Abstract

Excessive salt or sodium intake is strongly linked to increased blood pressure, which is a major risk factor for cardiovascular diseases. This study aimed to qualitatively explore the views of key stakeholders on salt intake reduction and barriers and facilitators to reducing salt intake in Malaysian schools. The stakeholders in this study were school administrators, food operators, and consumers. Their views were determined using in-depth interviews and focus group discussions, and data collected were analyzed using inductive thematic analysis. Salient barriers identified in this study were a lack of knowledge pertaining to salt intake reduction and foods sold outside the school. Meanwhile, key facilitators of salt reduction included few strategies such as public health campaigns, priority towards salt reduction policies, and school-based education programs, alongside support from other relevant stakeholders. Overall, the barriers and facilitators signal the need for implementing salt reduction programs and the collaborative efforts of different stakeholders.

Keywords: Adolescents; Nutrition; Qualitative study; Salt intake; School

What We Already Know

- Diet-related diseases are increasing in Malaysia and have increased the burden on the community, especially middle-income households; high salt intake is a crucial determinant of increased blood pressure, which leads to cardiovascular diseases such as stroke and heart attack.
- Preventing raised blood pressure from an early age (e.g., childhood and adolescence), known as primordial prevention, can avert lifelong hypertension and its associated consequences.
- Salt reduction strategies implemented in schools in other countries have shown fruitful results; however, limited studies have been conducted in the context of Malaysia.

What This Article Adds

- Despite being aware of excessive salt intake in Malaysia and its impact on health, stakeholders have limited skills and knowledge pertaining to salt intake reduction in schools.
- Implementing salt reduction programs and collaborative efforts of different stakeholders are necessary to ensure the success of salt reduction interventions in Malaysian schools.

Introduction

Excessive sodium or salt intake is linked to increased blood pressure[1] and increased likelihood of developing hypertension.[2] Consequently, the World Health Organization (WHO) considers reducing salt intake a key measure in addressing the growing burden of non-communicable diseases and decreasing healthcare costs in developed and developing

countries.[3] It has urged member states to reduce their salt intake by 30% by 2025; however, no country is on track to achieve this goal.[4]

Dietary data suggests that adults' salt intake in most of Southeast Asia exceeds the WHO recommended 5 g/day.[5] Among Malaysian adults, the average salt intake is 7.9 g/day, almost double the recommended amount.[6] However, related data on Malaysian children and adolescents is limited. In the Malaysian school setting, students commonly purchase food from the canteen and school convenience shop, which are managed by canteen operators and the school administration, respectively. The school convenience shop primarily offers energy-dense snacks and beverages, while the canteen sells staple foods such as noodles, fried rice, nuggets, and fried chicken, as well as energy-dense traditional cakes and sugar-sweetened beverages, despite some being listed as prohibited items by the 'Healthy School Canteen Guidelines'[7]. Increased blood pressure can begin from childhood and track from early life to adulthood[8]. Moreover, living a lifestyle that include such unhealthy habits (e.g., physically inactive, unhealthy body weight) will increase the risk of the early development of cardiovascular diseases (CVDs) [9] and premature death.

Consuming lower amounts of salt, along with maintaining a healthy weight, from childhood can slow the rise in blood pressure and prevent the development of hypertension and CVDs in later life. Meta-analyses of controlled trials have shown that reduced salt intake lowers blood pressure in children and adolescents.[10] Furthermore, the implementation of school-based intervention programs aimed at reducing salt content in meals has yielded promising results in diverse settings such as Portugal and Arkansas.[11,12] For example, these programs have involved improving their menu by reducing sodium content in existing meals and providing training to food handlers. However, the extent to which these approaches can be successfully adapted to the Malaysian context requires further examination. This study explored the views of key

stakeholders across Malaysia on salt intake, salt intake reduction, and barriers and facilitators to reducing salt intake in schools.

