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Factors Associated with Self-Efficacy Toward Healthy Eating and Physical Activity among Kuwaiti Adolescent Girls

LATIFA AL-GHANIM and DALAL ALKAZEMI*

Department of Food Science and Nutrition, College of Life Sciences, Kuwait University, Kuwait.

Abstract

Factors that influence adolescents' health-related behaviors in Kuwait are unclear. We hypothesized that self-efficacy would be negatively associated with a heavier weight status and positively associated with healthy eating-related behaviors. We aimed to measure healthy eating-related parameters in a sample of Kuwaiti girls and to assess the correlates of self-efficacy. The participants of this cross-sectional study were adolescent schoolgirls. The main outcome measures were self-efficacy, dietary habits, dietary beliefs, nutrition knowledge, physical activity, and weight status per body mass index (BMI) categories. Pearson's correlation analysis was performed to determine the associations among the healthy behavior-related parameter scores. Independent samples t-test was used to examine the differences in scores between participants' characteristics and self-efficacy score (SES). Only 19.9% of the participants had high self-efficacy toward healthy eating behaviors, 20.9% had "satisfactory eating habits," 11.3% had a good comprehension of the meanings of healthy and unhealthy dietary habits and food, 16.3% had good nutrition knowledge, and 29.2% had an active lifestyle. SES is associated negatively with BMI, and positively with all the domains of healthy eating and with physical activity. However, SES was not associated with nutritional knowledge. Adolescent girls in Kuwait demonstrated a high level of self-efficacy toward healthy eating and behaviors with firm nutritional beliefs; however, they failed to practice them. Interventional school nutrition programs could help to improve healthy behaviors among adolescents.

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Sedentary Behavior;
Self-Efficacy;
Weight Status.

Introduction

Adolescent obesity is a major health concern in Kuwait. According to the latest survey conducted by the Kuwait Nutrition Surveillance System (2018), 21.5% of adolescents were overweight and 27.5% had obesity. Overweight and obesity correlate with age in both sexes.[14] Adolescence is a transition period when teenagers gradually become independent and responsible for their eating behaviors and attitudes.[30] Their growing independence is often associated

CONTACT Dalal AlKazemi dalal.alkazemi@ku.edu.kw Department of Food Science and Nutrition, College of Life Sciences, Kuwait University, Kuwait.

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with unconventional eating patterns. Any retained dietary habits and nutritional knowledge acquired in adolescence may persist in adulthood and would have important lifelong ramifications.[20,36,40] Unhealthy eating habits commonly reported among Kuwaiti adolescents include fast food consumption, skipping breakfast, consumption of high-calorie snacks, and low consumption of fruits and vegetables.[1,4] Fewer studies have reported on the factors that affect the eating habits of Kuwaiti adolescents.[22] found that the lack of information and motivation were the main barriers keeping adolescents from eating a healthy diet. It is unclear what factors may influence adolescents' health-related behaviors in Kuwait, and more studies are required to identify what motivates and helps adolescents adopt healthy eating habits.

According to the social cognitive theory, behaviors are mediated by variables such as self-efficacy, attitudes, and knowledge. The concept of self-efficacy was defined by Albert Bandura as an individual's beliefs toward his/her ability to do something or his/her confidence in doing so.[19] found that food choice decisions were affected mainly by attitudes toward health, with positive attitudes being associated with a higher intake of fruits and breakfast and less intake of high-fat snacks.[10] found that higher self-efficacy toward making healthy food choices was associated with healthy food intake among adolescents in Ireland. Furthermore, knowledge about healthy food choices may help improve eating habits and thus facilitate the adoption of a healthy diet.[12,29,39] Such factors influencing food choices and eating behaviors and their interrelations have never been investigated in Kuwaiti adolescents. This research is important to determine the intervention strategies required to address adolescents' nutrition-related health problems and improve healthy eating behaviors among them.

The present study was conducted to measure psychosocial determinants of eating behaviors in a sample of Kuwaiti adolescents, focusing on self-efficacy as the major outcome measure and to investigate the relationship between self-efficacy and dietary beliefs, physical activity, nutritional knowledge, and weight status in a sample of Kuwaiti adolescent girls. We hypothesized that self-efficacy in adolescent girls would be associated negatively with their weight statuses, and positively with healthy eating-related behaviors.

Methods

Study Design

The present cross-sectional study was conducted between October 2014 and February 2015 among adolescent girls recruited at three different high schools in Kuwait. A self-administered survey questionnaire was used to collect data on sociodemographic characteristics, anthropometric variables, body weight, dietary behavior, and health-related lifestyle habits. The data were collected during regular school hours.

