

# Influences of psychosocial factors and home food availability on healthy meal preparation

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## Funding information

Centre of Excellence for Research, Value Innovation and Entrepreneurship (CERVIE) UCSI University, Grant/Award Number: Proj-In-FAS-058

## Abstract

The involvement of children in healthy meal preparation activities has emerged as a potential strategy to promote healthy eating behaviour among children. However, there is a lack of understanding of children's internal (psychosocial factors) and external factors (home food availability) that may support the practice of preparing healthy meals. This study aimed to determine children's psychosocial factors of healthy meal preparation within themselves and their external environment of home food availability as predictors for the practice of healthy meal preparation. Public schools ( $n = 8$ ) from all three zones (Bangsar-Pudu, Keramat and Sentul) in Kuala Lumpur, Malaysia, were selected through stratified random sampling. Two hundred children aged 9–11 and their parents participated. Children's psychosocial factors towards healthy meal preparation and their home food availability were assessed through children and parents, respectively, using validated questionnaires. Majority of the schoolchildren (86.5%) had poor practice of healthy meal preparation. Increased attitude ( $r = 0.344$ ,  $P < 0.001$ ) and self-efficacy ( $r = 0.501$ ,  $P < 0.001$ ) of healthy meal preparation and the availability of fruits ( $r = 0.304$ ,  $P < 0.001$ ), vegetables ( $r = 0.243$ ,  $P < 0.001$ ) and healthful ready-to-eat foods ( $r = 0.227$ ,  $P = 0.001$ ) at home were positively correlated with the practice of preparing healthy meals. After adjusting for age, sex and monthly household income, increased self-efficacy ( $P < 0.001$ ), availability of fruits ( $P = 0.01$ ) and lower availability of less healthful ready-to-eat food ( $P = 0.01$ ) were associated with better healthy meal preparation practices. Outcomes revealed that positive self-efficacy of healthy meal preparation, home food availability of fruits and less healthful alternatives were associated with the practice of healthy meal preparation and thus should be targeted in future health-promotion strategy.

## KEYWORDS

children, healthy meal preparation, home food availability, Malaysia, psychosocial factors

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## 1 | INTRODUCTION

Healthy eating is important for children in promoting well-being, growth and development (Weichselbaum & Buttriss, 2014). The increasing trend of childhood obesity, micronutrient deficiencies and unhealthy dietary pattern among children worldwide (Best, Neufingerl, Van Geel, Van Den Briel, & Osendarp, 2010; The GBD 2015 Obesity Collaborators, 2017; World Health Organization, 2014) call for an effective strategy to instil the healthy nutrition behaviour from childhood. Encouragingly, there is growing evidence demonstrating that the practice of healthy meal preparation in children is related with positive nutrition behaviour (Hersch, Perdue, Ambroz, & Boucher, 2014; Muzaffar, Metcalfe, & Fiese, 2018). Healthy meal preparation can be defined by wide-ranging constructs such as cooking from scratch, the frequency of preparing meals at home using healthy cooking methods and fresh ingredients to substitute processed foods while reducing the use of oil, sugar and salt (Raber et al., 2016). In children, involvement in healthy meal preparation may include helping family, typically parents, in various food-related activities such selecting fresh ingredients, washing and cutting vegetables, peeling eggs and stirring foods (Olfert et al., 2019; van der Horst, Ferrage, & Rytz, 2014).

It was shown that the frequency of helping to prepare food at home was positively associated with higher fruit and vegetable preferences and the self-efficacy for selecting and eating healthy foods among children (Chu et al., 2013). Furthermore, the involvement of children in healthy meal preparation was associated with increased consumptions of fruits, vegetables, grains, milk and meat alternatives (Chu, Storey, & Veugelers, 2014; van der Horst et al., 2014). Qualitative studies have also indicated the positive effect of cooking on children's feelings in terms of their independence, pride and enjoyment; children like to eat what they cook themselves, want to help their parents and teach others about what they learned about nutrition (Bowen & Devine, 2011; Dougherty & Silver, 2007). It is also notable that hands-on cooking activities encourage greater vegetable consumption and had stronger effect compared with conventional nutrition education among children (DeCosta, Møller, Frøst, & Olsen, 2017).

