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What are the commonly available street foods in Malaysia?

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ABSTRACT

Variety types of street foods that are available in other Asian, African, and European countries has been scientifically studied due to the nutritional contribution. The foods in these studies vary from local to non-local foods, and from homemade to industrial foods being prepared as street foods. Although street food has become a phenomenon in Malaysia, there is limited research that identifies the different types of street foods that are available in this country. Hence, this study aims to identify 820 types of street foods that are commonly available in Malaysia, the classification of the foods prepared as street foods for three food categories, and the preparation methods used. We conducted a field survey of street food stalls in all 14 states of Malaysia using a survey form. Then, the surveyed street foods were ranked from the highest to lowest frequency by food category for each state and the whole of Malaysia. From a total of 10 520 surveyed street foods across all states, there were 820 different types of street foods in the whole of Malaysia which comprised of 42.6 % main meals, 35 % snacks, and 22.4 % desserts. Most of the main meals and desserts were classified as local cooked dishes (80.2 %) and local desserts (84.2 %), respectively. Snacks were classified as local cooked dishes (35.5 %), local snacks (28.6 %), and processed foods (20.3 %). Most of the street foods were prepared by steaming (23.2 %) and deep-frying (21.1 %). In this study, the commonly available street foods in Malaysia existed in wide range of options and preparation methods.

1. Introduction

Out-of-home foods in Malaysia range from different types of supermarket food products [1], fast foods, processed foods, and restaurant foods [2]. Besides these, another type of out-of-home food [3] that has become another form of dining habit among Malaysians is street food. By definition, street foods are "Ready-to-eat foods consumed without further processing or preparation, and sold by roadside hawkers such as trolleys, bicycles, markets, trucks or stalls that do not have fixed building or four walls" [4].

Mohd Johan et al. [5] have described that this phenomenon of mobile eateries (which includes street foods) has started in the early 1900s when street foods were sold only on foot and from moveable non-motorized platforms (pushcarts, food bikes, stalls) to motorized platforms such as food trucks. To this day, street food still serves its purpose of providing an affordable and convenient dining experience, especially among low-to middle-income earners [6,7]. Due to the convenience nature of street food and changing of lifestyle nowadays, street food has its own contribution towards food consumption among the Malaysians, source of employment, and even economic growth [8,9]. Nevertheless, street food studies in Malaysia are scarce.

A scoping review by Abrahale et al. [10] found that 85.5 % of research conducted worldwide on street food was more concerned with food safety. Meanwhile, street food studies focusing on the food availability, consumption, and nutrition existed in a considerable amount. This is a concern as street food is generally poor in nutritional quality, in which the high levels of energy, fats, saturated fats, and sugar could contribute to the development of non-communicable diseases when

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street foods are taken in an excessive amount [11]. Besides commonly known to be laden with sugar, fats, saturated fats, and energy, a scoping review article concluded that street foods are also high in salt content, especially in developing countries [10].

Studies from other countries that assessed the nutrient contents of street food, employed a phase in which food availability was firstly determined prior to the nutritional assessment of selected foods. Street food available in other Asian countries [12–14], African countries [15], and European countries [16] vary from local to non-local foods, and from homemade to industrial foods being prepared as street foods. On the other hand, the types of street foods that are available in Malaysia has not yet been scientifically documented. We hypothesised that the types of street food available in Malaysia today might come in more variations. This is because, vendors from different ethnicities in Malaysia has been assimilated in the street food scene since the early 1970s, thus further produced a diversity of Malaysian ethnic dishes being sold as street food [5]. Besides that, foods from other countries including Japan, South Korea, and Middle East has also been entering the local food scene, thus flourishing the multicultural foods available in Malaysia [17].

In Malaysia, two recent studies which were extensions of the current study, have determined the nutrient contents in selected amounts of street foods in Malaysia. Haron et al. [18] reported on the sodium contents in 94 selected street foods, whereas Zainal Arifen et al. [19] reported on the fatty acid composition in 39 selected street foods. Thus, the current study aimed to list 820 different types of street foods that are commonly available around Malaysia, to determine the classification of the foods prepared as street foods based on three food categories i.e. main meals, snacks, or desserts, and to identify the preparation methods used to prepare the street foods. Findings from this study could serve as a base for more future research on local street foods focusing on nutrition. from the perspective of various fields ranging from health science [18, 19].

