Relationship between Family Factors, Food Consumption Behaviors, and Nutritional Status among Muslim School-Age Students in Nakhon Si Thammarat Province, Thailand

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Article

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Abstract: Nutritional status problems in school-age children are a crucial public health problem worldwide. This research aimed to explore the relationships between family factors, food consumption behaviors, and the nutritional status of Muslim school-age children in Thasala District, Nakhon Si Thammarat Province, Thailand. This descriptive research was conducted among 228 children aged 9-12 years. Data were collected using demographic data, nutritional status assessment, and food consumption behaviors assessment. Data were analyzed using descriptive statistics, chi-square, and binary logistic regression statistics. The results revealed that the majority of the samples reported having moderately healthy food consumption behaviors (M = 2.01, SD = 0.56). The samples had a normal weight (72.4%), while 15.8% of the samples were classified as overweight and obese. The number of siblings and food consumption behaviors had a significant relationship with nutritional status ($p < 0.05$). Confirmation with binary logistic regression results also revealed that the likelihood of normal nutritional status was 2.40 times higher in children who had 3 or 4 siblings compared to those with 1 or 2 siblings (AOR = 2.40; 95% CI: 1.299-4.459). Additionally, children with healthy food consumption behaviors were 2.34 times more likely to have normal nutritional status compared to those with unhealthy dietary consumption (AOR = 2.34; 95% CI: 1.183-4.631). Conclusion: Since the number of siblings and healthy food consumption behaviors were associated with nutritional status, healthcare providers must consider these two factors when establishing health education and behavior modification care plans to promote healthy food consumption and nutritional status among this group.

Keywords: food consumption behaviors; nutritional status; Muslim school-age students

1. Introduction

Nutritional status problems among school-age children have appeared as a significant global public health concern, affecting both developed and developing nations. Many countries are facing severe nutritional challenges, involving issues such as malnutrition, overweight, and obesity [1]. The number of Asian children and adolescents aged 5-19 years who were reported to be overweight or obese exceeded three hundred million. In Southeast Asia, specifically, the prevalence of overweight and obesity has reached alarming rates, with figures as high as 30% [2]. The findings of the second Southeast Asian Nutrition Surveys (SEANUTS II) among 13,933 children aged 6 months to 12 years across urban and rural schools in Thailand, Indonesia, Malaysia, and Vietnam from 2019 to 2021 revealed an increasing trend of overnutrition and malnutrition among children aged 7-12 years [3,4]. This trend is particularly concerning in Thailand. The country has set targets for the prevalence of undernutrition and overnutrition among children at less than 5% and 10%, respectively. However, recent data from 2020 to 2022 showed a gradual increase in the prevalence of overweight and obesity

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among Thai children, rising to 12.5% and 13.3%, respectively, surpassing the target of 10% [5]. Moreover, there has been a significant rise in the number of children experiencing stunting, increasing from 6.0% in 2020 to 9.5% in 2022, also surpassing the target of 5%. On the contrary, the proportion of school-age children with normal height and weight has decreased from 64.3% to 57.2% during this period, falling below the target of 66% [5]. These indicate that many countries worldwide, including Thailand, are experiencing increasing problems of overnutrition, obesity, and stunting among school-age children. These trends suggest that future health problems related to these abnormal nutritional statuses will likely increase.

Abnormal nutritional status in school-age children can lead to many health problems. Older school-age children (aged 9-12 years) who consume more food than their bodies need are at risk of developing metabolic syndrome [6]. Excessive calorie intake is a leading cause of central obesity, as these excess calories are converted to sugar and fat, which accumulate in various parts of the body, particularly the abdomen. Excessive fats also are deposited in blood vessels leading to hypertension and cardiovascular diseases. Moreover, obese children are at risk of joint and bone-related diseases due to the increased pressure on their musculoskeletal system [7,8]. In contrast, malnourished older school-age children are prone to frequent illnesses and stunted growth, which can lead to impaired brain development. Consequently, older school-age children with malnutrition are more likely to experience lethargy, lack of concentration, and decreased learning ability [9].