According to the social cognitive theory's (SCT) reciprocal causation, personal factors in the form of cognitive and affective, environmental events and behavioural pattern operate as interacting determinants that influence one another bidirectionally (Bandura, 1999). It was suggested that psychosocial determinants such as knowledge, attitude and self-efficacy are essential as moderators and mediators to produce enduring and sustainable health behaviour, such as the practice of healthy meal preparation (Mead, Gittelsohn, De Roose, & Sharma, 2010; Michels et al., 2018; Oude Luttikhuis et al., 2009). These psychosocial determinants are important cognition-related factors that are often crucial before a nutrition behaviour can take place (Sheeran et al., 2016).

Concurrently, the environment plays a key role in determining behaviour. Previous studies have demonstrated that home food availability can influence the development of nutrition-related

### Key messages

- Children with good practice of healthy meal preparation had increased attitude, self-efficacy and a healthier home food availability.
- Self-efficacy was a significant predictor for good healthy meal preparation practice.
- The availability of fruits at home was positively associated with healthy meal preparation practice.
- The availability of unhealthy ready-to-eat food at home was inversely associated with healthy meal preparation practice.

behaviours in children; food made available and accessible to children, whether intentionally or unintentionally, will affect what they eat (Rosenkranz & Dziewaltowski, 2008; Savage, Orlet Fisher, & Birch, 2007; Yee, Lwin, & Ho, 2017). Apart from its crucial role in food consumption, home food availability should be considered when it comes to meal preparation (McGowan et al., 2017). It was shown that home food availability could improve meal preparation among adults (Garcia et al., 2018); however, evidence is limited when it comes to the practice of meal preparation among children. Home food availability was suggested as a strong influence on children's outcomes but was less explored as a factor for healthy meal preparation practices (Cunningham-Sabo & Lohse, 2013). Indeed, home food availability may result in favourable (facilitator) or unfavourable (barrier) environment that affects the healthiness of meals prepared.

Despite the positive outcomes associated with the practice of healthy meal preparation, it was consistently reported in the literature that children's involvement in healthy meal preparation is insufficient (Chu et al., 2014; Woodruff & Kirby, 2013). Because the practice of healthy meal preparation foster positive interest of children in nutrition and thus represents a potential health promotion strategy (Muzaffar et al., 2018; Wolfson, Frattaroli, Bleich, Smith, & Teret, 2017), it is essential to understand the factors that may support children's participation in preparing healthy foods. This is much needed given that the prevalence of childhood obesity in Malaysia has been rising steadily over the past 13 years from 5.4% (2006) to 6.1% (2011), then almost doubling to 11.9% in 2015 and, most recently, reaching 14.8% in 2019 (Institute for Public Health, 2008, 2011, 2015, 2019). Moreover, the dietary pattern of Malaysian children remains unsatisfactory with the majority (more than half) not consuming adequate vegetables, fruits, legumes, fish and dairy products daily (Institute for Public Health, 2017). Hence, exploring the role of these psychosocial factors are crucial as a needs assessment to inform the development of future health interventions to improve the nutritional status and dietary pattern of schoolchildren through the practice of healthy meal preparation, by focusing on

the influential factors. This could address key barriers faced by middle-income countries such as Malaysia whereby nutrition interventions are yet to be 'hands-on' focused (The Academy of Medical Sciences, 2017), and data on children's involvement in healthy meal preparation are still lacking. We hypothesized that children's internal factors within themselves (psychosocial factors) and external factors such as environmental aspects (home food availability) would interact and influence their behaviour, that is, the practice of healthy meal preparation. Hence, this study aimed to determine schoolchildren's psychosocial factors towards healthy meal preparation and home food availability as determinants for the practice of healthy meal preparation.

