' feeding practices, shopping motivation, and mealtime stress during the COVID-19 pandemic. **Methods:** A hundred-five caregivers and their children were recruited via social media. The information on feeding practices, shopping motivation, and mealtime stress was requested of caregivers via a Google form, along with information on the anthropometric measurements and dietary intake of their children. Qualitative data on dietary intake and feeding practice changes were collected. Data were analyzed using descriptive analysis, and qualitative data were analyzed using thematic analysis. **Results:** There are big concerns about the children's food intake and body weight as it is beyond the normal requirement for their age. As for parental feeding behaviour, the results indicated that parents have acceptable practices, high consideration when shopping but most of them (55%) experience stress at mealtime during the COVID-19 pandemic. **Conclusion:** In conclusion, this study provides insight into children's nutritional status as well as positive and negative parental behaviour during the COVID-19 pandemic which could be explored further in future studies whereby necessary intervention is deemed needed.

Keywords: COVID-19, Nutritional status, feeding practices, shopping, stress

Introduction

The first case of SARS-Cov-2 was reported in Wuhan, China, resulting in a worldwide pandemic (Zarina et. al., 2021). As in Malaysia, the first case of COVID-19 was discovered by Chinese tourists from Singapore on 25 January 2020, and the first death was reported on 17 March 2020. (Khalid, 2020). As a result, the COVID-19 pandemic has had an impact on communities, particularly on their psychosocial, economic, and educational systems. In order to prevent the emergence of new infection clusters, social restrictions are becoming more prevalent. During MCO, for example, social gatherings and outdoor activities were restricted to avoid close contact while the cases were at their peak (Khalid, 2020). As a result, the majority of the community has gained weight.

The most significant event caused by the COVID-19 pandemic, on the other hand, was the economic crisis, which forced many non-essential industries to close or operate with minimal human strength. As a result, the majority of the community's jobs and sources of income were lost. A similar set of consequences can be observed in children. During the pandemic, children's health was said to deteriorate. According to Zemrani and colleagues (2021), the healthcare of children is deteriorating as a result of the pandemic, where the increase in unhealthy lifestyles, such as frequent snacking, increased screen time by 4.8 hours/day, and decreased physical activity by 2.3 hours/week, demonstrated that children's nutritional status is on high alert (Zemrani et al, 2021).

As a result, the purpose of this study is to assess children's nutritional status, as well as their parents' practices, shopping motivation, and mealtime stress during the COVID-19 pandemic.

Methods

Subjects

Between March and April 2022, caregivers and their children aged 3 to 12 were recruited using convenience sampling via social media (Facebook and WhatsApp). Those with chronic illnesses were excluded from this study. This study was approved by the institution’s ethics committee. A consent form was obtained from the participants before the commencement of this study.

Anthropometric assessments

In this study, anthropometric assessments include height and weight**.** Height was measured using a measuring tape in centimetres (cm), while weight was recorded in kilogram (kg) using either analogue or digital measuring weight, depending on what was available in their home. Both assessments were self-reported. Body mass index (BMI) and z-scores for height-for-age, weight-for-age and BMI-for-age were obtained using WHO AnthroPlus. The categories for their nutritional status were determined according to the WHO Child Growth Standards (2008). At the end of the question, one open-ended question was asked regarding their weight and height changes during COVID-19.

Dietary Assessments

The Food Frequency Questionnaire (FFQ), adapted from the Malaysian Adult Nutrition Survey, was used for dietary assessments (2003). It consists of 16 questions covering 8 food groups: cereals and cereal products, meats and their products, fish and seafood, eggs, milk, vegetables, fruits, and beverages. The FFQ assessed portion size and frequency of food consumption. Caregivers were required to select a frequency of daily, weekly, or monthly. Nutritionist Pro was used to calculate total energy, macronutrients, and micronutrients from FFQ (Axxya Systems, LLC, 2007). Micronutrient adequacy was determined by comparing current intake to RNI (2017). One open-ended question was asked at the end of the questions about their changes in dietary assessments during COVID-19.