Recruitment and Sampling

In total, 301 participants were conveniently sampled at three different schools located in three different governorates: Asema and Al-Jahra (both public schools), and Hawally (a private school). Each school location is characterized by special demographic and socio-cultural features as per the residential governorate of the students. For example, the educational levels of the Kuwaiti residents in Al-Jahra had been noted to be lower than those of Kuwaiti residents in Asema and Hawally. Although intermediate or secondary education is the dominant education category in each governorate among the adult population, 28.7% of Al-Jahra residents received only primary education or lower, whereas more than 40% of residents of Asema and Hawally reported being educated to college level or higher (Ministry of Health, 2013). Ethical approval was obtained from the Ministry of Health and the Ministry of Education. Participating classrooms were chosen by the school administration based on scheduling convenience, and students were selected from each classroom randomly. Parental written informed consent was obtained before collecting data. All students aged 13–19 years who were willing to participate were included in this study. This study was carried out by the tenets of the Declaration of Helsinki.

Survey Questionnaire: Construction and Validation

The survey questionnaire was initially adopted from that formulated by Turconi *et al*. (2008); however, many of the items were modified to render the final questions appropriate for Kuwaiti adolescents. The survey questionnaire included six main sections in addition to the first section on demographic information. The questionnaire contained a total of

48 questions. The survey questionnaire included the following six scales.

Self-efficacy
measured the level at which participants can assume attitudes and behaviors that can improve health statuses related to nutrition, with the possible outcomes being presented as the shortest form of the Likert scale, and they included "yes", "I do not know", and "no" and scored as 3, 2, and 1, respectively. This section consisted of seven questions. The maximum possible score was 21, and the scores were divided into three tertiles categories based on sample distribution: low self-efficacy (scored 0 to 16), moderate self-efficacy (scored 16 to <19), and high self-efficacy (scored 19 to 21).

Nutritional Knowledge
assessed a few nutritional aspects. This section consisted of seven items. The maximum possible score was 7, and the total scores were divided into three categories based on sample distribution: insufficient knowledge (scored 0–<3), good knowledge (scored 3–<4), and very good (scored 4–7).

Dietary Beliefs
measured participants' understanding levels in identifying the concepts of a healthy diet, the healthiest foods, and the healthiest cooking methods. This section consisted of three items. The maximum possible score was 12, and the total scores were divided into three categories based on sample distribution: little comprehension of the meaning of healthy and unhealthy food and dietary habits (scored 0 to <9), sufficient comprehension of the meaning of healthy and unhealthy food and dietary habits (scored 9 to <11), and good comprehension of the meaning of healthy and unhealthy food and dietary habits (scored 11 to 12).

The healthy eating score (HES) was determined from the participants' food frequency consumption, which represented the adequacy of intake of major food groups, including the daily consumption of fruits and vegetables, dairy products, carbohydrates, and meat. Furthermore, the intakes of sweets, fast food, high-sugar drinks, and energy drinks were measured. Frequency of intake was measured as daily intake or intake per week if the food was not consumed daily; the ideal answer had the highest value, according to the USDA sex and age-specific guidelines.[37] The serving sizes were explained verbally, and illustrative graphics were included in the questionnaire to ensure that the adolescents could estimate food intake more accurately.[16] This section consisted of 19 items. The maximum possible score was 94, which indicated the best possible food intake pattern.

Dietary Habits
assessed breakfast eating habits, consumption of high-sugar foods after meals; the number of main meals in the day; and the type of snacks consumed daily. This section consisted of four items. The maximum possible score was 16, and the scores were divided into tertiles based on sample distribution: "inadequate eating habits" (scored 0–<9), "partially satisfactory eating habits" (scored 9–<12), and "satisfactory eating habit" (scored 12–16).

Physical Activity
assessed physical activity levels, types of activity, and the number of hours spent in physical education (PE) classes. This section consisted of seven items. The maximum possible score in this section was 18, and the scores were divided into three categories: sedentary (scored 0–<8), moderate (scored 8–<10), and active physical activity levels (scored 10–18). The possible choices from all scales were coded in descending order from the healthiest answer (best value) to the least healthy one (least value).

