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Research Article

Food Label Use and Associated Factors: A Cross Sectional Study from Occupied Palestinian Territories

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Abstract

Background: Use of food labels can help consumers to make informed choices on foods they purchase which could have beneficial role in protection from obesity and diet related chronic diseases. The aim of this study was to investigate food label use in the Palestinian society along with related factors.

Methods: Electronic survey was distributed on social media platforms to Palestinian society in West Bank, Gaza, and other places of Palestinian communities' presence. The survey collected data on demographic variable, obesity, chronic disease history and nutritional deficiencies. In addition to food label use information. Data was analyzed using IBM SPSS 21 software.

Results: We included 271 participants in our study, mean age of our study group was 25.6±10 y, mainly females. Obesity was present in 24.4% of the study group, whereas 42.8% reported they were not satisfied with their current weight and 49.4% reported they attempted to lose weight. The prevalence of label use in our study group was 61.6%. Majority of label users obtained information on amount of calories, serving size, fat, sugar, vitamins and minerals content. Very few obtained information on sodium, saturated fat and transfat in food product. Food label use was significantly related to age ($p<0.05$) and healthy dietary patterns ($p<0.05$), but was not related to obesity and chronic disease.

Conclusion: Our study indicate high rate of label use among Palestinians with some gaps in nutrition information obtained.

Keywords: Food label; Diet; Obesity; Calories

Introduction

Food labels are considered part of healthy informed choice to purchase food products as they provide information on food ingredients such as calories, proteins, fat (saturated, transfat), cholesterol and sodium [1]. Studies indicated an association between nutrition label use and decrease in risk of chronic diseases such as Diabetes mellitus [2]. In year 1990, the nutrition and labeling education act allowed the creation of food label with aim of combating obesity and diet related chronic diseases in USA. Current regulation requires the food manufacturer to provide information on important nutrients according to their significance to population health [3]. In Occupied Palestinian territories currently there is no clear declared regulations on food labels, given that, up to author knowledge, most food products contain food labels, but the information provided on label are not adequately informative for example lacking information on total ingredients or important items such saturated and transfat.

Consumers around the world are becoming more interested in obtaining nutrition information about the food they consume given that interpretation of nutrition information may be different across the public [4]. Although, according to author knowledge, most products in Palestinian Territories is labeled, currently there is no published policy on food label and no specification for type of food label to be used although, in neighbor Arab countries such as Lebanon, Nutrition label on food product is mandatory, and manufacturer should provide information on ingredient list, allergen declaration alongside with other information such as date of making [5].

In previous work, attitudes towards healthy eating and value of food, vulnerability to diet related diseases, nutrition knowledge and numeracy and gender were associated with food label use [6]. Mostly, in Occupied Palestinian territories the Guideline Daily Amount (GDA) labels which show the amount of fat, saturated fat, sugar and sodium is used mainly. However, some products are marketed with lower information in terms of clarity and magnitude of information presented [7].

Label use is associated with changes in dietary behavior in segment of the population, most importantly decrease in energy intake, decreasing unhealthy dietary behavior and increase vegetables intake. At the same time, label use may improve manufacturer standards in food production such as decrease sodium and transfat content of manufactured food products [8]. Among study group from USA, frequent label user had lower intake of sodium and salty snacks [9]. However, impact of label use on Palestinian population was not studied before.

Some studies showed that females were more likely to use food labels, in addition to adults who have nutrition awareness and positive attitudes towards food selection [10]. Barriers towards nutrition label use included; lack of interest, lack for food purchasing and lacking time [11]. Knowing the factors associated with not using food labels and improving food label content in Palestinian Occupied territories is imperative.

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Cardiovascular diseases and cancer are the leading causes of death in Palestinian occupied territories [12]. In the year 2017, globally 11 million deaths were attributable to poor dietary factors including; high intake of sodium, low intake of whole grains and low intake of fruits [13]. Hence the goals of this study were: 1) to evaluate trends of food label use among Palestinians 2) to evaluate demographic and lifestyle factors related to label use in Palestinian society 3) to study the association between dietary habits and food label use

Methodology

A cross-sectional design was used to evaluate the trends of food labels among Palestinians through an electronic data collection tool which was distributed through different social methods that included facebook and professional, social and student facebook groups. The population consisted of all Palestinians living in the West Bank, Gaza, and in Israel. A convenient sampling method was adopted to reach the determined sample size of n=271.

The data collection tool was adopted based on a Literature review. In the study by Ollberding, information on age, diet, use of food label, item of food label used, gender, education, income and smoking were obtained, whereas in the study by Samuel et al, data on chronic disease (Diabetes mellitus) was obtained, we extended data on diseases to include any chronic disease or nutrition related disease [2,6]. It consisted of 3 parts the first one was about the demographic data; the second part was about the medical history that included questions about nutritional problems as deficiency of vitamins and minerals. The last part assessed the participants regarding their use of food labels in term of checking and reading them before using the food item and the reason for reading it. Information on weight, height, obesity, upper part obesity were self reported.