## 2 | METHODS

### 2.1 | Design and participants

This cross-sectional study was conducted from January to March 2018 at public schools in Kuala Lumpur in which the medium of communication is Bahasa Melayu (Malaysia's official language) and English. Kuala Lumpur was selected as it was the state in Malaysia with the highest prevalence of childhood obesity and the lowest prevalence of children with normal body mass index (BMI) (Institute for Public Health, 2015). Kuala Lumpur is the national capital city of Malaysia comprising three zones, namely, (1) Bangsar/Pudu, (2) Sentul and (3) Keramat. Schools were randomly selected from every zone through stratified random sampling to give a good representation. Full list of all government primary schools in the respective zone was obtained from Kuala Lumpur Federal Territory Education Department (Jabatan Pendidikan Wilayah Persekutuan Kuala Lumpur, 2013). Eight schools were selected. Children who fit the inclusion/exclusion criteria set were selected through convenience sampling and invited to participate in the study with their parents. However, only those with parents' consent and individual assent were included in the study. Inclusion criteria were healthy schoolchildren, Malaysian, aged 9–11 and can communicate in English/Malay language. Exclusion criteria were schoolchildren with any serious comorbidity that requires treatment (e.g., diabetes and heart disease) or learning disabilities.

The age of 9–11 is generally recognized as middle childhood, a critical stage in which children gain independence, sense of responsibility and start to make their own food choices (CDC, 2018). According to Malaysia's national health survey, this age group was prone to childhood obesity (Institute for Public Health, 2015). Furthermore, the diet of children at this age is often characterized as poor, with low intake of fruits, vegetables and dairy, coupled with increased sugar and fast food consumption (Institute for Public Health, 2017; Koo et al., 2016). Hence, it is critical to target this age group in practising healthy meal preparation as a nutrition promotion effort. Considering 95% confidence level, 5% precision and prevalence of childhood obesity at 14.8% (Institute for Public Health, 2015), a minimum sample size of 194 was required, excluding 20% increase of

nonresponse and noncompliance rate. We recruited 200 pairs of Malaysian schoolchildren and their parents.

### 2.2 | Healthy meal preparation questionnaire

Schoolchildren received healthy meal preparation questionnaire developed by authors of the current study in 2019. The current study was the first to use this questionnaire. Reliability and validity of the questionnaire were established (Ng et al., 2020). Healthy meal preparation questionnaire was answered by children as this questionnaire was intended for the use of children to assess their internal factors within themselves. Healthy meal preparation questionnaire consisted of five sections—schoolchildren's details and subsequent sections were on their psychosocial factors (knowledge, attitude and self-efficacy as indicated the published questionnaire) and practice towards healthy meal preparation. In brief, the knowledge section consisted of general nutrition questions (e.g., food groups and their nutrients) and specific healthy meal preparation questions (e.g., cooking methods and healthier meal choices). One point was given for every correct answer. Knowledge score may range from a minimum of 0 up to a maximum of 9 marks. Attitude determined schoolchildren's opinions and feelings towards healthy meal preparation, cooking and healthy meals (e.g., how do you feel about cooking/making healthy snacks?). Self-efficacy defined schoolchildren's beliefs on their personal capabilities to perform activities related to meal preparation and healthy food choices (e.g., how sure you are that you can help your family make a healthy meal/prepare fruits to eat with your breakfast?). Answer options for attitude and self-efficacy consisted of 5-point Likert scale illustrated using smiley faces. Positive statements corresponded with a score of 1 (I hate/I cannot/Strongly disagree) to 5 (I love/I can/Strongly agree). Attitude and self-efficacy score may range from 7 to 35 and 9 to 45, respectively. Practice reflected on children's involvement in healthy meal preparation tasks (e.g., how often do you help cook vegetables for dinner/prepare oats with milk as your breakfast?). Answer options included 'Never' (never throughout the year), 'Rarely' (1–12 times/year), 'Sometimes' (2–4 times/month), 'Often' (2–4 days/week) and 'Always' (5–7 days/week). Positive statements corresponded to a score of 1 for 'Never' and 5 for 'Always', whereas negative statements were recoded inversely. Practice score may range from a minimum of 7 to a maximum of 35 marks and was further computed as the percentage out of a total of 35 points. Subsequently, practice was further categorized as poor practice (<80%) and good practice (≥80%–100%) (Bloom, 1956). Overall, higher score indicated better knowledge, attitude, self-efficacy and practice towards healthy meal preparation.