2. Materials and methods

This was a cross-sectional study of the most commonly available street foods in Malaysia. Following the approval from the Research Ethics Committee of the National University of Malaysia with reference number UKMPPI/111/8/JEP-2020-433, a series of field surveys were carried out in all 13 states and one Federal Territory of Kuala Lumpur in Malaysia starting from early 2020, stopped shortly due to nationwide

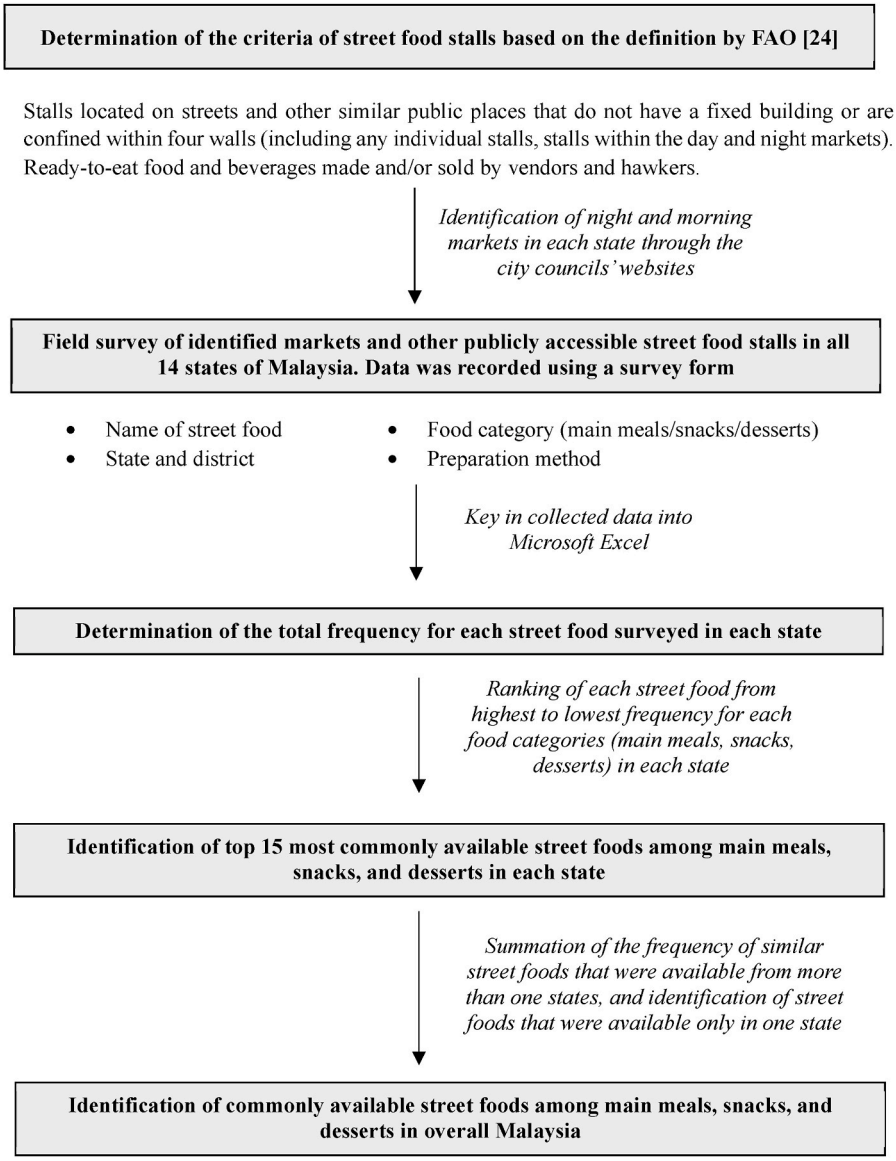

Fig. 1. Flowchart of data collection.

lockdowns, then resumed in December 2020. The flowchart of the data collection of the present study is illustrated in Fig. 1.

