



# Socio-demographic disparities in the eating behaviour of Malaysian children during the COVID-19 lockdown

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## ABSTRACT

**Objectives:** This cross-sectional study aimed to investigate the eating behaviour of Malaysian children aged 2 to 11 years old during the Movement Control Order (MCO) due to the coronavirus disease 2019 pandemic.

**Methods:** A total of 204 Malaysian parents of children aged 2 to 11 years old were recruited for this study using a combination of purposive and snowball sampling approaches. Parents were required to fill an online questionnaire hosted on Google Forms, which consisted of socio-demographic characteristics (including child's gender, age, and ethnicity, as well as parental income during the MCO) and a 35-item list from the Children's Eating Behaviour Questionnaire (CEBQ). Data analysis was conducted by further stratifying the children's eating behaviour according to socio-demographic characteristics.

**Results:** No significant differences were observed in the eating behaviour of the children across age and parental income groups during the MCO. Malaysian Indian children had significantly lower mean scores for the food responsiveness ( $2.50 \pm 0.64$ ) and emotional over-eating ( $2.13 \pm 0.72$ ) subscales than Malaysian Chinese children. Girls had a significantly higher mean score for the slowness in eating subscale during the MCO than boys.

**Conclusion:** Children's eating behaviour were comparable across socio-demographic characteristics. Nonetheless, the findings of the current study provide an overview of Malaysian children's eating behaviour during the MCO.

**Keywords:** Children; COVID-19 lockdown; Eating behaviour; Movement Control Order

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## Introduction

The Malaysian government enforced a lockdown, or Movement Control Order (MCO), from March 18 to May 3, 2020, in the wake of a sudden surge in the number of coronavirus disease 2019 (COVID-19) cases worldwide [1]. Several preventive measures were taken by the government to break the chain of transmission; for instance, wet markets were not allowed to operate in some states during the MCO due to the difficulties in exercising social distancing, while restaurants were only open for food delivery and takeaway. Nevertheless, supermarkets were

permitted to operate within certain hours stipulated by the Malaysian National Security Council [2].

Enforcement of the MCO has had several indirect effects on household income and expenditure patterns for Malaysians [3]. Children living in the middle 40% (M40) and bottom 40% (B40) of households (low-income households) may have had difficulty accessing nutritious and sufficient meals during the COVID-19 pandemic. The temporary closure of wet markets also negatively impacted the accessibility of food commodities during the MCO. Given these factors, it is speculated that the eating behaviour of children could be different following enforcement of the MCO. Therefore, this study aimed to investigate socio-demographic disparities in the eating behaviour of Malaysian children aged 2 to 11 years old during the MCO in response to the COVID-19 pandemic.

## Materials and Methods

Data collection for this cross-sectional study was conducted from May 5 until May 19, 2020. A combination of purposive and snowball sampling approaches was adopted to enrol Malaysian parents of children aged 2 to 11 years old in the current study. An online questionnaire consisted of informed consent, socio-demographic characteristics (including the child's gender, age, and ethnicity, as well as parental income during the MCO), and a 35-item Children's Eating Behaviour Questionnaire (CEBQ) was hosted on Google Forms and circulated to Malaysian parenting groups on Facebook, WhatsApp, Instagram, and Twitter. Ethical approval was obtained from the Management and Science University Ethics Committee with a reference number of MSU-RMC-02/FRO1/02/L2/005.

For the purposes of data analysis, all surveyed children were coded as either pre-schoolers (2–6 years old) or school-aged children (7–11 years old) according to the age reported by the parent. Parental monthly earned income during the MCO was further stratified into 3 categories, which represented the bottom 40% (B40;  $\leq$  RM 4,850), middle 40% (M40; RM 4,851–10,959), and top 20% (T20;  $\geq$  RM 10,960) of earners [4]. Children's eating behaviour during the MCO were assessed using the CEBQ, a 35-item instrument that rated eight eating behaviour subscales on a 5-point Likert scale ranging from "never" to "always" [5]. These subscales were further sorted into 2 groups of appetitive traits for the current study: food approach traits (with subscales of food responsiveness, emotional over-eating, enjoyment of food, and desire to drink) and food avoidance traits (with subscales of satiety responsiveness, slowness in eating, emotional under-eating, and food fussiness) [6].

## Statistical Analysis

Data analysis was conducted using IBM SPSS ver. 26.0 (IBM Corp., Armonk, NY, USA). Socio-demographic characteristics were reported as frequency, percentage, mean and standard deviation (SD) where appropriate. Eating behaviour subscales were expressed as mean and SD. All continuous variables were tested for normality; data were considered to be normally distributed if the skewness was  $\pm 2$ . Differences in means were analysed using the independent samples t-test or analysis of variance as appropriate. A *p*-value of less than 0.05 indicated statistical significance.