Parental Feeding Practices

The Home Self-Administered Tool for Environmental Assessment of Activity and Diet Family Food Practices Survey was adopted to assess feeding practices (HomeSTEAD; Vaughn et al., 2017). It is made up of three main practises: coercive control practises (CCP), autonomy support practises (ASP), and structure practises (SP), with a total of 23 questions. On a three-point scale, caregivers were asked to rate their agreement with each item (Never, Sometimes, Always). The answers were rescored to -1,0,1 for each. Negative scores would indicate low scores, zero would indicate no change, and positive scores would indicate a high. Higher scores indicated greater use of soothing food, greater child autonomy, more rules and limits, a stricter meal setting, and a more positive meal atmosphere. One open-ended question was asked at the end of the questions about how their feeding practices changed during COVID-19.

Parental Shopping Motivations

The parental shopping motivation questionnaire was adapted from Philippe et al. (2021) and Rigal et. al. (2012). It includes 17 items in the categories of convenience, weight control, natural, health control, preferences, and price. During the COVID-19 pandemic, caregivers were asked to rate their use of these items on a three-point scale (i.e., wrong for me, neutral, true for me) based on their shopping motivation. The answers were rescored to -1,0,1 for each. Negative scores would indicate low scores, zero would indicate no change, and positive scores would indicate a high. Higher scores indicated high consideration made by the caretakers during COVID-19. One open-ended question was asked at the end of the questions about how their shopping motivations changed during COVID-19.

Parental Mealtime Stress

Caregivers were asked to complete an open-ended questionnaire about their stress levels during mealtime. The rate was calculated on a three-point scale (Never, Sometimes, Always). A higher score indicated a high level of stress among caregivers during the COVID-19 pandemic. One open-ended question was asked at the end of the questions about their changes in mealtime stress during COVID-19.

Data analysis

Descriptive analysis is used to describe sociodemographic and anthropometric data. A simple thematic analysis was conducted to evaluate the results in parental feeding practices, shopping motivation as well as parental stress. All data were analyzed using Statistical Package for the Social Sciences (SPSS) (IBM, USA) version 23.0.

Results

Participants' characteristics

A total of 105 caregivers of children aged 3 to 12 years old participated in this study. The demographics of the caregivers as presented in Table 1. The majority of them are female (90.5%), aged between 35-49 years old (47.9%), and have tertiary education (77.1%). half of the participants (50.5%) were from M40 backgrounds. As for children, 72 children aged 3 to 12 years old participated in this study, of which 43.8% (n= 32) of them were boys, and 54.8% (n= 40) were girls.

Table 1: Demographics of respondents (N=105)

Demographic	n (%)
Caregivers	
Sex	
Male	9.5 (10)
Female	90.5 (95)
Relationship status	
Parents	94.3 (99)
Family members	4.9 (5)
Others	1.0 (1)
Working status before the lockdown	
Working	89.4 (94)
Not working	10.6 (11)
Working status during the lockdown	
Working	89.4 (94)
Not working	10.6 (11)
Level of education	
Bachelor/Master/PhD	77.1 (81)
Secondary school	8.6 (9)
Certificate/Diploma	14.3 (15)
Financial status	
B40 (< RM 4850)	44.8 (47)
M40 (RM 4850- RM 10959)	52.4 (55)
T20 (> RM 10959)	2.9 (3)
Children	
Age of children	
3-5 years old	10.6 (11)
6-10 years old	46.6 (39)

11-12 years old	19.1 (20)
Sex	
Boy	43.8 (32)
Girl	54.8 (40)

Nutritional Status of Children

Table 2 shows the mean for children's anthropometric assessments. The mean for height and weight were 125.09 cm (SD ± 15.33) and 33.31 kg (SD ± 30.98), respectively. Their mean z-scores for BMI-for-age, height-for-age and weight-for-age were 2.13 (SD ± 7.33), -2.17 (SD ± 3.49), -0.43 (SD ± 1.951) respectively. Findings reported that 6.4% (n=6) of children were overweight, 16%(n=15) were obese, 30.9% (n=29) were stunted, and 10.5% (10) were underweight.

Table 2: Anthropometric assessments of children (N=94).