2.1. Criteria of the street food stall

The definition of street food in this study was adopted from the Food and Agriculture Organization (FAO) [4]: "Ready-to-eat foods consumed without further processing or preparation, and sold by roadside hawkers such as trolleys, bicycles, markets, trucks or stalls that do not have fixed building or four walls."

Therefore, eligible street food vending sites included in the survey were food establishments selling ready-to-eat food and not contained within a fixed building or four walls, i.e., mobile and stationary vending sites, individual stalls, and stalls at the morning and night markets. Vending sites selling fresh fruits and/or beverages were excluded from the survey.

2.2. Determination of commonly available street foods in all states in Malaysia

Through a preliminary direct observation, street food stalls in Malaysia can be found to be randomly scattered throughout the cities and villages and are either located on the sides of the street or at a dedicated vending site such as the morning and night markets. Physically, each stall is displayed as either a stationary canopy stall or a moveable stall using various forms of food vehicles. Typically, morning and night markets consisting of registered food stalls are regulated by the local council in each respective state. Therefore, for each state, we firstly identified a list of markets available in every district through the city council websites. From the identified lists of markets by district, for the survey in each state, we selected the districts with the most listed markets. However, it is important to note that our survey took place during the COVID-19 pandemic which affected the operating hours of most stalls in the list. Therefore, convenience sampling was used during the survey in which we also surveyed other publicly accessible street food stalls that were in other districts within the respective state. Locations of the survey were not restricted to any dominating race or ethnicity.

During the survey, the information on each available street food was recorded using a survey form for the name, state, district, food category (e.g., main meal, snack, or dessert), and preparation method of the street food. Additionally, the location for every stall or vending site were recorded, and photographs of the foods sold were captured.

Following the survey, the collected data was keyed into Microsoft Excel to determine the total frequency of the surveyed street food in each state. During this step, street foods that came with different flavours were identified and further renamed with one similar name. For example, chocolate waffles, strawberry waffles, and peanut butter waffles were renamed into waffles. Then, the total frequency of the food surveyed was recorded as the number of stalls that sell the particular food within the state. For example, the total frequency of a particular food was recorded as either 3 if the food is sold from three different stalls, or as 1 if sold from the same stall. Once the total frequency had been assigned, the street foods were ranked from highest to lowest frequency. This was conducted for each food category in every state.

This study surveyed a total of 10 520 street foods from 380 locations across 68 districts in Malaysia. Based on Table 1, 40 % of the street foods surveyed belonged to the snacks category, whereas 37 % were main meals, and 23 % were desserts. Selangor recorded the highest number of street foods surveyed, whereas Perlis recorded the least. Main meals were mostly found in the Federal Territory of Kuala Lumpur, whereas snacks and desserts were mostly found in Selangor. Appendix A lists the 15 most commonly available street foods under the main meals, snacks, and dessert categories for every 13 states and 1 federal territory surveyed in this study.

Table 1
The total number of street foods surveyed in this study by food category, districts, and locations of every state.

States	Number of districts surveyed	Number of locations surveyed	Street foods category			Total street food by states
			Main meals	Snacks	Desserts	
Selangor	7	17	792	1000	553	2345
Federal Territory of Kuala Lumpur	7	14	883	935	328	2146
Negeri Sembilan	1	6	333	305	164	802
Melaka	1	5	203	480	156	839
Johor	8	194	207	220	143	570
Kedah	3	11	118	64	35	217
Perlis	2	8	42	47	20	109
Perak	11	40	90	65	37	192
Penang	4	34	113	44	43	200
Terengganu	7	10	495	504	396	1395
Pahang	8	14	362	356	241	959
Kelantan	2	4	92	102	172	366
Sabah	4	8	54	55	28	137
Sarawak	3	15	103	57	83	243
Total by category	68	380	3887	4234	2399	10 520

2.3. Determination of commonly available street foods in Malaysia

Following the preparation of a list of most to least commonly available street foods for main meals, snacks, and desserts in every state, the frequency of similar street foods that were available from more than one state was totalled up. Whereas the street foods that were found in only one state were identified. Once the total frequency had been determined, the street foods were ranked from highest to lowest total frequency to determine the most to least commonly available main meals, snacks, and desserts in Malaysia.