The adopted survey questionnaire was tested for validity and reliability through four stages. The survey questions were reviewed for face validity by two faculty members of the Department of Nutrition and were translated to Arabic and back-translated to English by a professional translator. A student researcher also reviewed the Arabic version to ensure that the wording was appropriate for the Kuwaiti students and could be understood clearly. Inconsistencies between the two versions were discussed and revised by the researchers. The modified questionnaire was tested for content validity by five local experts in nutrition using Lawshe's method. All items with content validity ratios below 0.78 were excluded, and adjustments were made until a consensus was reached on the final version (Ayre, 2013). Comprehensiveness and clarity were assessed by conducting structured interviews with

a sample of adolescents (n = 10), who were not included in the main survey sample, to confirm comprehension and feasibility for this age group. The final version of the questionnaire was assessed for reliability using an additional group of adolescents (n = 33). Scores of the same students (2 weeks between two sittings) were assessed for test-retest reliability; however, these students were not included in the main study sample. Cronbach's α was calculated for total subscales and recalculated if an item was removed from a subscale to improve consistency. Good consistency of the scale was defined for Cronbach's α values between 0.5 and 0.7 based on the dimensionality of the scale (Cortina, 1993). However, a lower Cronbach's α was considered sufficient to indicate consistency for scales with less than 10 items (Cortina, 1993). Cronbach's α values ranged from 0.43 to 0.76, demonstrating acceptable internal consistency, similar to that reported in a study conducted by Turconi *et al*. (2008).

Anthropometric Measurements

Students' weights and heights were measured using a beam balance scale (Detecto eye-level scale with height rod, model number 2391; Acculab Digital Scales, USA). Students were asked to take off their shoes before measurement. Weights were recorded to the nearest decimal fraction, while heights were recorded to the nearest whole digit. The body mass index (BMI) was calculated by dividing the weight in kilograms by the square of the height in meters. The weight status was assessed using Centers for Disease Control and Prevention growth charts and classifications such that underweight, normal weight, overweight, and obesity was defined as a BMI < 25^{th} percentile, 25^{th} ≤ BMI < 85^{th} percentile, 85^{th} ≤ BMI < 95^{th} percentile, and BMI ≥ 95^{th} percentile, respectively (Centers for Disease Control and Prevention, 2013).

Sociodemographic Information

The questionnaire included questions on each student's governorate, student's nationality, father's and mother's nationalities, father's and mother's educational levels, mean family income, major (science or literature), birth date, in addition to two questions: "Are you interested in receiving nutrition information?" and "What is the preferred source of any received nutrition information?"

Statistical Methods

All variables were assessed for normality. Descriptive statistics were provided using means and standard deviations for continuous variables; frequencies and proportions for categorical variables; and prevalence for weight status. Analysis of variance with Bonferroni's correction was used to study the associations between tertiles of self-efficacy scores (SES) and other health-related domains. Pearson's correlation coefficients were determined for the relationship between the scores of the six scales and BMI. All scores, except for the HES, were divided into tertiles based on the sample distribution. Analysis of variance was used to compare the differences in mean scores across tertiles. Multivariate regression was used to determine the final independent correlates of SES. The data were coded, entered, and analyzed using SPSS Statistics version 24 (SPSS Inc., Chicago, IL, USA). Analysis items with $P < 0.05$ were considered to be statistically significant.

Table 1: Participant Characteristics

Variables	n (%)
Governorate	
Asema	100 (33.2)
Al-Jahra	100 (33.2)
Hawally	101 (33.6)
Nationality (%)	
Kuwaiti	221 (73.5)
Others	80 (26.5)
Mean household income per month, KD	
Low (<1500)	33 (11.2)
Medium (1500-2000)	125 (41.4)
High (>2000)	143 (47.4)
Fathers educational level	
High school and lower	65 (21.5)
Bachelor's degree and higher	236 (78.5)
Mothers educational level	
High school and lower	76 (25.1)
Bachelor's degree and higher	225 (74.9)

Abbreviations: KWD, Kuwaiti dinar

Results

Population Characteristics

In total, 301 participants (mean age, 16.6 ±1.2 years) completed the study. There was equal participation from all three locations: Asema (n = 100, 33.2%),

Al-Jahra (n = 100, 33.2%), and Hawally governorates (n = 101, 33.6%) (Table 1). Kuwaiti students constituted 73.5% of the sample, whereas 26.5% were of other nationalities. Most of the students' parents had bachelor's degrees and higher (78.5% and 74.9% for fathers and mothers, respectively). With regards to family income, 11.2% reported income levels less than 1,500 Kuwaiti dinars (KWD) per month, 41.4% reported income levels between 1,500 and 2,000 KWD per month, and 47.4% reported income levels above 2,000 KWD per month (Table 1). Sixty-six participants (21.9%) reported that they were interested in receiving nutrition information, while 15.2% were not interested in receiving nutrition information, and 18.6% were unsure. When asked about their preferred source of nutritional information, 43.6% reported having received information from social media. The majority of students reported that they were not getting any nutritional information from health professionals (73.5%) or their schools (89.9%) (data not shown in the tables). The mean BMI was 25.26 ± 5.61 kg/m2. We found that 2.4% of participants were underweight, 54.9% had normal weights, 24.1% were overweight, and 18.5% had obese.