### 2.3 | Home food availability questionnaire

In the current study, parents provided information on home food availability rather than children themselves. This was important as

children could be aware of foods that were prepared, served to and/or eaten by them only, whereas parents who were usually in charge of grocery shopping and meal planning at home would give a more accurate representation of all foods that were available at home. Parents received a home food availability questionnaire that was previously validated by other researchers (Couch, Glanz, & Chuan, 2014; Glanz & Steffen, 2008; Marsh, Cullen, & Baranowski, 2003). Details on monthly household income (Department of Statistics Malaysia, 2014) were collected. The questionnaire includes information on the availability of various types of fruits, vegetables, healthful ready-to-eat foods (e.g., whole grains, dairy and nuts) and unhealthful ready-to-eat foods (e.g., sweets, instant noodles and chips) at home during the past 1 week. Aside from the foods from the validated questionnaires, several fruits, vegetables and ready-to-eat foods were included to reflect on Malaysians' usual food consumption (Institute for Public Health [IPH], 2014). Because various home food availability questionnaires were combined and modifications were made on the basis of Malaysians' diet, we further assessed the internal consistency of the overall home food availability questionnaire, which was 0.72 Cronbach's  $\alpha$  value (unpublished data,  $n = 200$ ).

## 2.4 | Procedure

Prior to data collection, study information sheet and consent form were sent to parents. Only schoolchildren with their parent's consent and individual's assent participated in the study. In the present study, we used two tools, that is, the healthy meal preparation questionnaire (answered by schoolchildren) and the home food availability questionnaire (answered by parents). At assessment, the healthy meal preparation questionnaire was distributed to schoolchildren with clear instructions after briefing on the study objectives. Subsequently, schoolchildren were guided in completing the self-administered questionnaire during the school session. In addition, researchers clarified any issues or questions that arose regarding the questionnaire immediately. All submitted questionnaires were checked by the researcher to ensure completeness. On the other hand, parents received the home food availability questionnaire and were required to submit within 1 week.

**TABLE 1** Children's characteristics according to their practice level ( $n = 200$ )

Variables	<i>n</i> (%)	Good practice ( <i>n</i> = 27)	Poor practice ( <i>n</i> = 173)	<i>P</i> value
Age <sup>a</sup>	9.59 (0.74)	9.57 (0.75)	9.70 (0.67)	0.391
Sex				0.842
Male	85 (42.5)	11 (5.5)	74 (37.0)	
Female	115 (57.5)	16 (8.0)	99 (49.5)	
Household income <sup>b</sup>				0.607
≤RM2500	62 (31.0)	7 (3.5)	55 (27.5)	
RM2500–RM5500	73 (36.5)	9 (4.5)	64 (32.0)	
>RM5501	65 (32.5)	11 (5.5)	54 (27.0)	

<sup>a</sup>Reported as mean (SD).

<sup>b</sup>According to Department of Statistics Malaysia, 2014.

## 2.5 | Data analysis

Statistical analysis was performed using Statistical Package for Social Science (SPSS version 20.0, SPSS Inc., Chicago, IL, 2011). Prior to data analysis, data entered were cleaned and checked. Results were reported as mean (standard deviation) for continuous variables and frequency (percentage) for categorical variables. Mean score of practice was divided by total practice score before converting to percentage for categorizing schoolchildren into those with good and poor practice of healthy meal preparation. Analysis was conducted in comparison between children with good versus poor practice of healthy meal preparation. Pearson's chi-square determined the association of sex and monthly household income with practice level. Independent sample *t*-test determined differences in psychosocial factors and home food availability between schoolchildren with good and poor practice of healthy meal preparation. Pearson's correlation test identified correlations between psychosocial factors and home food availability with the practice of healthy meal preparation. Multiple linear regression determined the psychosocial factors and home food availability associated with schoolchildren's practice of healthy meal preparation, adjusted for their age, sex and monthly household income. All multiple linear regression model assumptions such as linear relationship, multivariate normality, independent errors, outliers, multicollinearity and homoscedasticity were fulfilled. Factors included in the multivariable model were determined by the univariable model ( $P \leq 0.25$ ) and associations with healthy meal preparation practices based on previous published work (Sperandei, 2014). Statistical significance was set at  $P < 0.05$ .