## Results

Table 1 shows the socio-demographic characteristics of children aged 2 to 11 years old as reported by parents. A total of 204 parents participated in the current study, in which an equal distribution of pre-schoolers ( $n=102$ , 50.0%) and school-aged children ( $n=102$ , 50.0%) was noted. Most of the surveyed children were boys ( $n=115$ , 56.4%), Malay ( $n=82$ , 40.2%), and living in M40 households ( $n=111$ , 54.4%). The mean age of the children was 6.52 years, and the average parental monthly earned income during the MCO was RM 9,268.58.

Table 2 shows children's eating behaviour during the MCO according to socio-demographic characteristics. No significant differences were observed in eating behaviour according to age and parental income groups during the MCO. Malaysian Indian children showed significantly lower mean scores in the food responsiveness ( $2.50 \pm 0.64$ ) and

**Table 1.** Socio-demographic characteristics of children

Characteristic	Value
Gender	
Boy	115 (56.4)
Girl	89 (43.6)
Age (y)	6.52 $\pm$ 2.00
2–6 (pre-schoolers)	102 (50.0)
7–11 (school-aged children)	102 (50.0)
Ethnicity	
Malay	82 (40.2)
Chinese	53 (26.0)
Indian	69 (33.8)
Parental income during the MCO (RM) <sup>a)</sup>	9,268.58 $\pm$ 6,303.23
$\leq$ 4,850 (B40)	43 (21.1)
4,851–10,959 (M40)	111 (54.4)
$\geq$ 10,960 (T20)	50 (24.5)

Data are presented as *n* (%) or mean  $\pm$  standard deviation. MCO, Movement Control Order; B40, bottom 40%; M40, middle 40%; T20, top 20%.

<sup>a)</sup>1 USD = RM 4.13 (as of September 2020).

**Table 2.** Mean score of the subscales of the CEBQ according to socio-demographic characteristics

Characteristic	Food approach traits				Food avoidance traits			
	FR	EOE	EF	DD	SR	SE	EUE	FF
Gender								
Boy	2.62 ± 0.68	2.24 ± 0.69	3.34 ± 0.78	3.05 ± 0.71	3.03 ± 0.59	2.92 ± 0.76 <sup>a)</sup>	3.05 ± 0.65	3.17 ± 0.73
Girl	2.73 ± 0.72	2.37 ± 0.65	3.40 ± 0.75	3.09 ± 0.81	3.09 ± 0.62	3.28 ± 0.75 <sup>b)</sup>	3.18 ± 0.67	3.10 ± 0.69
Age (y)								
2–6 (pre-schoolers)	2.69 ± 0.66	2.25 ± 0.67	3.31 ± 0.70	3.00 ± 0.71	3.12 ± 0.64	3.18 ± 0.79	3.14 ± 0.66	3.16 ± 0.73
7–11 (school-aged children)	2.65 ± 0.74	2.34 ± 0.68	3.42 ± 0.82	3.14 ± 0.78	2.99 ± 0.57	2.98 ± 0.75	3.07 ± 0.66	3.12 ± 0.70
Ethnicity								
Malay	2.66 ± 0.66	2.29 ± 0.56	3.38 ± 0.68	3.09 ± 0.79	3.04 ± 0.53	3.10 ± 0.75	3.22 ± 0.70	3.18 ± 0.68
Chinese	2.91 ± 0.77 <sup>a)</sup>	2.50 ± 0.73 <sup>b)</sup>	3.48 ± 0.79	3.04 ± 0.78	2.95 ± 0.64	2.92 ± 0.80	3.03 ± 0.59	3.16 ± 0.60
Indian	2.50 ± 0.64 <sup>b)</sup>	2.13 ± 0.72 <sup>b)</sup>	3.26 ± 0.84	3.07 ± 0.69	3.15 ± 0.65	3.17 ± 0.77	3.03 ± 0.65	3.08 ± 0.81
Parental income during the MCO (RM)								
≤ 4,850 (B40)	2.80 ± 0.69	2.47 ± 0.64	3.34 ± 0.70	3.25 ± 0.70	3.01 ± 0.61	3.16 ± 0.78	3.19 ± 0.67	3.26 ± 0.76
4,851–10,959 (M40)	2.58 ± 0.61	2.21 ± 0.67	3.36 ± 0.76	2.98 ± 0.74	3.07 ± 0.62	3.09 ± 0.76	3.09 ± 0.70	3.08 ± 0.71
≥ 10,960 (T20)	2.74 ± 0.86	2.32 ± 0.70	3.40 ± 0.84	3.12 ± 0.80	3.06 ± 0.57	2.98 ± 0.79	3.06 ± 0.55	3.16 ± 0.66
Overall	2.67 ± 0.70	2.29 ± 0.67	3.36 ± 0.77	3.07 ± 0.75	3.05 ± 0.60	3.08 ± 0.77	3.10 ± 0.66	3.14 ± 0.71

Data are presented as mean ± standard deviation.