Anthropometric assessments	Mean (SD)	n (%)
Weight	33.31 (15.33)	
Height	125.09 (30.97)	
BMI-age z-score	2.13 (7.33)	
Height-age z-score	-2.17 (3.49)	
Weight-age z-score	-0.43 (1.95)	
Nutritional status (BMI-for-age)		
Normal		55.3 (52)
Overweight		6.4 (6)
Obese		16.0 (15)
Nutritional status (height-for-age)		
Normal		69.1 (65)
Stunted		30.9 (29)
Nutritional status (weight-for-age)		
Normal		42.1 (40)
Underweight		10.5 (10)

Table 3 shows the children's mean intake of macronutrients and micronutrients (n=101). On average, children consume 1002 kcal (SD ± 889.82) daily. Their mean intakes for carbohydrates, protein, and fat were 132 g (SD ± 124.76), 56 g (SD ± 59.96), and 28 g (SD ± 28.24), respectively. Meanwhile, the mean intake for Vitamin C, Vitamin D, Vitamin B6, Vitamin B12, Iron and calcium was 104 mg (SD ± 175.86), 5 µg (SD ± 18.09), 1 mg (SD ± 1.23), 13 µg (SD ± 33.29), 14 mg (SD ± 18.39), and 502 mg (SD ± 539.37) respectively.

Table 3: Mean energy, macronutrient, and micronutrient intake of children during the pandemic Covid-19 (N=101).

Nutrients	Mean	Standard deviation
Macronutrients		
Total energy (kcal)	1002	889.81
Carbohydrates (g)	132	124.76

Protein (g)	56	59.96
Fat (g)	28	28.23
Micronutrients		
Calcium (mg)	502	539.36
Vitamin C (mg)	104	175.86
Vitamin D (µg)	5	18.08
Vitamin B6 (mg)	1	1.23
Vitamin B12 (µg)	13	33.28

In Table 4, children aged 1 to 3 years old were reported to achieve 540% Vitamin C intake, 490% Vitamin B6 intake, 3272% Vitamin B12 intake, 175% calcium intake and 276% Vitamin D intake when compared to RNI. Meanwhile, for those aged 4 to 6 years old, they were able to meet their requirements for Vitamin C (469%), Vitamin B6 (238%) and Vitamin B12 (483%), but not for calcium (74%) and Vitamin D (32%). As for children aged 7 to 9 years old, they were reported to fulfil the requirement for Vitamin C (215%), Vitamin B6 (111%) and Vitamin B12 (609%), but not for calcium (43%), and Vitamin D intake (14%). Similarly, for those aged 10 to 12 years old, they were reported to fulfil the requirements for Vitamin C (201%), Vitamin B6 (99%), and Vitamin B12 (539%), but not for calcium (27%) and Vitamin D (12%). As for those aged 13 to 19 years old, they were able to fulfil the requirement of Vitamin C (101%), and Vitamin B12 (136%), but not for Vitamin B6 (66%), calcium (29%), and Vitamin D (12%).

Table 4: Micronutrient intake of children with percentage achieving RNI by age groups during the COVID-19 pandemic (N=101).

Micronutrients	Age group	RNI 2017	% Achieving RNI
Calcium	1-3 years old	700 mg/day	175
	4-6 years old	1000 mg/day	74
	7-9 years old		44
	10-12 years old	1300 mg/d	28
	13-19 years old		29
Vitamin C	1-3 years old	30 mg/day	540
	4-6 years old		469
	7-9 years old	35 mg/day	216
	10-12 years old		201
	13-19 years old	65 mg/day	101
	1-3 years old		276

Vitamin D	4-6 years old	15 µg/day	33
	7-9 years old		15
	10-12 years old		12
	13-19 years old		12
Vitamin B6	1-3 years old	0.5 mg/day	490
	4-6 years old	0.6 mg/day	239
	7-9 years old	1.0 mg/day	112
	10-12 years old		99
	13-19 years old	1.3 mg/day	66
Vitamin B12	1-3 years old	1.5 µg/d	3272
	4-6 years old		484
	7-9 years old	2.5 µg/d	609
	10-12 years old	3.5 µ/d	540
	13-19 years old	4.0 µg/d	137

Parental Feeding Practices

Table 5 illustrates the mean scores for parental feeding practices. The highest feeding practices score was noticed for setting up rules and limits around unhealthy foods (5.09, SD ± 1.94), while the lowest was observed in the meal settings (2.96, SD ± 1.20). The mean scores for other items were as follows: 3.23 (SD ± 2.07) for soothing with food, 3.47 (SD ± 1.20) for guided choice - when, 3.76 (SD ± 1.21) for guided choice - what, 4.66 (SD ± 1.71) for guided choice - amount, and 4.09 (SD ± 1.38) for the atmosphere of meals.