## 2.6 | Ethical considerations

UCSI Faculty of Applied Sciences Ethics Board approved the study protocol (Proj-FAS-EC-17-007). Ministry of Education Malaysia and Kuala Lumpur Federal Territory Education Department [KPM.600–3/2/3 Jld 45 (91)] granted approval for the research study, and the principal of each primary schools gave permission to proceed with data collection.

### 3 | RESULTS

The mean age of schoolchildren was 9.59 (0.74) years, and more than half (57.5%) were females (Table 1). Schoolchildren were equally distributed in terms of monthly household income of low, middle and high. Majority of the schoolchildren ( $n = 173$ , 86.5%) had a poor practice of healthy meal preparation. There were no significant differences in the practice of healthy meal preparation across sex, monthly household income and age.

In terms of psychosocial factors, schoolchildren with good practice tend to have a positive attitude (29.89 vs. 27.29,  $P = 0.001$ , minimum and maximum marks ranging from 7 to 35) and better self-efficacy (38.78 vs. 33.46,  $P < 0.001$ , minimum and maximum marks ranging from 9 to 45) towards healthy meal preparation, as compared with schoolchildren with poor practice (Table 2). Schoolchildren with good practice also had slightly better knowledge towards healthy meal preparation than those with poor practice, although this was insignificant (5.74 vs. 5.63,  $P = 0.797$ , minimum and maximum marks ranging from 0 to 9). Furthermore, when comparing home food availability, schoolchildren with good practice significantly had more availability of fruits (6.56 vs. 4.64,  $P = 0.001$ , minimum marks ranging from 0 to 16), vegetables (10.11 vs. 7.82,  $P = 0.002$ , minimum marks ranging from 0 to 16) and healthful ready-to-eat foods (5.00 vs. 3.84,  $P = 0.012$ , minimum marks ranging from 0 to 9) at home, when compared with schoolchildren with poor practice of healthy meal preparation.

As shown in Table 3, significant positive correlations were found between attitude ( $r = 0.344$ ,  $P < 0.001$ ), self-efficacy ( $r = 0.501$ ,  $P < 0.001$ ) and availability of fruits ( $r = 0.304$ ,  $P < 0.001$ ), vegetables ( $r = 0.243$ ,  $P < 0.001$ ) and healthful ready-to-eat foods ( $r = 0.227$ ,  $P = 0.001$ ) at home with the practice of healthy meal preparation. No correlation was found between knowledge and practice ( $r = 0.133$ ,  $P = 0.06$ ).

Multiple linear regression analysis was conducted to determine predictive factors of the practice of healthy meal preparation among schoolchildren, adjusting for their age, sex and monthly household income (Table 4). Self-efficacy ( $P < 0.001$ ), availability of fruits ( $P = 0.013$ ) and less healthful ready-to-eat foods at home ( $P = 0.015$ )

**TABLE 3** Correlation coefficient between psychosocial factors and home food availability with the practice of healthy meal preparation ( $n = 200$ )

Variables	Correlation with practice	P value
Psychosocial factors		
Knowledge	0.133	0.060
Attitude	0.344	<0.001*
Self-efficacy	0.501	<0.001*
Home food availability		
Fruits	0.304	<0.001*
Vegetables	0.243	<0.001*
Ready-to-eat (healthful)	0.227	0.001*
Ready-to-eat (less healthful)	-0.017	0.810

\*P significant at <0.05.

were significant predictors of the practice of healthy meal preparation. We found that practice increased by 0.434 and 0.196 standard deviation, respectively, for every 1 standard deviation increase in self-efficacy point and fruits availability point. Additionally, practice reduced by 0.163 standard deviation for every 1 standard deviation increase in less healthful ready-to-eat food availability point. This model accounted for 33.3% variance for the practice of healthy meal preparation among schoolchildren.