CEBQ, Children's Eating Behaviour Questionnaire; FR, food responsiveness; EOE, emotional over-eating; EF, enjoyment of foods; DD, desire to drink; SR, satiety responsiveness; SE, slowness in eating; EUE, emotional under-eating; FF, food fussiness; MCO, Movement Control Order; B40, bottom 40%; M40, middle 40%; T20, top 20%.

<sup>a,b)</sup>Different alphabetical superscripts indicate statistically significant differences at the level of  $p < 0.05$ .

emotional over-eating ( $2.13 \pm 0.72$ ) subscales than Malaysian Chinese children. Girls had a significantly higher mean score for the slowness in eating subscale than boys during the MCO. It is also worth noting that the enjoyment of food ( $3.36 \pm 0.77$ ) and food fussiness ( $3.14 \pm 0.71$ ) subscales showed the highest mean scores within the food approach traits and food avoidance traits, respectively. All subscales of food avoidance traits and 3 of the subscales of food approach traits (food responsiveness, enjoyment of food, and desire to drink) were above the midpoint of 2.50. The overall mean scores were  $2.82 \pm 0.52$  for food approach traits and  $3.08 \pm 0.52$  for food avoidance traits.

## Discussion

The eating behaviour of Malaysian children were previously examined using the CEBQ in the South East Asian Nutrition Surveys (SEANUTS) for Malaysia [7], which showed that younger children (7–9 years old) had significantly higher mean scores for the food avoidance subscales than older children (10–12 years old). However, the mean scores for the food approach subscales were comparable across age groups. Although the findings in the current study did not reveal age variation in any subscales, a higher mean score was observed for emotional over-eating during the MCO

( $2.25$ – $2.34$ ) than was reported in the SEANUTS study ( $1.47$ – $1.60$ ). The high mean score for emotional over-eating could be due to children being highly susceptible to emotional stress (anger, sadness, anxiety, and boredom) during the MCO [8]. In addition, it is noteworthy that girls scored significantly higher in the slowness in eating subscale than boys did in the current study, which is similar to the results of the SEANUTS study [7].

Study by Loh et al. [9] showed that Malaysian Malay adolescents aged 13 years old had significantly higher mean scores for the food responsiveness, enjoyment of food, emotional over-eating, slowness in eating, emotional under-eating, and food fussiness subscales than Malaysian Chinese and Indian adolescents. By comparison, the findings of the current study only revealed a significant difference in the food responsiveness and emotional over-eating subscales between Malaysian Chinese and Malaysian Indian children. This result could be attributed to the fact that eating behaviour during the MCO were reported by parents as opposed to adolescents, as in the former study. Another study also suggested that parental income during the enforcement of the MCO could have influenced the eating behaviour of children [10]. Despite the differences mentioned above, no significant differences were found between the mean scores of all subscales for parental income

groups. A possible explanation for this is that households may have still been financially secure at the time of data collection.

It is also worth mentioning that the current study has several limitations. The online questionnaire could only be accessed by parents with internet access during the MCO. Therefore, the eating behaviour of children living in rural regions with limited internet access might not be well-reflected in these findings. Furthermore, this study was unable to ascertain whether children had pre-existing disordered eating behaviour before the MCO. Regardless, the current study is the first to investigate the eating behaviour of Malaysian children during the MCO.

## Conclusion

The findings of the current study revealed that girls had a significantly higher mean score for the slowness in eating subscale during the MCO than boys. Similarly, Malaysian Indian children had significantly lower mean scores for the food responsiveness and emotional over-eating subscales during the MCO than Malaysian Chinese children. Children's eating behaviour were comparable across socio-demographic characteristics; nonetheless, the findings of the current study provide an overview of the eating behaviour of Malaysian children during the MCO.

## Notes

### Ethics Approval

Ethical approval was obtained from the Management and Science University Ethics Committee with a reference number of MSU-RMC-02/FR01/02/L2/005. Informed consent was obtained from parents prior to answering this online survey.

### Conflicts of Interest

The authors have no conflicts of interest to declare.

### Funding

None.

### Availability of Data

All data generated or analysed during this study are included in this published article. For other data, these may be requested through the corresponding author.

### Authors' Contributions

Conceptualization: TST; Data curation: all authors; Formal analysis: all authors; Investigation: all authors; Methodology: all authors; Project administration: all authors; Resources: TST; Visualization: all authors; Writing—original draft: SPJL; Writing—review & editing: all authors.

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