Based on the thematic analysis, most respondents claimed that there was no difference in their practices before and during the pandemic COVID-19. However, caregivers did report that there were differences in feeding practices due to the high amount of time spent at home.

"When being at home for a long period, boredom is one of the causes for them to consume foods. This habit continues until now" (ID: 21)

"During the pandemic COVID-19, I always order some food, for example from Shopee" (ID:25)

"More frequency to cook at home" (ID: 67)

Table 5: Mean scores for parental feeding practices. (N=104)

Parental feeding practices	Mean scores	SD
Soothing with food (-)	3.23	2.07
Guided choice – when (+)	3.47	1.20
Guided choice - what	3.76	1.21
Guided choice - amount	4.66	1.71
Rules and limits around unhealthy foods	5.09	1.94
Meal setting	2.96	1.20
Atmosphere of meals	4.09	1.38

Parental Shopping Motivation

Table 6 shows the mean scores for parental shopping motivations during the pandemic Covid-19. The highest score which motivates parents during food shopping was for health control (4.74, SD ± 2.33), while the lowest factor was observed for the price (2.27, SD ± 1.60). Other factors of shopping motivation had the following mean scores: convenience (3.29, SD ± 2.58), weight control (3.67, SD ± 2.58), natural ingredients (4.35, SD ± 2.33), and child's preferences (4.10, SD ± 2.53).

Most caregivers maintained their shopping motivation throughout the COVID-19 pandemic. Few caregivers reported changing their shopping motivation due to rising prices, particularly for food items and increased food consumption.

"Observing the economic status and the importance of choosing healthy food for kids." (ID: 28)

"Being thriftier during the pandemic Covid-19." (ID: 58)

"Healthy foods will be the first choice." (ID:44)

Table 6: Mean scores for parental shopping motivation. (N=103)

Parental shopping motivations	Mean scores	SD
Convenience	3.29	2.58
Weight control	3.67	2.58
Natural	4.35	2.33
Health control	4.74	2.33
Preferences	4.10	2.53
Price	2.27	1.60

Parental Stress Level

Figure 7 illustrates the percentages of Malaysian parental stress levels when preparing food for the family or at mealtime during the pandemic COVID-19. Fifty-two percent (n= 55) of participants reported experiencing stress either occasionally or at all times during mealtime.

As the lockdown began, most of them expressed stress because of their responsibility to consistently cook and care for their children.

"I have to take care of my children alone without my husband due to work purposes." (ID: 16)

"Lacking idea in cooking food." (ID:76)

"Issues on food waste become a priority rather than taste." (ID:92)

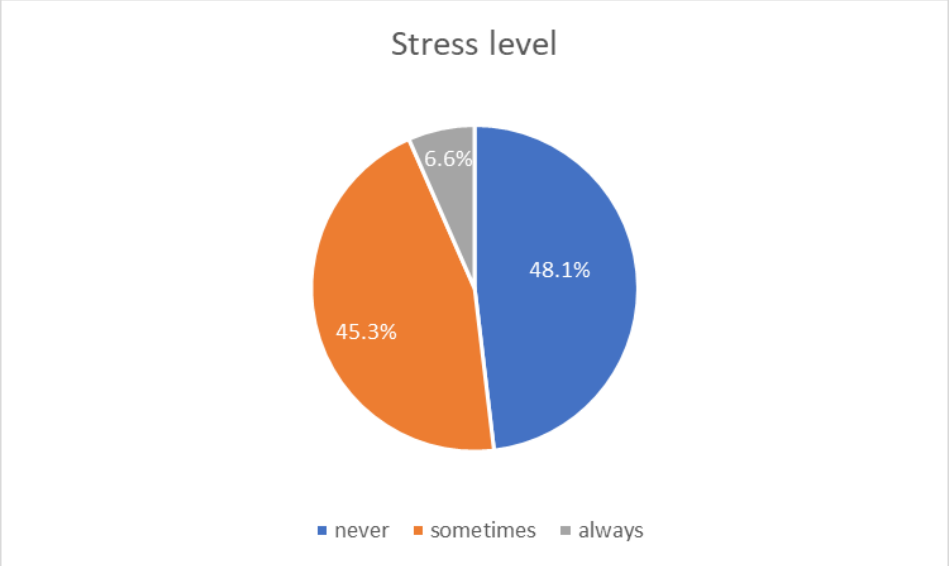

Figure 7: Parental stress level: percentage of the total sample of caregivers reporting their stress level during COVID-19 (N=105).