### 4 | DISCUSSION

Current study findings demonstrated that schoolchildren with increased psychosocial factors towards healthy meal preparation and with a healthier home food availability had a good practice of healthy meal preparation. Particularly, schoolchildren with a better attitude and self-efficacy were actively involved in healthy meal preparation, as opposed to knowledge whereby no significant difference was found. According to a systematic review (Glanz, Rimer, & Viswanath, 2008), health behaviour theories that explore roles for

**TABLE 2** Summary of children's psychosocial factors and home food availability ( $n = 200$ )

Variables	Overall mean ( $n = 200$ )	Good practice ( $n = 27$ )	Poor practice ( $n = 173$ )	P value
Psychosocial factors				
Knowledge (0-9)	5.65 (2.30)	5.74 (2.01)	5.63 (2.35)	0.797
Attitude (7-35)	27.65 (3.87)	29.89 (3.59)	27.29 (3.80)	0.001*
Self-efficacy (9-45)	21.34 (5.15)	38.78 (4.53)	33.46 (5.88)	<0.001+
Home food availability				
Fruits (0-16)	4.90 (2.72)	6.56 (2.34)	4.64 (2.69)	0.001*
Vegetables (0-16)	8.13 (3.56)	10.11 (3.19)	7.82 (3.52)	0.002*
Ready-to-eat (healthful) (0-9)	4.00 (2.24)	5.00 (2.11)	3.84 (2.22)	0.012*
Ready-to-eat (less healthful) (0-11)	5.52 (2.32)	5.44 (2.75)	5.53 (2.26)	0.866

\*Good versus poor practice significant at  $P < 0.05$ .

**TABLE 4** Factors associated with practice of healthy meal preparation ( $n = 200$ )

Variables	Unstandardized $\beta$	SE	Standardized $\beta$	P value
Knowledge	-0.119	0.149	-0.053	0.424
Attitude	0.089	0.101	0.067	0.381
Self-efficacy	0.374	0.069	0.434	<0.001*
Fruits	0.372	0.149	0.196	0.013*
Vegetables	0.136	0.110	0.094	0.217
Ready-to-eat (healthful)	0.101	0.177	0.044	0.569
Ready-to-eat (less healthful)	-0.362	0.147	-0.163	0.015*

Note: Dependent variable: practice of healthy meal preparation; model adjusted for age, sex and monthly household income. Model fit:  $R = 0.577$ ;  $R^2 = 0.333$ ; adjusted  $R^2 = 0.294$ . Model assumptions were fulfilled. No multicollinearity detected.

Abbreviation: SE, standard error of regression coefficient.

\*P significant at <0.05.

behaviour-specific cognitions in identifying the act of health behaviours converge attitudes and self-efficacy as major determinants of human behaviour. Children's direct experience with food through cooking activities are related to cognitive factors of feelings, attitude and self-efficacy (Cunningham-Sabo & Lohse, 2013). A study conducted among Canadian children showed that preparing meals at home daily was achieved through increased self-efficacy (Chu et al., 2013). Our findings were consistent with correlational evidence (Chu et al., 2013; Woodruff & Kirby, 2013) and experimental studies (Sheeran et al., 2016) that established both attitudes and self-efficacy as reliable predictors of nutrition-related behaviours. It is likely that schoolchildren with positive perceptions and the self-confidence to engage in activities related to healthy meal preparation had the motivations that were necessary to prepare healthy meals (increased practice).

Additionally, our findings showed that a child, whether with good or poor knowledge, may or may not practise healthy meal preparation. Declarative nutrition knowledge itself is insufficient to implement dietary practices or improve dietary behaviour, but instead only provides the information to an individual (Brug, 2008). On the other hand, behaviours are dynamic and complex processes involving decision points, and in the process, many other factors such as attitude, perceived consequences of the behaviour, self-efficacy (confidence) and environment can influence a person's mind (Worsley, 2002), rather than just knowledge. Providing knowledge does not make a person change their behaviour (Kelly & Barker, 2016), and even with knowledge, the individual can still translate the knowledge and act according to their feelings (Worsley, 2002). Findings of the current study indicate that knowledge was not the only reason to preparing healthy meals, as the literature indicates that there are other influential factors too.