In Nakhon Si Thammarat Province, malnutrition in school-age children remains a significant issue. The percentage of children aged 6-14 years with an appropriate height-to-weight ratio decreased slightly from 56% in 2023 to 55% in 2024, which was below the Department of Health's target [10]. In Thasala District specifically, the number of school-age children with normal nutritional status was also lower than the national standard, with only 54.9% of this target group having an appropriate height-to-weight ratio. In contrast, the number of school-age children with abnormal nutritional status surpassed the national target. The percentages of school-age children who were obese, stunted, and underweight reached 12.7%, 9%, and 5.9%, respectively [10]. The main causes of abnormal nutritional status among school-age children in Thasala District arise from family and community factors. Thasala District is a semi-urban coastal area with a high population of Muslims [11]. This area is characterized by residents who work in fishing and daily wage labor, often resulting in insufficient income and economic instability. Due to the nature of Muslim families, each family tends to have many children. Additionally, many families are broken, leading to children being raised by grandparents or relatives. These family and economic issues can significantly impact the nutritional status of school-age children. Previous studies have indicated that family size and the primary or formal caregiver are significant factors related to the nutritional status of school-age children [12,13]. The number of siblings was significantly related to nutritional status, with larger family sizes often leading to different nutritional outcomes [12]. Moreover, children living with grandparents are more prone to being overweight or obese [14].

The Muslim community has a unique food consumption culture, which is a primary factor affecting nutritional status. In Thasala District, food preferences among Muslims often include salty, sweet, and fatty foods due to the common use of coconut milk in cooking. Popular dishes in this area, such as sticky rice with fried chicken or fried beef, grilled chicken with coconut milk curry sauce, coconut milk curry rice, chicken biryani, massaman curry, roti, and sweet tea, are high in fat but low in fiber [15]. Frequent consumption of these foods can increase the risk of overweight and obesity, leading to cardiovascular diseases [7]. Additionally, most school-age children are prone to unhealthy dietary habits, such as choosing foods based on preference rather than nutritional value, skipping breakfast, eating at irregular times, and consuming unhealthy snacks. These eating behaviors result in excessive calorie intake and insufficient nutrient intake [16]. Consequently, Muslim school-age children are at risk of developing both overnutrition and undernutrition, which can negatively affect their long-term health and nutritional status [15].

Although there is some understanding of the cultural and religious factors influencing the dietary habits and nutritional intake of Muslim school-age children, little is known about how these factors specifically affect their nutritional status. Previous studies have primarily focused on the

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nutritional status of Muslim children under the age of 5 years, rather than the school-age group. For example, studies in Bangladesh and Nepal have revealed that Muslim children under 2 and 5 years old were frequently stunted and underweight, due to factors such as family size and economic status [12,17]. Only a few studies have been conducted on school-age children. The research conducted in Malaysia has found that a significant percentage of Malaysian children aged 5-12 years were affected by stunting and overweight/obesity. The main contributing factor to abnormal nutritional status in Malaysian children was income constraints. Children from low-income families tended to consume cheap meals that contained high carbohydrates and fat with low nutrient density, contributing to both obesity and stunting. Additionally, they lacked opportunities for physical activity and awareness of proper nutritional management [18]. Previous studies on the nutritional status of Muslim school-age children in Thailand have been conducted in Narathiwat and Pattani [15,19]. However, these studies solely focused on the issue of underweight among Muslim school-age children. The research indicated that food consumption behavior and family factors were associated with the underweight status in this group of children. In Pattani, Muslim school-age children were prone to being underweight due to inappropriate eating behaviors, such as avoiding nutrient-rich proteins like meat, milk, and eggs in favor of snacks [19]. These findings highlight the significant influence of family factors and unhealthy eating behaviors on children's nutritional status. However, despite the prevalence of abnormal nutritional status among Muslim school-age children in Thasala District, Nakhon Si Thammarat Province, surpassing the standard target set by the Ministry of Public Health, there remains a gap in research. This gap lies in the inadequate exploration of the relationships between family factors, dietary habits, and the nutritional status of this specific demographic. Addressing this gap is crucial for promoting appropriate nutritional status and developing targeted strategies to mitigate abnormal nutritional status in Muslim school-age children. Furthermore, it is essential to promote healthy eating behaviors among Muslim school-age children to ensure their growth into healthy and productive members of society, contributing to the nation's overall well-being.