Table 2: Distribution of Participants Across Tertiles of Scores

Section	The Max Total Possible Score	% (n) of Participants		
		Low	Moderate	High
(1) Self-efficacy[a]	21	25.6 (77)	54.5 (164)	19.9 (60)
(2) Dietary habits[b]	16	23.3 (70)	55.8 (168)	20.9 (63)
(3) Dietary beliefs[c]	12	28.9 (87)	59.8 (180)	11.3 (34)
(4) Physical activity[d]	18	30.9 (93)	39.8 (120)	29.2 (88)
(5) Nutrition knowledge[e]	7	19.6 (59)	64.1 (193)	16.3 (49)

[a]Self-efficacy score tertiles: low (0–16), moderate (16–19), and high (19–21)
[b]Dietary habits score tertiles: low (0–9), moderate (9–12), and high (12–16)
[c]Dietary beliefs score tertiles: low (0–9), moderate (9–11), and high (11–12)
[d]Physical activity score tertiles: low (0–8), moderate (8–10), and high (10–18)
[e]Nutrition knowledge score tertiles: low (0–3), moderate (3–4), and high (4–7)

Assessment of the Six Individual Scales of the Survey Questionnaire

Table 2 shows the percentage distribution of participants according to tertiles of scores of the six domains. For self-efficacy, the mean score was 17.03 ± 3.26 (at 81% of the total score; interquartile range [IQR] 15–19). More than a quarter of the sample (25.6%) was in the "low self-efficacy" category, half (54.5%) was in the "moderate self-efficacy" category, and 19.9% was in the "high self-efficacy" category (Table 2). For the HES determined from food frequency consumption, the mean score was 45.88 ± 7.95 (at 49% of the total score; IQR 40–51). Only 8.3% and 7% of the total sample met the recommended amount of fruits (3 servings/day) and vegetables (3–4 servings/day), respectively. In addition, 3.7% met the recommended number of servings for dairy products (3 cups/day), 44.5% consumed meat or chicken once per day, and 31.9% consumed seafood once to twice per week. Only 19.9% consumed legumes more than four times per week, and 38.5% consumed legumes once in 10 to 15 days. Per week, 43.2% and 20.6% of the participants consumed fast foods once/twice and three to four times, respectively (shown in the table in Additional file 1). The mean dietary habits score was 10.33 ± 2.46 (at 65% of the total score; IQR 9–12). Approximately forty percent (40.2%) reported that they ate breakfast sometimes, 55.1% ate breakfast always or often, and only 4.7% never ate breakfast. Approximately half the sample (51.5%) reported that they sometimes ate sweets after meals, and more than a third of the sample (41.5%) consumed snacks such as candies, chocolates, cakes, and ice creams. Students also reported consuming fast foods (17.3%); salty foods, such as chips (17.3%); or healthy snacks (19.9%), such as fruits, fruit juices, milk, laban, dried fruits, or dates. The number of

main meals reported during the day varied; only 32.9% consumed three main meals daily. However, 40.5% consumed two main meals daily (shown in the table in Additional file 2). Overall, 20.9% of participants had "satisfactory eating habits," 55.9% had "partially satisfactory eating habits," and 23.3% had "inadequate eating habits" (Table 2). The mean dietary beliefs score was 9.51 ± 1.97 (at 79% of the total score; IQR 8–11). Twenty-nine percent (28.9%) of the participants showed poor comprehension about healthy and unhealthy food and dietary habits, 59.8% showed sufficient comprehension, and only 11.3% showed good comprehension (Table 2). More than sixty percent (68.4%) of the students believed that "a healthy diet is varied and includes all food groups," 64.8% of the participants identified correctly "washed ready to eat vegetables" as the healthiest food item from a list; 65.1% identified "cooking on a grill/in boiled water" as the healthiest cooking method, but the best answer was "cooking in the oven without fats," which was answered correctly by 21.9% of the sample.