Our multiple linear regression model of psychosocial factors and home food availability accounted for 33.3% of variance in the practice of hands-on healthy meal preparation. Although it was reported that modest variance of below 30% is the norm for predicting nutrition-related behaviour among the general population (Baranowski, Cullen, & Baranowski, 1999; Campbell et al., 2007), our model (>30%) was able to predict considerable variance in behaviour.

Hence, future interventions may utilize both individual psychosocial factors and their environment/resources (home food availability) to advocate healthy meal preparation practices among schoolchildren. In the relevance of psychosocial factors, only self-efficacy had a significant association with healthy meal preparation practices. A recent meta-analysis revealed that changing attitude had small- to medium-sized effects on the behaviour of the general population, whereas changing self-efficacy had a medium effect on behaviour (Sheeran et al., 2016). Our findings are in line with SCT on the importance of self-efficacy in determining health-related behaviour. Self-efficacy is a useful construct grounded in SCT and has been used to measure a person's confidence in his or her ability and skill to perform a specific behaviour (Bandura, 1999). In the context of hands-on tasks that require skills (such as healthy meal preparation), self-efficacy is essential for the outcomes, either successes or failures (Schunk & Gunn, 1986). Self-efficacy is responsible for an increased amount of time and effort made to solve problems faced when performing specific hands-on tasks (Bandura, 1997; Holloway & Watson, 2002). Thus, a child's perception of his/her ability to perform the behaviour could act as a driver, possibly translating to the performance of actual behaviour. If accurate, a child's confidence may be more important to perform actual food-related tasks, as opposed to just having a good attitude towards healthy meals.

Apart from children's individual psychosocial factors, the current study shows that physical environment too had a role in the practice of healthy meal preparation. We found that schoolchildren with good practice of healthy meal preparation had higher availability of fruits, vegetables and healthful ready-to-eat foods at their home, in contrast with schoolchildren with poor practice. Further analysis demonstrated that high availability of fruits and low availability of less healthful foods contributed to the practice of healthy meal preparation. Previously, the convenience and ease of preparation of less healthful alternative such as chips as compared with healthful alternative were shown to be the greatest barrier to healthy food consumption among children (O'Dea, 2003). Because less healthful food options oftentimes were easier to consume because of fewer preparation steps, children may resort to such options if those foods were available at home and not learn to prepare healthy meals.

Moreover, children's preferences over foods depended greatly on taste, in which sweet (fruits), 'junk', fried and salty foods were children's choice (Holsten, Deatrick, Kumanyika, Pinto-Martin, & Compher, 2012). Past study showed that parents provided convenience foods such as instant noodles and carbonated drinks at home, regardless of nutrition value (Kim, Park, Ma, & Im, 2019). If parents preferred purchasing less healthful options such as high-calorie and low nutrient-dense foods, children will have less chance to build acceptance and preferences towards healthier foods (Scaglioni, Arrizza, Vecchi, & Tedeschi, 2011) and, seen in our findings too, the lower opportunity to prepare healthy meals. Given children's preferences were towards less healthful foods, it could be that the availability of such foods at home became their choice, and hence it contributed to them not preparing healthy meals because they can consume those less healthful foods instead. Study findings suggest that when preparing healthy meals, the availability of certain foods was more influential in affecting children's practice of healthy meal preparation, and this may be attributed to their liking in terms of familiarity and taste.

Although vegetables and healthful alternatives such as whole grains and dairy were not significant in our regression model, future strategies should focus on promoting children's exposure and liking of these foods. Naturally, the physical environment can either directly facilitate or inhibit behaviour (Branscum & Crowson, 2017). Children will be provided with the opportunity to be involved in healthy meal preparation at home if they are in an environment with the needed resources, that is, healthy food availability. This is especially important when it is often difficult to make changes to behaviour in an environment that increasingly promotes the intake of high-energy and low nutrient-dense food (Osei-Assibey et al., 2012). Therefore, providing support (Mills, Brown, Wrieden, White, & Adams, 2017) to counteract less healthful home food environment could produce an effect on behaviour change in the practice of healthy meal preparation among schoolchildren. Taken together, it is key to ensure frequent availability of fruits, vegetables and healthful foods such as whole grains, dairy products and protein foods while simultaneously ensuring less frequent availability of less healthful foods such as highly processed foods and sugary drinks to support the behaviour of children in preparing healthy meals. Because children tend to have less autonomy in food environment at home and parents are usually the gatekeepers of food that made purchasing decision (Maubach, Hoek, & McCreanor, 2009; Reicks et al., 2015), our findings highlighted the need to ensure parents were equipped with the nutrition knowledge to purchase and increase the availability of healthful foods at home while limiting less healthful options.