Methods

Study Design and Ethical Considerations

The COREQ checklist for qualitative research was adhered in reporting this study.[13] This qualitative study was conducted between May 2020 and March 2022 and was part of a larger project focusing on salt reduction in Malaysia's out-of-home sector.[14] The stakeholders in this study were categorized into three groups: administrators (e.g. school principals and assistant principals), food operators (e.g. school canteen operators and school convenience shop operators), and consumers (e.g. parents and teachers) from five regions of Malaysia: western Peninsular Malaysia (Kuala Lumpur and Selangor), southern Peninsular Malaysia (Johor), northern Peninsular Malaysia (Kedah), eastern Peninsular Malaysia (Terengganu), and East Malaysia/Borneo (Sabah and Sarawak). In-depth interviews (IDIs) were conducted with administrators and food operators, while focus group discussions (FGDs) were held with consumer stakeholders, where we encouraged them to openly share their views on salt intake reduction in schools. Owing to the COVID-19 pandemic, the IDIs and FGDs were conducted either face-to-face or via Google Meet. Face-to-face IDIs were conducted in a comfortable and quiet space at schools, while face-to-face FGDs were conducted in meeting halls because they were convenient for both researchers and respondents. FGDs with parents and teachers were conducted separately to ensure homogeneity among the group respondents. The IDIs and FGDs lasted 30–60 minutes. Ethical approval was obtained from the *committee name withheld for review* (approval number: *withheld for review*), *committee name withheld for review* (approval number: withheld for review), and *committee name withheld for review* (approval number: *withheld for review*). Before collecting data, approval was also obtained from the Ministry of Education and the respective schools. The interviews were conducted using pseudonyms, and

data transcriptions were anonymized to maintain confidentiality. Identifiable information of the stakeholders was used only in the consent form and to sort interviews according to the different stakeholders. Records were stored securely on a password-protected computer, and consent forms were stored in a locked cabinet.

Study Framework and Topic Guides

We developed an open-ended, semi-structured topic guide using the social-ecological model with adaptations from the United Kingdom Medical Research Council framework and Theoretical Domains Framework, as described in the study protocol.[14] We used developed, pre-tested, and piloted topic guides to determine the views of administrators, food operators, and consumers. Table 1 presents information about the stakeholders, sample size, and method of data collection. The first guide focused on administrators, while the other two sets were customized for food operators and consumers. Each topic guide comprised domains and questions for each domain. The domains were (i) societal and cultural norms and values (e.g., What are your opinions on salt intake in Malaysia? How about salt intake in schools? Is it a problem?), (ii) practice and action (e.g., What are your opinions on salt-reduction initiatives in schools?), (iii) motivation (e.g., Which factors would encourage you to participate in reducing salt intake in schools?), (iv) barriers (e.g., What are the barriers to reducing salt intake in schools?), (v) monosodium glutamate (MSG) (e.g., What are your opinions on MSG?), and (vi) additional information (e.g., Is there anything you would like to add?). We paraphrased a few questions and sentences (without changing the domains) to refine the topic guides and effectively interview moderators and stakeholders. As there were no major amendments to the topic guides, the stakeholders involved in the pilot study were included in the sample for data collection.

Sampling Procedure and Data Collection

We randomly chose 3–4 schools from the sampling frame, which comprised 5–10 schools that were nearest to the researchers. Stakeholders were recruited from randomly selected schools through purposive and snowball sampling. They were recruited through multiple ways (email invitations, calls, and messages), and were provided with a detailed overview of the study. No relationships were found among the stakeholders before the interviews. Individuals who were among the targeted stakeholders, aged 18 or older, and consented to participate in the study were included in the study. Stakeholders unwilling to participate were excluded. A formal invitation, information sheet, and consent form were distributed to the eligible stakeholders. They were assured of anonymity and confidentiality before their written consent was obtained in both Malay and English. Before data collection, all researchers received the training required for qualitative research. Three parties were involved in each interview: moderators, stakeholders, and notetakers. The moderator started the session with an ice-breaker and a brief introduction to the study. Then, they proceeded with the interview using the topic guide and employing an inductive approach, in which the interview can be modified based on the issues the stakeholders bring up during the interview. The notetaker recorded the interviews using digital voice recorders and wrote down necessary information for future analysis.