In this study, there were 194 similar types of main meals, 208 similar types of snacks, and 143 similar types of desserts found from more than one states, and only 155 different types of main meals, 79 types of snacks, and 41 types of desserts were available from only one state. Therefore, the current study presents a total of 820 different types of street foods (349 main meals, 287 snacks, 184 desserts) found in the whole of Malaysia, ranging from the most to the least commonly available.

2.4. Categorisation of street food based on food category

During the survey data entry, the category of food was assigned to every street food as either main meal, snack, or dessert. The criteria for the three categories in this study were based on the description by the International Scientific Committee [20] as follows.

i. Main meal: Food commonly eaten during main mealtimes, i.e., breakfast, lunch, and dinner.
ii. Snack: Savoury food eaten between the main mealtimes, i.e., morning tea and afternoon tea.
iii. Dessert: Sweet food eaten at the end of a main meal or as part of the main meal.

2.5. Classification of foods prepared as street foods

All 820 types of commonly available street food in Malaysia under main meals, snacks, and desserts, was classified into six classifications of prepared foods and further sub-classifications. The classifications were adapted based on the existing Protocol for Sampling and Methods of Analysis for MyFCD by the National Technical Working Group of MyFCD [21]. This protocol contains a list of different types of processed foods

and prepared foods in Malaysia. Prepared foods are divided into Traditional Malaysian *kueh,* cooked dishes, and franchised fast foods, with further sub-classifications.

This current study adapted the classifications and sub-classifications of the protocol to suit the variety of street foods identified. Street foods under all three food categories were classified into six classifications: (1) uncooked dishes, (2) local cooked dishes, (3) non-local cooked dishes, (4) local snacks and desserts, (5) non-local snacks and desserts, or (6) processed foods. Local and non-local cooked dishes were further classified as rice-based dishes, meat and egg dishes, fish and seafood dishes, noodle or pasta-based dishes, vegetable and legume dishes, or bread, doughs and batters. Local snacks and desserts were further classified as vegetables, fruits, and legumes-based, wheat flour-based, glutinous rice-based, rice and rice flour-based, porridge and *pengat*, cold desserts, cakes and breads, pastries, or egg-based. Processed foods were further classified as fish and seafood-based, burger, chicken-based, vegetables and fruits-based, beef-based, pork-based, biscuits and sweets, milk products-based, or pizza.

2.6. Types of preparation methods

The preparation method was assigned to every commonly available street food in Malaysia according to the definition of different types of preparation methods by Brown [22] as follows.

i. Pan-frying: Placing food (usually meat) in a very hot frying pan with no added fat. The accumulated fat is kept in moderate amounts (up to ½–inch deep), but not enough to completely cover the food.
ii. Steaming: Heating food by direct contact with the steam generated by boiling water that has been steamed. Food is often placed in a rack or steamer basket above boiling water and the pot or pan is covered with a lid to trap the steam.
iii. Stir-frying: Heating food with the least amount of fat (usually oil). The pan is held stationary while the food is stirred and turned over very quickly with utensils.
iv. Grilling: Cooking food above an intense heat source. The grill may be a rack or a flat surface on a stove.
v. Stewing: Simmering chopped ingredients such as meat (often browned first) and vegetables placed in a large casserole, stock pot, or slow cooker with small to moderate amount of water, stock, or other liquid, which often becomes a sauce as the food cooks. The pot is covered and the food is simmered for some time on the range or in an oven.
vi. Baking: Heating of food by hot air in an oven.
vii. Deep-frying: Placing food in an amount of fat that is enough to completely cover the food. The fat was heated to very high temperatures (177 °C–232 °C) before placing the food.

2.7. Statistical analysis

A descriptive test was used to determine a list of the most to least frequently available street food in every state and for the whole country by food category. Based on the list for the whole of Malaysia, the descriptive test was further used to determine the frequency and percentage of the classification of foods prepared as street foods, and the types of preparation methods used to prepare the street foods. All the tests were conducted using Statistical Package for Social Sciences (SPSS) version 25.0 (IBM, New York, USA).

3. Results

3.1. Different types of commonly available street foods in Malaysia

The study found 820 different types of street foods that are commonly available in Malaysia. These foods comprised of 349 main meals, 287 snacks, and 184 desserts. Table 2 shows the first 20 most commonly available main meals, snacks, and desserts in Malaysia. The full list of all 820 types of street foods can be referred to Appendix B.