This study aimed to explore the nutritional status of Muslim school-age children, and the relationships between family factors, food consumption behaviors, and the nutritional status of Muslim school-age children in Thasala District, Nakhon Si Thammarat Province, Thailand.

2. Materials and Methods

2.1. Study Design

The current study was a cross-sectional descriptive research project that utilized a secondary dataset from a previous study. The original study focused on anemia, knowledge, and food consumption behaviors in the prevention of anemia among primary school students in Thasala District, Nakhon Si Thammarat Province. By reanalyzing this existing dataset, the present research aimed to explore the relationships between family factors, food consumption behaviors, and the nutritional status of Muslim school-age children in the same district. The study's population consisted of 408 students in grades 4 to 6, aged 9 to 12 years, attending schools within Thasala District, Nakhon Si Thammarat Province.

2.2. Population and Sample Size

The study's population consisted of 408 students in grades 4 to 6, aged 9 to 12 years, attending schools within Thasala District, Nakhon Si Thammarat Province. Two out of ten sub-districts in Thasala District were randomly selected. Then, four schools within these selected sub-districts were also randomly chosen. According to the original research project, the established criteria for selecting the sample group included the ability to read and write Thai, along with obtaining consent from both the students and their parents or guardians to participate in the research study. The sample group was recruited using stratified random sampling. Since the data set for this population was already recorded in the statistical analysis program, 228 students who identified as Muslim were selected for further analysis.

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2.3. Data Collection

This study utilized secondary data from the original research. It received an exemption from the Institutional Review Board and conducted the data analysis accordingly. The informed consent obtained from participants in the original study also covered this secondary analysis. The dataset included information on demographics, family details, nutritional status, and food consumption behaviors of participants. It did not contain any identifying information. The data collection process followed ethical guidelines to protect participant privacy and maintain data confidentiality and integrity.

2.4. Research Instruments

The first questionnaire was on demographics and family factors, which included gender, educational level, age, primary caregivers, and the number of siblings.

The second questionnaire was a nutritional status assessment developed by the Bureau of Nutrition, Department of Health, Ministry of Public Health. Participants' nutritional status was assessed using weight-for-height, height-for-age, and weight-for-age ratios [20].

The last questionnaire was an 18-item food consumption behaviors assessment developed by the Department of Health, Ministry of Public Health. The questionnaire used a Likert scale with three levels to assess participants' food consumption behaviors. The questionnaire consisted of 11 positive statements and 7 negative statements. Responses to positive statements were scored on a scale from 1 point to 3 points. For negative statements, the scoring was reversed, with 1 point indicating 'Always' and 3 points indicating 'Never'. The total score ranged from 18 to 54 points [21]. Overall food consumption behaviors were interpreted based on Bloom's (1971) taxonomy into two categories including healthy food consumption behavior (score ≥ 65%) and unhealthy food consumption behavior (score < 65%) [22]. Meanwhile, Best and Kahn's criteria were used to classify each food consumption behavior item into three categories: required food consumption behavior modification (mean score range from 1.00 to 1.66), moderate-level food consumption behavior (mean score range from 1.67 to 2.33), and healthy food consumption behavior (mean score range from 2.34 to 3.00) [23]. The food consumption behavior assessment questionnaire was tested for reliability with 30 students who had similar characteristics to the samples. The reliability coefficient, measured using Cronbach's Alpha, was found to be 0.73.

2.5. Ethical Statement

The researchers conducted this study by the principles outlined in the Declaration of Helsinki. All procedures involving human participants adhered to the ethical standards of the relevant institutional board. Approval for this study was obtained from the Ethics Committee on Human Research at Walailak University on August 4, 2022 (WUEC-22-227-01), as mandated before data collection. Informed consent was obtained by the researchers from all individual participants and the parents and/or guardians before they were included in the study. The children aged 9-12 years and parents will provide written consent. Research information will be stored securely, with data coded for confidentiality.