Regarding physical activity (Table 2), the mean score was 9.05 ± 2.72 (at 50% of the total score; IQR 7–11). Almost a third of the participants (30.9%) were sedentary, more than a third (39.8%) had moderate physical activity levels, and another third (29.2%) reported active physical activity levels. Only 9% reported that their physical activity levels were high during their free time by performing activities such as brisk walking, dancing, swimming, and biking. More than two-thirds of the students (75.4%) reported that they participated in school-based PE classes and 41.9% spent one hour per week in PE classes. Students perceived PE classes as "boring" (48.2%), "tiring" (15.3%), "make me feel well, healthy, and happy" (23.9%), and only 8% found PE classes to "stimulate them away from routine classroom activities." About sedentary behaviors, 79.7% reported that they preferred watching television, listening to music, using the computer, or reading a book during their free time. Moreover, 33.9% spent more than 6 hours per day engaging in sedentary activities such as watching television, sitting at the desk, and playing with electronic gadgets. The average nutrition knowledge score was 3.44 ± 1.12 (at 49% of the total score; IQR 3–4) (Table 2). Overall, nutritional knowledge was insufficient in 19.6% of the sample, good in 64.1%, and very good in 16.3%. Students were able to identify sources of carbohydrates (76.3%) and proteins (78.7%), and less able to identify sources of fiber (43%). The majority of participants failed to identify foods that were low in fat (73.9%) or calorie-dense (79.4%). Most of the students (85%) were familiar with the concept that a "balanced diet" contains all the nutrients in proper quantities.

Comparison Among Locations

Differences in the mean scores of the six survey domains among school locations were assessed (shown in the table in Additional file 3). There were no significant differences in the mean scores of HES among the locations. In terms of food habits score, Al-Jahra governorate had significantly the lowest mean score (9.6 ± 2.4 vs. 10.5 ± 2.4 for Asema and 10.9 ± 2.4 for Hawally), and Hawally governorate school had significantly the highest physical activity score (10.1 ± 3.1 vs. 9.0 ± 2.2 for Asema and 8.0 ± 2.4 for Al-Jahra), dietary beliefs (10.3 ± 1.6 vs. 9.4 ± 2.1 for Asema and 8.9 ± 2.0 for Al-Jahra), and nutritional knowledge (4.0 ± 1.2 vs. 3.3 ± 0.9 for Asema and 3.0 ± 1.0 for Al-Jahra). The Asema governorate had significantly the lowest mean self-efficacy score (15.7 ± 4.0 vs. 17.4 ± 2.8 for Al-Jahra, and 17.9 ± 2.5 for Hawally). There were no differences in BMI and BMI percentiles among the locations ($P > 0.05$).

Correlates of Self-Efficacy

Students who were in the highest SES tertile had the highest HES (47.6 ± 7.9) and physical activity scores (9.7 ± 2.8) (Table 3). Furthermore, those in the upper two tertiles for SES scored higher than those in the 1st tertile for dietary beliefs (9.7 ± 1.9) and dietary habits (9.9 ± 1.8), respectively. When analyzing food frequency components, we found a significant association between SES and intake of dairy products, fast food, and sugar-sweetened beverages (shown in the table in Additional file 1). Students with higher SES consumed dairy products more frequently and consumed fast food and sugar-sweetened beverages less frequently compared to those with lower SES. Additionally, we found significant associations between SES and snacking habits; that is, participants with high SES tended to snack more on fruits or fruit juices/milk or laban/yogurt/dried fruits/dates and were less likely to snack on candies/chocolates/sweets and cakes/ice cream (shown in the table in Additional file 2).

Table 3: Anthropometric Characteristics and Survey Parameters Scores of Participants According to Tertiles of Self-Efficacy Scores

Variables	Total	SES Tertiles		
		Tertile 1 (0-15.9)	Tertile 2 (16-18.9)	Tertile 3 (19-21)
Age (years)	16.6 ±1.2	16.8±1.1[a]	16.6 ±1.2[a]	16.5±1.2[a]
BMI (Kg/m^2)	25.3±5.6	26.0±6.8[a]	25.6 ±5.4[a]	24.6 ±5.0[a]
School Locations (distribution %)				
Asema	100 (33.2%)	11.6±2.9	17±0.9	19.5 ±0.9
Al-Jahra	100 (33.2%)	13.3±1.7	17.4±0.7	19.8 ±0.8
Hawally	101 (33.6%)	13.2±1.5	17±0.8	19.8 ±0.8
Healthy eating (score out of 94)	45.9±7.9	44±7.0[a]	45.0±8.3[a]	47.6 ±7.9[b]
Dietary habits (score out of 16)	10.3±2.5	9.6±2.2[a]	10.4±2.3[b]	10.7 ±2.6[b]
Dietary beliefs (score out of 12)	9.5±3.4	8.7±2.1[a]	9.7±1.9[b]	9.9 ±1.8[b]
Physical activity (score out of 18)	9.1±2.7	8.3±2.5[a]	8.7±2.6[a]	9.7 ±2.8[b]
Nutrition knowledge (score out of 7)	3.4±1.1	3.4±1.3[a]	3.4±1.1[a]	3.5 ±1.0[a]