Discussion

This present study was designed to examine children's nutrition status and the feeding practices, shopping motivations, and stress levels of Malaysian parents during the COVID-19 pandemic. This study also assessed the nutritional status and nutrient intake of the children. Six percent of children were overweight, 16% were obese, 30.9% were stunted, and 10.5% were underweight. Older children exhibited a pattern of decreasing nutrient intake relative to younger children. During the Covid-19 pandemic, it was reported that caregivers had imposed rules and limits on unhealthy foods, shopped for food with a focus on health, and occasionally felt stressed about mealtimes.

In terms of nutritional status, the findings were consistent with other studies that revealed a high prevalence of overweight and obesity among children and adolescents during the COVID-19 pandemic. Among them were China, the United States, and Greece (Jia, Zhang et al, 2021; Jensen, Kelly, Powell et al 2021; Androutsos, Perperidi, Georgiou et al, 2021). Nonetheless, this study observed an alarming proportion of stunting and underweight indicating double-burden malnutrition in the population.

In terms of nutrient intake, the mean total calorie intake is quite low compared to the recommended energy intake from Malaysian RNI 2017, which is 1000kcal/day to 1900kcal/day by age 3 to 15 years old. The age group that

meets the requirement for the percentage achieving RNI is 1 to 3 years old. Caregivers may prioritize the children's micronutrients since this age group is more susceptible to infection or disease. Children aged 13 to 19 years old, on the other hand, have the lowest approaching percentage of achieving RNI in terms of calcium, vitamin D, and vitamin B6 intake. According to studies in other countries, including China, Iran, Africa, and other Asian countries, the age group 13 to 19 years old has a common deficiency, particularly in calcium, vitamin D, and B6 (Lassi, Moin et al, 2017). Caregivers showed negative and positive changes in their feeding practices during the pandemic COVID-19. Particularly negative changes were observed in calming children's tantrums with food and becoming flexible in meal settings, while positive changes were reported in establishing rules and limits around unhealthy foods and guiding children's food selections. Changes in eating patterns, an increase in eating time, and the consumption of fast food during the lockdown were the direct cause of these patterns. This concern is ratified by the findings that recorded a high frequency of non-healthy food intake and the number of meals during the COVID-19 pandemic. (Jafri, Mathe, Aglago et, al, 2021; Janssen, Chang, Hristov et, al 2021). The highest score on feeding practices explained that the caregivers are being more authoritarian in regulating rules, meal settings, and atmosphere when having a meal, as well as permissive in soothing and autonomy aspects.

Caregivers' food shopping motivations changed in this study when they preferred healthy foods for their children. This situation is consistent with statistics collected by Statista (2020) on fresh food stocked up during the COVID-19 pandemic among Malaysians, which revealed that Malaysian consumers prefer to preserve the freshness of their vegetables (89%), meat and poultry (78%), and fruits (70%). Similarly, in the United States and France, researchers discovered significant differences in shopping motivations before and during the COVID-19 pandemic, with people preferring healthy foods during the outbreak. (Celik et al 2020; Philippe et. al, 2021). Increased fear and anxiety may have contributed to this positive change in the preference causes for food consumption, as individuals believe that quality food is associated with good health and a stronger immune system.

The majority of caregivers in this study reported feeling stressed at home. This is consistent with recent findings that 70% of Malaysian adults experienced stress during the COVID-19 pandemic (Perveen et al., 2020). This assertion is supported by a study conducted by Syazwani and colleagues (2020), which found that 26.6% of Malaysian parents experienced higher levels of parental burnout. Similarly, a study on working parental stress found that the level of parental stress ranged from average to high and that it needed to be addressed as soon as possible. Working from home, self-isolation, financial status, and other factors are among the causes of parental stress (Mohammed et al., 2020).

However, the results of this study should be interpreted with caution because the majority of variables, including the nutritional status of children and parental feeding practices, were self-reported. As it is subject to the parent's understanding and interpretation, it may be biased.

Conclusion

This study collects information on children's nutritional status and various parental behaviours during the COVID-19 pandemic. The level of malnutrition among children should be urgently sought by the government or any nutrition-related NGOs as it may affect their productivity in the

future. On the basis of the current feeding practises of parents, appropriate nutrition education interventions are required to assist them in adopting healthy feeding practises.

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