2.6. Statistical Analysis

This study analyzed the statistics using SPSS software (Version 24) for Windows™ (IBM Corporation, New York, NY, USA). The statistics employed the following:

1. Descriptive statistics, including frequencies, percentages, means, and standard deviations (SD), were employed to analyze participants' demographic data, food consumption behavior, and nutritional status.

2. The relationships between demographic data, consumption behavior, and nutritional status were analyzed using chi-square and binary logistic regression statistics, determining statistical significance at 0.05.

 doi:10.20944/preprints202406.1209.v1

3. Results

3.1. Samples' Demographics and Family Factors

More than half of the sample group were female (59.2%), and the majority were aged between 11 and 12 years old (54.4%). Nearly half of the sample group were in the fourth grade of primary school (43.9%). Moreover, the primary caregivers for most of the sample group were their parents (80.3%), and approximately two-thirds of them had 3-4 siblings (67.1%), as shown in Table 1.

Table 1. Samples' demographics and family factors information on school-age students (n = 228).

Demographics and family factors	n	%
Gender		
Male	93	40.8
Female	135	59.2
Educational level		
Grade 4	100	43.9
Grade 5	65	28.5
Grade 6	63	27.6
Age		
9-10 years old	104	45.6
11-12 years old	124	54.4
Primary caregiver		
Father/mother	183	80.3
Grandparent/relatives	45	19.7
Number of siblings		
1-2	75	32.9
3-4	153	67.1

3.2. Food Consumption Behavior among Muslim School-Age Students

After evaluating 18 food consumption behavior items, it was determined that the overall food consumption behavior of the participants was at a moderate level (M = 2.01, SD = 0.56). Most food consumption behavior items were at a moderate level. Importantly, the item categorized as being at healthy food consumption behavior was having breakfast containing grains and animal protein or grains, and milk daily (M = 2.34, SD = 0.50). On the other hand, food consumption behaviors that required modification included eating iron-rich foods 1-2 days a week (M = 1.60, SD = 0.56), eating sweet snacks, ice cream, and chocolate (M = 1.46, SD = 0.51); and drinking carbonated beverages, iced cocoa, and iced tea (M = 1.55, SD = 0.59), as shown in Table 2.

Table 2. Food consumption behaviors in Muslim school-age students (n = 228).

Food consumption behaviors	M	SD	Level
1. Having breakfast containing grains and animal protein or grains and milk	2.34	0.50	Healthy
2. Having three main meals every day	2.30	0.53	Moderate
3. Having two snacks every day	2.24	0.56	Moderate
4. Eating 8 spoonfuls of rice or starch a day	2.03	0.57	Moderate
5. Eating 4 servings of vegetables a day	2.08	0.54	Moderate
6. Eating 3 servings of fruits a day	2.20	0.53	Moderate
7. Eating 6 servings of meat a day	2.19	0.58	Moderate
8. Drinking 3 packs/boxes of plain milk a day	2.09	0.54	Moderate
9. Eating fish at least 3 days a week	2.33	0.62	Moderate
10. Eating 3 or 4 eggs a week	2.24	0.55	Moderate
11. Eating fatty meat, such as chicken or duck skin	2.23	0.65	Moderate
12. Eating bakery products like cakes, pies, and doughnuts	1.86	0.51	Moderate
13. Eating snacks	1.71	0.59	Moderate
14. Adding more condiments to cooked foods	1.86	0.59	Moderate

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Food consumption behaviors	M	SD	Level
15. Adding more sugar to cooked foods	1.99	0.61	Moderate
16. Eating iron-rich foods 1-2 days a week	1.60	0.56	Required modification
17. Eating sweet snacks, ice cream, and chocolate	1.46	0.51	Required modification
18. Drinking carbonated beverages, iced cocoa, and iced tea	1.55	0.59	Required modification
Overall	2.01	0.56	Moderate