The current study had several limitations. The aim of the study was to determine the association of schoolchildren's psychosocial factors towards healthy meal preparation and home food availability with the practice of healthy meal preparation, without claiming causality as this was a cross-sectional study. Schoolchildren with higher self-efficacy, attitude and healthy home food availability may also be healthier eaters who are more interested in food-related activities such as healthy meal preparation. Besides, data were

self-reported, and hence, social desirability and recall bias were inevitable. Children were recruited from public schools to allow for the representation of Malaysian children, regardless of their household income. Public schools in Malaysia consisted of children from various households (low, middle and high income) as all children have an equal chance and opportunity to enrol in public schools. On the other hand, children attending private schools in Malaysia are only those from the privileged community, and hence, it would not be suitable to represent children from low- and middle-income households. Nevertheless, it is highly recommended to also explore and include children from private schools as well in future studies. Further, the study was done in one state in Malaysia, and generalization may be limited. Despite various limitations, we combined data collected from children-parent dyads to understand both children's individual factors within themselves and their home availability through their parents. Children and parents' questionnaires were valid and reliable for the use of the current study population, important to reduce measurement bias. Besides, the randomization of schools was done to address potential selection bias. To the best of our knowledge, this is the first study that identifies factors associated with the practice of healthy meal preparation among schoolchildren in a developing country.

## 5 | CONCLUSION

Findings revealed that attitude and self-efficacy were important psychosocial factors in schoolchildren in determining their practice of healthy meal preparation. Self-efficacy was a stronger predictor of healthy meal preparation practice as compared with attitude. Schoolchildren's confidence and belief that they can accomplish healthy meal preparation tasks may be a significant driving force that led to the actual behaviour of preparing healthy meals. Furthermore, schoolchildren with healthier home food availability, particularly with the increased availability of fruits and decreased availability of less healthful alternatives, were more inclined to participate in healthy meal preparation. Hence, parents' role should not be neglected to ensure sufficient resources are made available for children to participate in hands-on healthy meal preparation tasks at home. Findings from this study support initiatives to advocate healthy meal preparation practices as part of a viable nutrition and health promotion strategies. With the understanding of factors that were associated with the practice of healthy meal preparation, nutrition educators and practitioners may emphasize on these determinants—psychosocial factors and home food availability to ensure the success of programmes aim to instil hands-on healthy meal preparation activities among schoolchildren. Future studies should focus on studying the psychosocial factors among overweight/obese children and identify how it can help improve their overall perception and health through healthy meal preparation education. Exploration in meal preparation can be further extended to intervention studies to incorporate food preparation skills by targeting the identified factors in order to assess the nutrition-related outcomes on children and their family.

## ACKNOWLEDGMENTS

Our heartfelt thanks to Centre of Excellence for Research, Value Innovation and Entrepreneurship (CERVIE) UCSI University (Proj-In-FAS-058) for providing funding. We are grateful to the selected schools for their assistance and to children and parents who participated.

## CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

## CONTRIBUTIONS

SK and NCM were responsible for the conception of the study. NCM collected the data, conducted data analysis and wrote the manuscript. SK, KHC, YRWK and FM reviewed the manuscript and substantially contributed to the interpretation of the results. All authors read and approved the final manuscript.

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**How to cite this article:** Ng CM, Satvinder K, Koo HC, Yap RWK, Mukhtar F. Influences of psychosocial factors and home food availability on healthy meal preparation. *Matern Child Nutr*. 2020;16(S3):e13054. <https://doi.org/10.1111/mcn.13054>