The three most commonly available main meals in Malaysia were regular *nasi lemak* or coconut rice (4.5 %), fried noodles (4.2 %), and Penang style *laksa* (4.0 %). Next, fried chicken (7.5 %), *keropok lekor* (5.8 %), and *satay* (5.0 %) were the three most commonly available snacks in Malaysia. Finally, the three most commonly available desserts in Malaysia were *apam balik* (8.9 %), varieties of cakes (6.6 %), and doughnuts (5.5 %).

3.2. Classifications and sub-classifications of commonly available foods prepared as street foods in Malaysia

All 820 types of street foods were classified into six classifications of foods prepared as street foods. Table 3 shows that nearly half (46.7 %) of the street foods are local cooked dishes. This was followed by local snacks and desserts (28.9 %), processed foods (11.3 %), non-local cooked dishes (7.2 %), non-local snacks and desserts (4.9 %), and uncooked dishes (1.0 %). Under the local cooked dishes, 38.1 % are rice-based dishes. For local snacks and desserts, 28.7 % are based on vegetables, fruits, and legumes, while 24.1 % are based on wheat flour. Under the non-local cooked dishes, 30.5 % comprise of breads, doughs, and batters. Whereas for non-local snacks and desserts, 25.0 % are pastries, and 22.5 % are cakes and breads.

From the 820 types of street foods, 349 of the foods are main meals. The majority (80.2 %) of main meals are local cooked dishes, followed by non-local cooked dishes (12.0 %), processed foods (7.2 %), and uncooked dishes (0.6 %). Under the local cooked dishes, more than half are rice-based dishes (51.8 %). Meanwhile, 31.0 % of the non-local cooked dishes are breads, doughs, and batters.

A total of 287 types of the street foods are snacks category. Under the snacks category, 35.5 % are local cooked dishes, followed by local snacks (28.6 %), processed foods (23.0 %), non-local cooked dishes (5.9 %), non-local snacks (4.9 %), and uncooked dishes (2.1 %). Around 40.2 % of the snacks under the local cooked dishes are based on meat and egg. For snacks belonged to the local snacks' classification, 47.6 % are based on vegetables, fruits, and legumes. More than half (52.9 %) of the snacks that are considered non-local cooked dishes are based on meat and egg. Snacks that are based on fruits, vegetables, and legumes made up 28.6 % of the non-local snacks, similar to pastries (28.6 %).

Finally, 184 of the street foods are different types of desserts. The majority (84.2 %) of desserts are local desserts, followed by non-local desserts (14.1 %), processed foods (1.1 %), and local cooked dishes (0.5 %). Under the local desserts' classification, 21.3 % and 20.0 % are based on glutinous rice and wheat flour, respectively. For non-local desserts, most (84.6 %) are cakes and bread (34.6 %).

3.3. Preparation methods of commonly available street foods in Malaysia

As much as 23.2 % of the foods were prepared by steaming, followed by deep-frying (21.1 %), grilling (10.1 %), pan-frying (9.4 %), stewing (7.6 %), boiling (6.5 %), as it is (5.5 %), baking (4.9 %), stir-frying (4.6 %), and braising (4.5 %). Meanwhile, only 1.1 % were prepared by simmering, followed by roasting (0.9 %), and smoking (0.6 %), respectively.

4. Discussion

This study found that the three most commonly available main meals in Malaysia were regular *nasi lemak* or coconut rice, fried noodles, and Penang style *laksa*. Fried chicken, *keropok lekor,* and *satay* were the three most commonly available snacks in Malaysia. Meanwhile, the three most commonly available desserts in Malaysia were *apam balik,* varieties of cakes, and doughnuts. Next, we found that nearly half of the 820 different types of street foods were local cooked dishes, in which mostly

Table 2
Top 20 most to least commonly available street foods in Malaysia for main meals, snacks, and desserts (n = 10 520).