[a,b]Differences at the 0.05 significance level according to the analysis of variance and post-hoc test

Table 4: Univariate Analysis of the Associations Between Variables and Self-Efficacy Scores

Variables	Regression Coefficient Beta	Standardized regression coefficient, B	95% confidence interval		P-value
			Lower	Upper	
Age	-0.266	-.095	-0.591	0.059	0.109
Governorate	0.899	.246	0.648	1.521	0.000
BMI	-0.074	-0.128	-0.140	-0.008	0.027
Healthy eating score	0.082	0.199	0.036	0.128	0.001
Dietary habits score	0.223	0.168	0.074	0.372	0.003
Physical activity score	0.242	0.202	0.108	0.376	0.000
Dietary beliefs score	0.381	0.230	0.198	0.564	0.000
Nutrition knowledge score	0.036	0.012	-0.295	0.367	0.832

Ses, Self-Efficacy Scores

SES was positively associated with HES, dietary habits, dietary beliefs, and physical activity, but not with nutrition knowledge. Both SES and physical activity were negatively associated with BMI. In the univariate analysis, the final correlates of SES, which we included in our multilinear regression model, were the governorates, BMI, and the scores of the following domains: HES, dietary habits, physical activity, and dietary beliefs (Table 4). In the multivariate linear regression analysis, SES remained significantly associated with the governorates ($\beta = 0.813$, $P < 0.001$), physical activity ($\beta = 0.153$, $P = 0.038$), dietary beliefs ($\beta = 0.245$, $P = 0.026$), and HES ($\beta = 0.173$, $P = 0.023$) (Table 5).

Discussion

To our knowledge, this study is the first to attempt to assess self-efficacy about health-promoting behaviors, such as physical activity and healthy eating among adolescent girls in Kuwait. The participants of this study demonstrated a moderate level of self-efficacy. However, those with the highest level of self-efficacy had better health-related behaviors, including more engagement in physical

activity and consistent healthier dietary habits and food choices. This is by the results of several studies among adolescents that showed correlations between self-efficacy and increasing physical activity levels 38, increasing the intake of fruits and vegetables, and engagement and adherence to weight control behaviors.[18] Self-efficacy is gained through knowledge, understanding, and skill development, and it is an important component in effective health communication and disease prevention interventions.[24] Self-efficacious people, who tend to be optimistic about engaging in behaviors, rather than focusing on negative thoughts about their inability to achieve a goal, are more likely to take on challenges easily, have a greater sense of commitment, and cope better with unexpected events or disappointment.[24] Non-efficacious people avoid challenges and fail at tasks perceived to be beyond their abilities, and they have little incentive to act or persevere in the face of difficulties.[24] 10showed that higher self-efficacy was associated with 'healthy food intake' in adolescents aged 13-18 years. Additionally, lower self-efficacy for healthy eating and higher peer support for unhealthy eating were associated with 'unhealthy food intake'.[25] found that high self-efficacy was associated with the lowest levels of fat and sodium intake.

Table 5: Multivariate Linear Regression Analysis for Identifying Independent Correlates of Self-Efficacy Scores

Stepwise Model	Unstandardized Coefficients		Standardized Coefficients	t	P-Value
	B	Std. Error	Beta		
(Constant)	10.905	1.626		6.708	0.000
Physical activity	0.153	0.073	0.125	2.082	0.038
Dietary beliefs	0.245	0.110	0.146	2.235	0.026
Dietary habits	0.080	0.090	0.059	0.891	0.374
Nutrition knowledge	0.455	0.185	0.154	2.459	0.532
Healthy eating score	0.057	0.025	0.137	2.283	0.023
Governorate	0.813	0.211	0.224	3.861	0.000
BMI	-0.045	0.034	-0.076	-1.343	0.180

[a]Dependent variable: self-efficacy
[b]Predictors: (constant), BMI, nutrition knowledge, healthy eating score, governorate, physical activity, dietary beliefs, and dietary habits
R-squared= 0.383