Data Analysis

Two researchers coded the transcripts using open coding and created a coding system that was reviewed and approved by the research team. Inductive thematic analysis was performed on the verbatim interview transcripts using the QSR International NVivo version 12 software. Stakeholders' quotations were labeled based on their sex, type, and region. These steps were performed to ensure consistent coding patterns. Two researchers thoroughly

analyzed and debated the generated themes and subthemes until they reached a consensus on articulation, structure, and analysis strategy.

Results

A total of 63 stakeholders participated in the IDIs (n = 22) and FGDs (n = 41). Some regions had a higher number of participants because of more encouraging responses from stakeholders or the number of stakeholders who responded to our call for pilot testing, which was crucial in reaching the saturation point at the end of the study. Ten stakeholders were excluded because they either declined or could not attend the interviews for personal reasons. Table 1 displays the sociodemographic characteristics of the stakeholders.

Table 1. Sociodemographic Characteristics of the Stakeholders

Characteristic	Administrators (n = 5)	Food operators (n = 17)	Consumers (n = 41)*	All stakeholders (n = 63)
Age				
Range	51–58	24–58	24–60	24–60
Mean ± SD	53 ± 3	42 ± 11	41 ± 9	42 ± 10
Sex (*n* [%])				
Male	4 (80)	8 (47)	12 (29)	24 (38)
Female	1 (20)	9 (53)	29 (71)	39 (62)
Education level (*n* [%])				
Secondary	-	9 (53)	16 (39)	25 (40)
Tertiary	5 (100)	8 (47)	25 (61)	38 (60)
Location				
Western Peninsular Malaysia (WPM)	-	3 (18)	8 (20)	11 (17)
Northern Peninsular Malaysia (NPM)	-	4 (23)	6 (14)	10 (16)
Eastern Peninsular Malaysia (EPM)	5 (100)	5 (29)	8 (20)	18 (29)
Southern Peninsular Malaysia (SPM)	-	3 (18)	9 (22)	12 (19)
East Malaysia/Borneo (EMB)	-	2 (12)	10 (24)	12 (19)

Note. (*) = data collection conducted using FGD; range of participants in each FGD was 2-5

Perception of salt intake and reduction of salt intake

Table 2 presents the themes obtained regarding stakeholders' perceptions of salt intake and reduction of salt intake. Generally, three subthemes arose for each main theme. Most stakeholders agreed that salt intake in Malaysia is high and there are many high-sodium products available, such as processed foods and fast foods. Stakeholders collectively acknowledged that excessive salt intake can lead to cardiovascular issues like hypertension and stroke. They also recognized that the preference for salty or high-salt foods is cultivated from an early age due to cultural eating habits. Regarding salt reduction, many stakeholders believed that food with less or no added salt would be unpalatable. They also perceived salt reduction as a low priority, even in school settings. Nonetheless, the stakeholders considered salt reduction initiatives as an important social responsibility that should be prioritized.

Table 2. Stakeholders' Perceptions of Salt Intake and Reduction of Salt Intake

Theme	Sub-themes	Representative responses
Perception of salt intake	In Malaysia, salt intake is high, and consuming it excessively will increase the risk of developing cardiovascular diseases, such as hypertension and stroke.	*"…Malaysians used salt in high amounts…" (Male, Consumer, NPM)* *"…Salt (high intake) is dangerous; for example, it can cause raised blood pressure…" (Male, Food operator, NPM)*
	There is a vast number of high-salt products.	*"…Food (high-salt products) plays a major factor; there are a lot of fast foods these days…" (Male, Administrator, EPM)* *"…Like my own kids, when they buy main dishes, such as noodles or rice, they have compulsory side dishes, such as nuggets and sausages…" (Female, Consumer, EPM)*
	Preference for high-salt food stems from eating culture and behavior	*"…Maybe it comes from their family line, through which they learn eating behavior is taught, and they pass on the same to their children…" (Female, Consumer, NPM)*