No.	Main meals (n = 3887)			Snacks (n = 4234)			Desserts (n = 2399)		
	Name of street food	n	%	Name of street food	n	%	Name of street food	n	%
1	*Nasi lemak* @ coconut rice (regular)	173	4.5	Fried chicken	317	7.5	*Apam balik*	214	8.9
2	Fried noodles	162	4.2	*Keropok lekor*	247	5.8	Cakes (varieties)	158	6.6
3	*Laksa* (Penang style)	157	4.0	*Satay*	210	5.0	Doughnut	131	5.5
4	Fried *kuey teow*	143	3.7	*Takoyaki*	118	2.8	Ice cream	87	3.6
5	Fried rice (regular)	116	3.0	Fried sausage	113	2.7	Banana fritters	80	3.3
6	Noodles with gravy (varieties)	112	2.9	Grilled sausage	107	2.5	*Tau fu fa* @ soybean curd	69	2.9
7	Fried vermicelli @ fried *mihun*	105	2.7	Fried chicken (non-meat parts)	103	2.4	Steamed baozi with sweet fillings (varieties)	56	2.3
8	Noodle soup	103	2.6	Curry puff	99	2.3	*Kueh lapis*	51	2.1
9	Chicken burger	101	2.6	Chicken nuggets	98	2.3	Agar-agar	41	1.7
10	*Kerabu* rice (salted egg)	101	2.6	Pizza (varieties)	85	2.0	*Kueh seri muka*	39	1.6
11	Vermicelli soup @ *mihun* sup	100	2.6	French fries	81	1.9	*Kueh keria*	37	1.5
12	*Roti john*	99	2.5	*Murtabak*	79	1.9	*Kueh peneram*	37	1.5
13	*Kebab*	95	2.4	Fried *popiah*	75	1.8	Muah chee (sweet)	35	1.5
14	Chicken rice	95	2.4	Fried sausage with cheese	75	1.8	*Apam beras*	35	1.5
15	Beef burger	80	2.1	Fried fish ball	74	1.7	*Kueh bingka pandan*	35	1.5
16	Rice porridge	70	1.8	Corndog	69	1.6	Shaved ice	34	1.4
17	*Kuey teow* soup	68	1.7	Sushi	64	1.5	*Kueh akok*	33	1.4
18	*Nasi lemak* @ coconut rice with fried chicken	67	1.7	Boiled corn (savoury)	61	1.4	*Kueh puteri ayu*	33	1.4
19	Cubed rice with peanut gravy @ *nasi impit*	63	1.6	Dim sum	56	1.3	*Apam balik* with cheese	28	1.2
20	Bread with savoury fillings (varieties)	56	1.4	Roasted chicken (small cuts)	53	1.3	*Kueh kaswi*	28	1.2

comprised of rice-based dishes. Similarly, most of the street foods in the main meals category were local cooked dishes that are based on rice. Meanwhile, nearly half of the street foods in the snacks category were local cooked dishes that are based on meat and egg. Most of the desserts were local desserts based on glutinous rice and wheat flour. Finally, the street foods were mostly prepared by steaming and deep-frying.

Within the main meals, snacks, and dessert categories, there was indeed a variety types of street foods available in Malaysia. In a study conducted among 100 Malaysian adults, *nasi lemak* was found to be one of the most consumed food-away-from-home in which could be due to *nasi lemak* is a widely available local food in Malaysia [23]. Numerous research was found to conduct studies on this national dish with different kinds of interests ranging from the aspect of social relevance [24], packaging [25], sensory properties [26], and even film representation [27]. Snacks such as fried chicken was among the top 10 high-sodium foods mostly consumed by Malaysians [28]. Another study reported that the intake of fried chicken among students in a local university posed a significant health risk compared to the intake of other types of deep-fried foods [29]. Therefore, the consumption should be controlled as fried chicken was found to be the most commonly available snack. Interestingly, *apam balik* can also be found in a variety of forms in other Asian countries including India, Indonesia, and Saudi Arabia [30]. *Apam balik* in Malaysia is known to be sweet, like the one available in Indonesia that is commonly known as *martabak*. However, in India, *apam balik* is of savoury type with eggs as the main ingredients. Meanwhile, in Saudi Arabia, this dish is available in both savoury and sweet forms.