We found that female students with the highest self-efficacy had higher scores of dietary beliefs; that is, they had a better comprehension of what constitutes healthy versus unhealthy dietary practices. Dietary beliefs can influence motivation and behavior and lead to positive outcomes. This is consistent with the role of self-efficacy in decision-making, outlined by Bandura's social cognitive theory.[11] found that, among adolescent girls, self-efficacy (both general and eating-related) was negatively associated with self-reports of disinhibited eating behaviors. The researchers identified that those girls were the least likely to believe in their ability to influence outcomes, and they were the most vulnerable when faced with a toxic food environment such as events involving a buffet meal.[11] Further, higher self-efficacy correlated positively with weight-conscious behaviors, such as eating more proteins, as promoted by diet culture.[11] Several studies showed that self-efficacy was positively associated with healthy eating behaviors and negatively with unhealthy eating behaviors. Among female adolescents in Minnesota, self-efficacy toward making healthy food choices was significantly positively related to calcium intake 15. Additionally, another study showed that self-efficacy toward low-fat milk consumption was correlated

positively with low-fat milk consumption, and negatively with sweetened beverages consumption.[33] In the present study, self-efficacy toward health and nutrition was positively correlated with healthy eating habits and physical activity, and negatively with BMI.

We found that students with sufficient nutrition knowledge about healthy and unhealthy foods and dietary habits had better eating habits.[22] found that one of the main barriers to healthy eating among adolescents was not having enough information on what constitutes a healthy diet.[39] reported that nutritional knowledge was associated with higher intakes of fruits and vegetables and less intake of fat.[12] demonstrated that improving nutrition knowledge in children and adolescents may lead them to adopt healthier eating behaviors. Contrary to our expectations, we did not find a relationship between nutrition knowledge and self-efficacy. Among the adolescent girls, we identified a gap in knowledge about dietary fiber, protein, and energy contents of food, which may indicate that they face difficulties in translating nutritional advice into food choices that improve their diet.[35] The overall nutrition knowledge in our sample was low, similar to that in previous reports among Kuwaiti adolescents and college students.[2,9] We also found that the father's educational level was positively associated with students' level of nutritional knowledge. [9] The education of the father may reflect his awareness and acquaintance with healthy nutrition and its impact on family health, and thus, may influence their children's knowledge. Nutritional knowledge may be a predisposing factor for eating behaviors; however, voluntary behavior improvement requires motivation, ability, and opportunity to improve one's behavior. For example, having more experience with meal preparation and kitchen experiences increase confidence and independence in dietary decisions.[13] Lack of nutritional knowledge may be due to the lack of knowledge on nutrition-specific information related to dietary concepts rather than those gained with a general understanding developed through the family environment or peer pressures.[10] In support of these concepts, students from the Hawally governorate showed better nutritional knowledge scores than those from the other two governorates in terms of nutritional knowledge and dietary beliefs. We speculate that this is because it was the only school that reported providing a nutrition class in their curriculum. The school environment can be an important setting for providing, promoting, and supporting healthy lifestyles among youth.[27] It was clear from the students' responses about their source of information that there was a lack of a reliable source for this age group, as the majority of the female students reported getting information on nutrition from social media (43.6%), and rarely getting any information on nutrition from schools (10.1%) or health professionals (26.5%).

In support of the above findings, we found that self-efficacy differed significantly according to governorates, and the governorate was found to be a major correlate in the multivariate regression model. Students from Al-Jahra scored the lowest in dietary habits and belief scores, physical activity, and nutrition knowledge. Students from the Asema governorate scored the lowest in SES. These observations can be partly explained by the fact that each governorate in Kuwait is characterized by special demographic and socio-cultural features. Similar to the results of a prior national survey, we found that according to the variations in parental educational levels among governorates, 28.7% of the Kuwaiti residents in Al-Jahra had received only primary education or less, whereas intermediate or secondary education was the dominant education category in other governorates, and over 40% of respondents in Asema and Hawally reported having received college education or higher (Ministry of Health, 2013). Much of the variations found in SES between governorates may be due to sociodemographic characteristics, family dynamics, and parenting style, which need further exploration in future studies [28,5]