		"…Usually, those who are used to high-salt foods face challenges in reducing salt intake because they're used to it…" (Female, Consumer, SPM)
Perception of reducing salt intake	Food with no or less amount of salt would be tasteless.	*"…For me, when it comes to food, if there's an insufficient amount of salt, it would taste bad…" (Male, Operator, NPM)* *"…Yes, if there's no salt, it will not taste good…" (Female, Consumer, WPM)*
	Reducing salt intake for healthy eating is not a priority.	*"…Salt (reduction)? I've never heard of people practicing it…it's unusual…" (Female, Operator, EPM)* *"…Certain schools focus only on certain areas, like academics…" (Male, Administrator, EPM)*
	Reducing salt intake is a social responsibility.	*"…We must take responsibility to implement this (reduction of salt intake), as it's for our own awareness…" (Male, Operator, NPM)* *"…Yes, it (reducing salt intake) should be one of our responsibilities …" (Female, Operator, EPM)*

Barriers and Facilitators to Reducing Salt Intake in Schools

Table 3 presents stakeholders' views on the barriers and facilitators to reducing salt intake in schools. The themes derived from the stakeholders can be categorized as personal, social, and environmental. The views of food operators yielded another category of factors, financial factors, as proposed elsewhere.[15]

Views of Administrators

The barriers included limited skills in implementing salt reduction programs and a lack of awareness about salt intake reduction in schools. No programs or policies specific to salt intake reduction had been implemented in schools that they were aware of. Many seemed to state that the lack of parents' role in salt intake reduction contributes to the difficulty in reducing schoolchildren's salt intake. High-salt foods sold by food vendors outside schools were another barrier, as no regulations existed regarding the foods they could sell to schoolchildren, as opposed to regulations school canteens had to follow. The facilitators included labeling the amount of salt present in foods sold in school canteens and implementing programs related to salt reduction, such as setting targets for salt reduction and having professionals talk about reducing salt intake. Support from other stakeholders, such as the education department and universities, to guide on salt reduction strategies in schools, as well as monitoring food sold outside the school fence, was also a facilitator.

Views of Food Operators

According to food operators, the barriers included a lack of knowledge pertaining to salt intake reduction. Most seemed to admit that negative feedback from customers is a challenge in reducing salt in cooking, in addition to competition with food vendors outside schools. Increased costs or negative effects on profits stemming from salt reduction efforts should also be considered. The facilitators included receiving guidance on salt intake reduction and including the canteen supervisor or manager in salt reduction programs. Receiving requests

for less salt from customers and educating children about salt reduction as early as preschool can further promote salt reduction, as mentioned by food operators. Providing customers the option to choose their desired salt intake by placing salt shakers on the tables, and using alternative cooking methods such as using natural ingredients or making the food spicier, were other facilitators for reducing salt. Most agreed that government enforcement was crucial to ensure that salt reduction in schools was feasible. Using salt intake reduction to market products may also motivate food operators to reduce salt in cooking.

Views of Consumers

The barriers included a lack of knowledge pertaining to salt intake reduction, children's demands for high-salt foods, and excessive marketing of such foods. Most consumers agreed that high-salt foods served in school canteens and outside schools were a challenge, apart from the time constraints in preparing homemade foods. The facilitators included government programs to increase awareness of salt intake reduction. Consumers were willing to practice salt reduction and restrict salt intake among children with support from other family members. Most consumers stated that educating schoolchildren about salt intake reduction early on is important, in conjunction with food industries producing low-salt products.