From the findings on the six classifications of the foods prepared as street foods, we observed a common trend in which local street foods in Malaysia were more commonly available than non-local street foods. This trend was consistent for the street foods in the main meals, snacks, and desserts categories in this study. However, the finding was in contrast with previous studies conducted on the street food availability in different countries. For instance, both traditional street foods and westernised street foods were frequently available around the same proportion in studies conducted in Tajikistan [12] and Kyrgyzstan [13]. However, it is important to note that the non-local street foods in the current study comprised not only food from the western countries, but also foods from other regions such as South Asia and Middle East. This indicates that the street food availability in Malaysia is diverse. Additionally, this also calls for interest to study the nutritional contribution of these foods towards the local population's diet.

Looking further into the sub-classifications between the local and non-local cooked dishes, snacks, and desserts, we also observed that most local main meals are cooked dishes that are based on rice, whereas most non-local main meals are cooked dishes that are based on breads, doughs, and batters. This was expected as rice has long been a staple food in Southeast Asian countries like Malaysia [31]. In Malaysia, there are many varieties of rice-based dishes [32]. Most of the time, steamed rice is eaten with side dishes of proteins and vegetables. Among the many other variations include *nasi minyak* or ghee rice which is a rice-based dish where the rice is sauteed in onion, garlic, ginger, and spices. Other than that, both local and non-local snacks are cooked dishes that are based on meat and/or egg. For desserts, most local desserts are based on glutinous rice and wheat flour. Whereas most non-local desserts were cakes and breads. Local desserts in this study comprised traditional *kueh* or local cakes. Local cakes of the sweet type in Malaysia are generally a mixture of glutinous rice flour, rice flour, or wheat flour with sugar, coconut milk, brown sugar, and palm sugar [32]. With respect to the preparation methods used to prepare the street foods in this study, the mostly used methods were steaming and deep-frying. An example of street food in this study that was prepared by deep-frying is French fries. Adolescents in Malaysia consider French fries as unhealthy fatty foods due to the oil used in the preparation method [33]. Additionally, a study conducted in Malaysia found that French fries contained the second highest level of acrylamide after potato crisps [34]. The variety sub-classifications of available street foods found in this study and the preparation methods used to prepare the street foods, indicate that a policy to promote a healthy street food environment for consumers in Malaysia is crucial.

To the best of our knowledge, this is the first study that surveyed the types of street foods available in the whole country. This study was strengthened by the intensive survey conducted across 13 states and one federal territory in Malaysia. This enabled a higher representation of street foods that are commonly available in the whole of Malaysia. However, this study was limited by the period when the survey took place, as the survey was conducted during the Movement Control Order in response to the COVID-19 pandemic which affected the operating hours of street food stalls. Therefore, the findings in this study could not represent the types of street food that are usually available pre- and post-pandemic. To further describe the street food setting in Malaysia, we advised that future street food survey studies should also collect data on the business operating hours, price of food per portion, characteristics of the food vending sites, and the nutritional content as done previously in studies from other countries [13,16].

Table 3
Classifications of different types of main meals, snacks, and desserts prepared as street foods in Malaysia ($n = 820$).