3.3. Nutritional Status and Food Consumption Behaviors of Muslim School-Age Students

The average height and weight of the sample group were 139.2 cm (SD = 10.1) and 36.1kg (SD = 12.3), respectively. When considering height-for-age and weight-for-age criteria, the majority of the participants had heights (68.4%) and weights (66.2%) within the normal range. Regarding weight-for-height criteria, most samples had normal weight (72.4%). However, over one-fourth of the participants were classified as having abnormal nutritional status. Over three-fourths of the Muslim school-age students were reported as having healthy food consumption behavior (78.1%). Only 21.9 percent of the samples had unhealthy food consumption behavior, as shown in Table 3.

Table 3. Nutritional status and food consumption behaviors of Muslim school-age students (n = 228).

Data	n	%
Height-for-age (M = 139.2, SD = 10.1, Min-Max = 102-165 cm)		
Severely stunted (< -2 SD)	21	9.2
Stunted (< -1.5 SD to -2 SD)	20	8.8
Normal height (-1.5 SD to +1.5 SD)	156	68.4
Tall (> +1.5 SD to +2 SD)	9	3.9
Tallness (> +2 SD)	22	9.7
Weight-for-age (M = 36.1, SD = 12.3, Min-Max = 20-90 kg)		
Severely underweight (< -2 SD)	10	4.4
Underweight (< -1.5 SD to -2 SD)	20	8.8
Normal weight (-1.5 SD to +1.5 SD)	151	66.2
Mildly overweight (> +1.5 SD to +2 SD)	13	5.7
Excess weight (> +2 SD)	34	14.9
Weight-for-height		
Severely wasted (< -2 SD)	7	3.1
Wasted (< -1.5 SD to -2 SD)	13	5.7
Normal weight (-1.5 SD to +1.5 SD)	165	72.4
Possible risk of overweight (> +1.5 SD to +2 SD)	7	3.0
Overweight (> +2 SD to +3 SD)	26	11.4
Obese (> +3 SD)	10	4.4
Food consumption behaviors		
Healthy (35-54 score)	178	78.1
Unhealthy (18-34 score)	50	21.9

3.4. Relationships between Family Factors, Food Consumption Behaviors, and Nutritional Status

Nutritional status had a significant relationship with the number of siblings ($\chi^2 = 6.806$, p = 0.009) and food consumption behaviors ($\chi^2 = 4.90$, p = 0.027), as shown in Table 4.

Table 4. Relationships between family factors, food consumption behaviors, and nutritional status (n = 228).

Factors	Total	Abnormal nutritional status	Normal nutritional status	χ^2	*p*
Primary caregivers					
Father/mother	183 (80.3)	52 (28.4)	131 (71.6)	0.285	0.594

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Grandparent/relatives	45 (19.7)	11 (24.4)	34 (75.6)		
Number of siblings					
1-2	75 (32.9)	29 (38.7)	46 (61.3)	6.806	0.009**
3-4	153 (67.1)	34 (22.2)	119 (77.8)		
Food consumption behaviors					
Healthy	178 (78.1)	43 (24.2)	135 (75.8)	4.900	0.027*
Unhealthy	50 (21.9)	20 (40.0)	30 (60.0)		

*$p < 0.05$, **$p < 0.01$.

The binary logistic regression results (see Table 5) revealed that the likelihood of normal nutritional status was 2.4 times higher in Muslim school-age children who had 3 or 4 siblings compared to those with 1 or 2 siblings (OR = 2.40; 95% CI: 1.299-4.459). Additionally, Muslim school-age children with healthy food consumption behaviors were 2.34 times more likely to have normal nutritional status compared to those with unhealthy dietary consumption (OR = 2.34; 95% CI: 1.183-4.631), as shown in Table 5.

Table 5. Binary logistic regression of the relationships between family factors, food consumption behaviors, and nutritional status (n = 228).