Table 3. Stakeholders' Views on the Barriers and Facilitators to Reducing Salt Intake in Schools

Category	**Sub-themes**		**Representative responses**
	Barriers	**Facilitators**	
		Administrators	
Personal	Limited skills in implementing salt reduction programs	Encouraging labeling the amount of salt present in foods	*"…Government would give us these guidelines (on reducing salt intake), however, it is difficult for us to implement them…" (Male, EPM)* *"…According to me, we should label the amount of salt present in the food…" (Male, EPM)*
Social	Lack of parental role in reducing salt intake	Initiatives on salt reduction	*"…In my opinion, it should start from the home, the children should be aware of it (reducing salt intake), and parents should be involved…" (Male, EPM)*
Environmental	Lack of awareness, initiatives, and policies concerning salt reduction in schools		*"…We are unaware of the information (on reducing salt intake), that's one of the main issues…" (Male, EPM)* *"…So far, there's no policy (on reducing salt intake); there isn't much, if there's any…" (Male, EPM)*

		"…I think we should have a target (for reducing salt intake), like they state in the contract; however, the food vendors didn't implement it, it's not standardized…" (Male, EPM) *"…We can start a program in which the school counselor gives a talk (about reducing salt intake)…" (Male, EPM)*
Uncontrolled high-salt food sold by food vendors outside the school	Support from other stakeholders, such as education departments and universities, in reducing salt intake in schools	*"…For now, the guidelines given (food guidelines in schools) are being implemented; however, we cannot control the food outside (outside the school)…" (Male, EPM)* *"…When children buy food from outside (outside the school), the vendors have control (over the amount of salt used); as consumers, we eat what we are served…" (Female, EPM)* *"…I think it's really important that education departments are involved…" (Male, EPM)*

			"…I think support from parties other than school stakeholders is also crucial, such as support from universities…" (Male, EPM)
		Food operators (cont.)	
Personal	Lack of knowledge pertaining to salt intake reduction, such as knowledge of food labels, salt substitutes, and cooking skills to reduce salt	Guidance on salt intake reduction, such as courses, talks, and advertisements	*"…Haven't heard of it, never used it (potassium chloride)…" (Male, NPM)* *"…Haven't heard of it (Healthy Choice Logo)…" (Female, EPM)* *"…That's the challenge, we don't know how to adjust the taste (after reducing salt) so that it's still palatable…" (Male, EPM)* *"…Usually for canteen, we would have courses…" (Male, SPM)*
		Involvement of canteen operators in salt reduction programs so they can guide their cooks effectively	*"…It should be the canteen operator, as the cooks will follow what they're told by their supervisor…" (Female, SPM)*
Social	Receiving negative feedback from customers for reducing salt	Receiving requests for less salt from customers	*"…We reduced salt (in cooking); then, we received a complaint that the food was tasteless…" (Male, SPM)*

			"…We can reduce the salt next time (if requested by the customer)…" (Female, SPM)
		Early education on reducing salt intake	*"…(Low salt intake) should be taught from the time children are in pre-school, like sugar and salt; if they're taught earlier, they wouldn't prefer it (high-salt food)…" (Male, EPM)*
		Provide customers the option to choose their salt intake	*"…Sometimes, we put salt on the table (so the customer can choose the amount of salt themselves)…" (Male, NPM)*
		Using alternative ways of cooking, such as using natural ingredients	*"…If I made the food spicier, they wouldn't notice that it has less salt…" (Male, EPM)*
Environmental	Competition with the food sold by food vendors outside the school	Enforcement from the government, such as a salt reduction policy	*"…We are not allowed to sell nuggets and hot dogs; however, the kids buy it outside the school, knowing it's available outside. They spend 50% of their allowance there…" (Male, EPM)*
			"…Yes, I think the responsibility is more of the government (salt reduction policy), we just follow…" (Male, NPM)