Food classifications	Total ($n = 820$)			Food categories					
				Main meals ($n = 349$)		Snacks ($n = 287$)		Desserts ($n = 184$)	
	n	%	% Out of food classifications	*n*	%	*n*	%	*n*	%
Local cooked dishes	*383*	*46.7*	*100.0*	*280*	*80.2*	*102*	*35.5*	*1*	*0.5*
Rice-based dishes	146	17.8	38.1	145	51.8	1	1.0	0	0.0
Meat and egg dishes	75	9.1	19.6	34	12.1	41	40.2	0	0.0
Fish and seafood dishes	55	6.7	14.4	21	7.5	34	33.3	0	0.0
Noodle or pasta-based dishes	52	6.3	13.6	49	17.5	3	2.9	0	0.0
Vegetable and legume dishes	29	3.5	7.6	11	3.9	17	16.7	1	100.0
Breads, doughs, and batters	26	3.2	6.8	20	7.1	6	5.9	0	0.0
Local snacks and desserts	*237*	*28.9*	*100.0*	*0*	*0.0*	*82*	*28.6*	*155*	*84.2*
Vegetables, fruits, and legumes-based	68	8.3	28.7	0	0.0	39	47.6	29	18.7
Wheat flour-based	57	7.0	24.1	0	0.0	26	31.7	31	20.0
Glutinous rice-based	39	4.8	16.5	0	0.0	6	7.3	33	21.3
Rice and rice flour-based	37	4.5	15.6	0	0.0	7	8.5	30	19.4
Porridge and *pengat*	16	2.0	6.8	0	0.0	0	0.0	16	10.3
Cold desserts	9	1.1	3.8	0	0.0	0	0.0	9	5.8
Cakes and breads	9	1.1	3.8	0	0.0	4	4.9	5	3.2
Egg-based	2	0.2	0.8	0	0.0	0	0.0	2	1.3
Processed foods	*93*	*11.3*	*100.0*	*25*	*7.2*	*66*	*23.0*	*2*	*1.1*
Fish and seafood-based	25	3.0	26.9	0	0.0	25	37.9	0	0.0
Burger	25	3.0	26.9	25	100.0	0	0.0	0	0.0
Chicken-based	17	2.1	18.3	0	0.0	17	25.8	0	0.0
Vegetables and fruits-based	8	1.0	8.6	0	0.0	8	12.1	0	0.0
Beef-based	7	0.9	7.5	0	0.0	7	10.6	0	0.0
Pork-based	6	0.7	6.5	0	0.0	6	9.1	0	0.0
Biscuits and sweets	3	0.4	3.2	0	0.0	1	1.5	2	100.0
Milk products-based	1	0.1	1.1	0	0.0	1	1.5	0	0.0
Pizza	1	0.1	1.1	0	0.0	1	1.5	0	0.0
Non-local cooked dishes	*59*	*7.2*	*100.0*	*42*	*12.0*	*17*	*5.9*	*0*	*0.0*
Breads, doughs, and batters	18	2.2	30.5	13	31.0	5	29.4	0	0.0
Meat and egg dishes	17	2.1	28.8	8	19.0	9	52.9	0	0.0
Rice-based dishes	10	1.2	16.9	9	21.4	1	5.9	0	0.0
Noodle or pasta-based dishes	10	1.2	16.9	10	23.8	0	0.0	0	0.0
Fish and seafood dishes	3	0.4	5.1	2	4.8	1	5.9	0	0.0
Vegetable and legume dishes	1	0.1	1.7	0	0.0	1	5.9	**0**	0.0
Non-local snacks and desserts	*40*	*4.9*	*100.0*	*0*	*0.0*	*14*	*4.9*	*26*	*14.1*
Pastries	10	1.2	25.0	0	0.0	4	28.6	6	23.1
Cakes and breads	9	1.1	22.5	0	0.0	0	0.0	9	34.6
Vegetables, fruits, and legumes-based	7	0.9	17.5	0	0.0	4	28.6	3	11.5
Cold desserts	7	0.9	17.5	0	0.0	0	0.0	7	26.9
Rice and rice flour-based	4	0.5	10.0	0	0.0	3	21.4	1	3.8
Wheat flour-based	3	0.4	7.5	0	0.0	3	21.4	0	0.0
Uncooked dishes	*8*	*1.0*	*100.0*	*2*	*0.6*	*6*	*2.1*	*0*	*0.0*

5. Conclusions

The commonly available street foods in this study ranged from a wide range of options. Local cooked dishes made up nearly half of the food. This was followed by local snacks and desserts. In terms of preparation methods used, most of the foods were prepared by steaming and deep-frying. Findings from this study could be useful for future research between street food and nutrition.

CRediT authorship contribution statement

Zainorain Natasha Zainal Arifen: Writing – original draft, Validation, Methodology, Investigation, Formal analysis. **Suzana Shahar:** Writing – review & editing. **Kathy Trieu:** Writing – review & editing, Investigation, Funding acquisition, Conceptualization. **Hazreen Abdul Majid:** Writing – review & editing. **Hasnah Haron:** Writing – review & editing, Supervision, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization.

Ethical statement

This work does not involve live subjects (human or animal).

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Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: Hasnah Haron reports financial support was provided by Resolve to Save Lives LINKS grant. If there are other authors, they declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jafr.2025.101724.

Data availability

The data that has been used is confidential.

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