Factors	Nutritional status		B	SE	Wald	*df*	EXP(B)	95%CI		*p-value*
	Abnormal n (%)	Normal n (%)						lower	upper	
Primary caregivers										
Grandparents/relatives [Ref]	11 (24.4)	34 (75.6)					1			
Father/mother	52 (28.4)	131 (71.6)	0.24	0.39	0.36	1	1.27	0.587	2.730	0.548
Number of siblings										
1-2 [Ref.]	29 (38.7)	46 (61.3)					1			
3-4	34 (22.2)	119 (77.8)	0.87	0.32	7.79	1	2.40	1.299	4.459	0.005**
Food consumption behaviors										
Unhealthy [Ref]	20 (40.0)	30 (60.0)					1			
Healthy	43 (24.2)	135 (75.8)	0.85	0.35	5.97	1	2.34	1.183	4.631	0.015**

Cox and Snell R Square = 0.055, Nagelkerke R Square = 0.079, **p < 0.05, Ref. = reference.

4. Discussion

4.1. Nutritional Status of Muslim School-Age Children

The findings indicated that the majority of Muslim school-age children (72.4%) in the Thasala District of Nakhon Si Thammarat Province displayed normal nutritional status. However, a significant minority, representing 15.8%, were found to have excessive nutritional status, classified as overweight or obese. This finding was consistent with the Department of Health and previous statistics, indicating a similar number of school-age children with overnutrition status [5,24]. In contrast, the percentages of school-age children overweight and obese in Muslim countries, including Malaysia, Palestine, and the United Arab Emirates, were twice as high compared to Muslim school-age children in the Thasala District [25–27]. The primary cause of overnutrition status in Muslim school-age children appeared to be their dietary behavior, as they consumed unhealthy foods rather than nutrient-rich foods. School-age children in the Thasala District frequently consumed sweet snacks, ice cream, chocolate, soft drinks, cocoa, and iced tea because these snacks and drinks were easily accessible. Additionally, school-age children in Nakhon Si Thammarat Province frequently consumed fried foods such as sausages and fried meatballs more than four times a week, which increased their risk of excess nutritional status [24]. In Malaysia, school-age children who were overweight or obese had reported frequent consumption of high-energy foods and lacked variety in their diets [25]. In Palestine and the United Arab Emirates, overweight and obese school-age children also consume more snacks and fast food [26,27].

Furthermore, the current study found that Muslim school-age children were relatively short (8.8%) and stunted (9.2%), which exceeded the Department of Health's target (5.5%) [5]. The percentage of Muslim school-age children with undernutrition status in the current study followed a

 doi:10.20944/preprints202406.1209.v1

similar trend in Pattani, Thailand, and Indonesia but was significantly lower than in Nepal and India [28–31]. This malnutrition issue may be caused by genetic factors and inadequate intake of protein and calcium compared to the body's requirements. In the current study, Muslim school-age children moderately consumed meat, fish, milk, and eggs. In Pattani, Muslim school-age children were prone to stunting due to inadequate consumption of protein and calcium, such as meat, milk, and eggs [19,28]. These findings highlighted that Muslim school-age children in low- to middle-income countries not only had problems with overnutrition but also faced malnutrition issues [28–31]. Addressing these issues promptly is imperative to mitigate its impact on children's future health.

4.2. Relationship between Family Factors, Food Consumption Behaviors and Nutritional Status

Family factors related to nutritional status were identified in this study. The number of siblings was found to be associated with nutritional status. Muslim school-age children with 3 or 4 siblings had a 2.4 times higher likelihood of having a normal nutritional range compared to those with 1 or 2 siblings. This could be attributed to families with 3 or 4 siblings being more likely to organize meals for their children to eat together, which promoted healthy eating habits and discipline. Since most Muslim families in the study area faced economic constraints, the quantity of food for each family member was limited. On the other hand, families with 1 or 2 siblings may be more inclined to provide larger quantities of food, potentially leading to excessive nutritional intake and subsequent overweight or obesity. This finding contradicted previous studies that had indicated that the number of siblings was related to the likelihood of malnutrition [12,32,33]. In Nepal, Muslim children under 5 years old with 3 or more siblings were found to be more prone to stunting compared to those with 1 sibling [33]. Similarly, the likelihood of stunting and wasting in Ghanaian children aged 1-5 years who lived with 3 or more siblings was 4.388 and 2.279 times higher, respectively, than those with 1 sibling [32].