Financial	Increased cost because of reducing salt/potential negative impact on profits; usage of salt substitutes	Using salt reduction strategies to increase sales and promotion	*"…According to me, all canteen operators would want cheap and high-quality ingredients…" (Male, NPM)* *"…We can use this (salt reduction) as an opportunity to market our products…" (Male, NPM)*
		Consumers (cont.)	
Personal	Lack of knowledge pertaining to salt intake reduction, such as knowledge of recommended intake and food labels	Salt reduction programs by the government	*"…We know that salt is also important for us, but how do we know the recommended amount so that when we eat, we don't take it excessively…" (Female, WPM)* *"…I don't know where to look for it (amount of salt in food labels)…" (Male, SPM)* *"…Maybe the government can promote salt reduction like they did with sugar…" (Female, WPM)*
		Willingness to practice salt intake reduction	*"…If there's a substitute for salt, I want to try it…" (Female, WPM)*

Social	Children's demand for high-salt foods and the influence of others	Restrictions on the intake of high-salt foods	*"…At the store, children go for potato chips and anything of the sort, it's very salty…" (Female, EPM)* *"…Influenced by their peers or when they go out with their relatives, they request (high-salt foods), because that's how children are…" (Female, SPM)* *"…I put a limit; for example, junk food only once a week…" (Female, WPM)*
		Early education on salt reduction	*"…We have to start from school… educate them so that when they get older, they're more aware…" (Male, SPM)*
		Support from family members in reducing salt intake	*"…I think family members…their support is what we need to reduce salt…" (Female, WPM)*

Environmental	Advertising or marketing of high-salt foods	Salt reduction by food industries	*"…Barriers include the promotion (by food industries), maybe with new menus and viral marketing food, sometimes we just want to try them…" (Female, WPM)* *"…While educating the children (about reducing salt intake), food industries should reduce (salt)…" (Female, WPM)* *"…School canteens use a lot of salt in the food…" (Female, SPM)* *"…If they don't buy it (high salt foods) during lunch hour, they buy it from outside after school ends…" (Female, EPM)* *"…Main reason for buying food from outside is time constraint…" (Female, WPM)* *"…When we order the food, we can inform them to use less salt; we have to remind them (food vendors)…" (Female, NPM)*

Discussion

Most stakeholders agreed that Malaysia's salt intake is excessive, which poses a significant risk of CVDs, including hypertension and stroke. The school food environment is important because it drives the dietary behavior of schoolchildren and adolescents.[16] However, limited efforts have been made to reduce salt intake in Malaysian schools. Stakeholders reported that they had limited skills in salt intake reduction, and little to no progress has been made thus far regarding salt intake reduction in schools. Most consumers agreed that the foods sold in school canteens are high in salt. This finding is supported by studies that examined salt content in school canteens.[17] Processed foods are easily available to children despite being prohibited.[7] Additionally, all stakeholders reported that foods sold outside the school serve as barriers to reducing salt intake. Unlike the guidelines school canteens must follow, no guidelines exist for these food vendors, making unhealthy foods easily accessible to children. Ahn et al. found that salt intake is higher among older children, and it may be due to frequent eating out and convenience-oriented eating habits.[17] Further research on food and drinks sold outside the school is warranted.

Most stakeholders considered foods with no or less salt tasteless, and food operators reported negative feedback from consumers as a barrier to reducing salt intake. This finding parallels that of a smaller-scale study in which students' perception and behavior toward healthy eating impeded the implementation of health initiatives in schools. Many students perceived the taste and high price of healthy foods as barriers to healthy eating in school. They expected healthy foods to have a sour taste with no added salt, which they did not find appealing. Additionally, healthy foods were seen as expensive, and not all students were willing to purchase them.[18] The provision of low-salt foods is hindered by the need to maintain profit margins and concerns over falling demand from the industrial sectors,[19] as reported by food

operators. However, initiatives such as providing the opportunity to choose salt intake or using natural ingredients in cooking (e.g., using spices or seafood broth, which can mask the absence of salt) have shown good consumer acceptance.[20] Some food operators also considered salt reduction in food a facilitator, saying that it can be used to promote healthier products. They emphasized the need for guidance on salt reduction and the inclusion of canteen operators or supervisors in such programs to ensure effective salt reduction efforts. Azizan et al. found the lack of capacity and resources to prepare healthy meals as a barrier to creating healthy school canteens.[18] They also highlighted the importance of continuous monitoring and education among food operators, in conjunction with healthy eating education among schoolchildren.