The prevalence of overweight and obesity (42.6%) was high in our sample, similar to those reported at the national level.[21] This can be partly explained by the poor eating habits found among adolescent girls. These findings are similar to those reported in earlier surveys.[1] Many factors increase fast-food consumption among adolescents in Kuwait, including the availability of fast-food restaurants 24 hours per day and 7 days per week, accessibility by home delivery, and low prices.[26] In our sample, snack components were mainly sweets such as candies, chocolate, and ice creams (41.5%). The preference for sweets may be related to sex; as adolescent girls, hormonal changes may affect food choices and desires. Similarly, a preference for sweets as a

snack choice was reported in Bahrain, where female students consumed sweets and chocolates more than males, and the majority of the female students reported that they consumed sweets and chocolates daily.[23] Stress was also shown to affect adolescents' food choices, but self-efficacy may be the moderator between stress and food intake.[25]

Notably, in our sample, BMI was negatively associated with self-efficacy, as shown by other researchers;[31,17] however, this relationship did not remain after considering all the various covariates in the multivariate regression model. There was no difference in weight status among SES tertiles in our sample. Our data showed that the relationship between weight status and self-efficacy could be modulated by physical activity, dietary beliefs, HES, and interacting factors related to the variations in the governorate or school location. All these factors may individually or synergistically affect weight status and susceptibility to overweight or obesity. Therefore, it is difficult to tease out an independent relationship.

Overall, physical activity levels were moderate in our sample and at a higher level in the private school. Physical activity scores showed that a majority (81%) of participants spent their free time engaging in sedentary activities. These observations are similar to those of previous studies conducted among adolescents.[1,4] Women are faced with more barriers to physical activity than men in Arab countries.[22] Some of the main barriers that were perceived to be somewhat important or important among female adolescents in Kuwait were "not having the time to be physically active", "the climate is not suitable for exercising", the "lack of motivation for physical activity", "less support from teachers", and the "lack of time". Similarly, we noted that increasing engagement in physical activity and decreasing sedentary behaviors among female adolescents are areas that need attention to promote a healthier and happier school environment. Expressing boredom and tiredness about their PE classes demonstrated that the students lacked motivation and had low self-efficacy.

Self-efficacy could be a primary target area for interventions leading to healthier lifestyle habits among adolescents. Particularly, combating the growing problem of obesity in adolescents in Kuwait is a public health priority. However, 7 found poor adherence to obesity interventions among adolescents with obesity and their families in Kuwait, and their engagement in the offered interventions was limited. Adolescents and their parents expressed a low degree of concern about obesity, especially concerning the fact that health-related quality of life was not impaired compared to that of their peers with healthy weights.[7] Furthermore,[3] found multiple cardiometabolic risk factors in adolescents with obesity in Kuwait. Therefore, to implement effective interventions among adolescents, researchers should begin with a period of efficacy building followed by a period of behavior change to yield maximum results. Furthermore, programs with such a structure should be evaluated in a subsequent randomized controlled trial.[32]

The strengths of the present study lay in the fact that we collected data from three different schools in the largest governorates in Kuwait and used locally validated scales to measure SES and health-related behaviors. The limitations lay in the fact that the sample consisted of only adolescent girls aged 13–19 years old and thus, the results may not be generalizable to adolescent males or younger females. Due to the recruitment strategy, these results may not be representative of their schools or their governorates and can only be considered as results of a pilot study. Therefore, future larger studies are warranted to determine these relationships in a more randomized sample using a cluster sampling method. In addition, due to the cross-sectional nature of this analysis, we can only infer associations among these variables but not a causal relationship. Future research should use a larger sample size to test statistical assumptions and evaluate the generalizability of results. Finally, prospective interventional studies should assess whether a change in self-efficacy may increase participation and adherence to health-promoting interventions.

Conclusions

Identifying self-efficacy and the interacting factors related to adolescents' health-promoting behaviors is required to design effective interventions for adolescents. These domains are important, warrant inclusion as part of the main outcomes of interventions, and may be more informative than its focuses on weight alone. Teachers and health professionals should put more effort into

helping adolescents understand the importance of meeting their dietary recommendations, especially encouraging the consumption of fruits and vegetables. Schools should promote physical activity engagement and ensure that PE classes are encouraging, age-appropriate, and enjoyable, by offering a variety of activities. Furthermore, programs that target self-efficacy for healthy eating could be beneficial in improving eating habits among adolescents in Kuwait.

List of Abbreviations

BMI – Body Mass Index
HES – Healthy Eating Score
PE – Physical Education
SES – Self-efficacy Scores
KWD – Kuwaiti Dinars

Consent for Publication

Consents are provided by parents and school administrations via a protocol approved by the Ministry of Education, Kuwait.

Availability of Data and Materials

Upon reasonable request from the corresponding author

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Conflict of Interests

There is no Conflict of interest to declare.

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