In the current study, the type of primary caregiver was not associated with the nutritional status of Muslim school-age children. This could be explained by the fact that regardless of the type of primary caregiver, whether they were parents, grandparents, or other relatives, Muslim school-age children were nurtured in the same way. Moreover, school-age children spent 5 days a week in school, where they had the autonomy to eat and purchase food according to their preferences. This finding contradicted a previous study conducted in Nepal, which indicated that children living with non-parental caregivers were 3.71 times more likely to be malnourished compared to those living with both parents [12]. It is important to note that these results may vary depending on economic status, social factors, environment, and the age of siblings when compared to the findings of this study.

Overall, the food consumption behavior of Muslim school-age children was considered moderately healthy, but there were areas where dietary behaviors could be improved. Typically, school-age children receive nutritional education at school, which influences their decision-making regarding food consumption behaviors. This finding was consistent with previous studies that indicated that most school-age children exhibited moderately healthy dietary behavior [34,35]. The current study showed that Muslim school-age children reported unhealthy food consumption behaviors, particularly irregular consumption of iron-rich foods; and frequent consumption of sweet snacks, ice cream, and chocolate, as well as regular consumption of carbonated drinks, iced cocoa, and sweetened tea. Although schools have established policies to prohibit the sale of unhealthy foods and drinks to students, nearby communities often have convenience stores that sell unhealthy snacks and sweetened beverages [34,35]. As a result, the likelihood of school-age children consuming unhealthy foods remains high. According to the national survey on Thai dietary habits, Thai children aged 6-14 years were more likely to consume salty, sugary foods but less likely to consume fruits and vegetables [36]. These unhealthy food consumption behaviors could lead to inappropriate nutritional status. In contrast, those who consumed healthy foods were more likely to have a normal nutritional status.

The current findings revealed that Muslim school-age children with healthy dietary behavior had a 2.34 times higher chance of having a normal nutritional status compared to those with

 doi:10.20944/preprints202406.1209.v1

unhealthy behavior. This finding was congruent with previous studies that had shown a significant relationship between food consumption behavior and nutritional status in schoolchildren [37,38]. School-age children who regularly consumed breakfast, three main meals a day, and nutrient-rich foods such as vegetables, fruits, meat, milk, and eggs were more likely to have a normal nutritional status [37,38]. In addition, the likelihood of having a normal nutritional status was high for those who consumed the quantity of foods needed to meet their body's nutritional needs and maintain energy balance [37,38]. These healthy food consumption behaviors helped prevent malnutrition and overnutrition problems. To promote a normal nutritional status, unhealthy food consumption behaviors in Muslim school-age children must be modified, such as reducing the consumption of crispy snacks, pastries, sweetened beverages, fried foods, and fatty meats, while increasing the consumption of nutritious foods rich in protein, calcium, vegetables, and fruits.

5. Conclusions

This study found that Muslim school-age children are experiencing rates of overweight, obesity, and stunting higher than the targets set by the Department of Health. Statistical analysis indicated that the number of siblings in the family and appropriate dietary behaviors significantly influenced the nutritional status according to established criteria. Therefore, healthcare professionals and schools should collaborate to develop interventions to promote appropriate dietary behaviors among school-age children and provide guidance to family members. These efforts should aim to enhance health and prevent nutritional problems in school-age children, aligning with established goals.

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Institutional Review Board Statement: All procedures performed in studies involving human participants followed the ethical standards of the Ethical Institutional Consideration. The researchers conducted the study following the Declaration of Helsinki. This study received approval from the Ethics Committee on Human Research at Walailak University on August 4, 2022 (WUEC-22-227-01), as mandated before data collection. Informed consent was obtained from parents and all individual participants involved in the study by the researchers.

Informed Consent Statement: Informed consent was obtained from parents and all subjects involved in the study.

Data Availability Statement: Data are available upon request from the authors.

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Conflicts of Interest: The authors declare no conflicts of interest.

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