Consumers reported that increasing demand from children for high-salt foods and time constraints in preparing homemade foods hinder salt intake reduction. Studies have shown that children consume excessive amounts of salt by overconsuming fast food,[21] soft drinks, and snacks.[22,23] Marketing strategies of the food industry further aggravated their salt intake, as reported by consumers. Boyland et al. found that advertised foods high in salt, sugar, and fat can influence children's eating habits, nutritional knowledge, and diet-related health.[24] The stakeholders in this study agreed that eating culture and behavior contribute to the preference for high-salt foods. High salt intake can suppress salt taste receptors.[10] Moreover, children's salt intake positively correlates with that of their parents.[25] This further highlights the importance of parents' role in reducing salt intake, as mentioned by school administrators in this study. Demanding less salt when eating out and restricting children's salt intake were common facilitators for consumers in this study.

Stakeholders stated that salt intake reduction is yet to be a priority in schools, and it appears that a lack of awareness on this topic is a barrier that all stakeholders face. They stated that they did not know much about reading food labels, salt substitutes, the recommended salt intake, and ways to reduce salt in cooking. Most stakeholders highlighted the need for salt

reduction programs, as they considered salt intake reduction a social responsibility. The administrators suggested labeling salt content in the foods sold in school canteens and implementing salt reduction programs such as educational talks by counselors. Studies have found that nutrition experts teaching consumers how to read food labels[26] and nutritionists providing cooking workshops[27] help reduce salt intake. However, most of these studies were conducted among adults, which would be appropriate for the stakeholders in this study. Food operators and consumers considered early education on salt reduction important for reducing salt intake. In He et al.'s study conducted in China,[28] salt reduction education modules were integrated into school curricula and children were encouraged to spread awareness about salt reduction initiatives among their families. This led to significant salt intake reduction among parents and children. He et al. suggested that this method should be implemented in conjunction with other strategies, such as collaborating with the food industry to lower the amount of salt in processed foods, to achieve a greater reduction in the population's salt intake, as reported by the consumers in this study. Given that the study was conducted within Asia, there may be some degree of transferability to the Malaysian context. However, this requires further examination. Furthermore, the support and collaborative efforts of other stakeholders are crucial for enabling salt reduction. The consumers stated that support from family members is crucial because they can offer motivation and constructive dialogue to change family habits.[29] Government bodies, universities, and nonprofit organizations may further aid salt reduction programs in schools. Implementation of school food policy and other timely interventions can encourage schoolchildren to eat healthier.[30]

This study had some limitations. First, it did not include schoolchildren because schools were closed during the study period owing to the COVID-19 pandemic. Their views could have provided a full picture of the topic. The study sample included only administrators from Eastern Peninsular Malaysia due to constraints in time and resources, which means that the perspectives

of administrators from other regions of Malaysia are not reflected in the data. Nevertheless, the research team reached data saturation through the administrator interviews, indicating that a comprehensive range of viewpoints within that particular geographic area was captured. Second, we had limited face-to-face interviews with stakeholders, which caused us to miss non-verbal cues. More face-to-face interviews would have provided detailed insight and reduced inconveniences such as Internet connectivity issues. However, this study is the first to qualitatively explore views on salt intake reduction and barriers and facilitators to reducing salt intake in Malaysian schools among stakeholders from different parts of the country. Its results can provide comprehensive baseline data for future interventions.

Conclusion

Drivers of excessive salt intake are multifaceted, and collaborative efforts from multiple stakeholders are crucial to ensure providing adequate support to reduce salt intake among schoolchildren. Providing education on salt intake reduction, along with implementing other appropriate strategies, is required to facilitate salt intake reduction. Further studies on this topic are warranted.

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