A self- administered food frequency survey to capture dietary habits in the last three days was adapted and translated from previous work [14]. The answer for each question was based on categorical response that was based on Likert scale. The frequency of consumption of dietary items in the last 3 days were was converted to ranked number. The paricipants were asked on the degree they consumed various types of fruits of vegetables, meats, cereals that are available to the Palestinian society. Then, major food groups' categories (vegetables, fruits, proteins, fat and grains) were created and calculated from taking the sum of food items that represent each group group.

Ethical consideration

The research was conducted in accordance with Declaration of Helsinki and approval from the IRB at An Najah National University was obtained before conducting the study. Agreement of participant was ensured through acceptance of the invitation and answering the questionnaire.

Statistical analysis

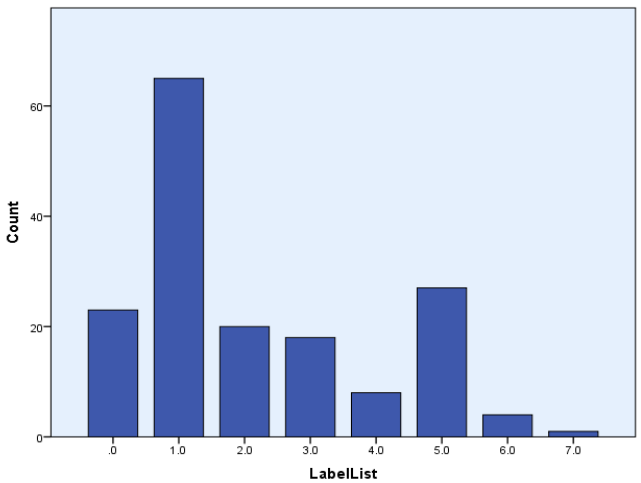
Data was summarized using percentages and means ± SD. Differences of study variables between food label users and non-users was calculated using Chi-square tests if variables were categorical and t-test if variables were continuous. Age was categorized into 4 groups, and variables were compared across 4 different age groups using chi-square or exact test according to number of participants available. Gender was not included because it was tested and was not found significant predictor and including it would decrease our sample size. Data was analyzed by IBM SPSS 21.

Results

The study included 271 participants to whom data on food label use was available. For some variables, there were some missing values and hence they were excluded from final analysis, but they were included in unadjusted analysis to identify the factors that were significantly associated with Food Label use. In general (Table 1), using food label was more common than not using it in the study group. Majority of the study participants were females and younger age participants with mean age for group (25.6 ± 10.0 y). Almost one fourth of the study group reported being obese and slightly higher value reported having upper body obesity. More than half of the study reported not being satisfied by their current weight status and slightly less than half tried to lose weight. Small proportion of the study participants reported being diagnosed with nutrition problems such as malnutrition, vitamin D deficiency, vitamin B12 deficiency, food allergy and anemia. Almost, 40% of the study participants reported using nutrition supplementation. Table 2 provides description of study continuous variables including diet score variables.

Graph 1 shows counts of participants according to information on food label they regularly check. The largest counts of the label users checked information on number of calories then regarding information on serving size and vitamins and minerals in the food products. Smaller counts checked information on fat and sugar content of food product. Very low number of participants checked information on saturated fat, transfat and sodium content of the food product.

Table 3 provides comparison of study demographic and lifestyle variables between label users and nonusers. Food label users were older than participants who does not use food label. Demographic variables including: gender, work status, income, education, place and region of residence were not different among label users and non-



Graph 1: Graph Counts of participants use of information on Food Label. 0-serving size;1-number of calories; 2-amount of sugar; 3-Amount of fat; 4-Amount of saturated fat; 5-Vitamins and Minerals; 6-Trans fat; 7-Sodium Content

Table 1: Descriptive Proportions of Study Categorical Variables.

Variable (n)	N (%)
Do you work (269)	
Yes	71 (26.4%)
No	198 (73.4%)
Income (156)	
Less than 2000 shikel	87 (55.8%)
2000-4000 shikel	37 (24%)
4000 shikel	21 (13.5%)
6000 shikel	11 (7.1%)
Chronic diseases (271)	
Yes	22 (8.1%)
No	249 (91.9%)
Place (269)	
city	116 (43.1%)
village	132 (49.1%)
Refugee Camp	12 (4.5%)
Israel	9 (3.3%)
Region (254)	
Northern West Bank	197 (77.6%)
Southern West Bank	26 (10.2%)
Ramallah and Jerusalem	31 (12.2%)
Obesity (271)	
No	205 (75.6%)
Yes	66 (24.4%)
Android Obesity (270)	
No	192 (71.1%)
Yes	78 (28.9%)
Did you try to lose weight (271)	
No	137 (50.6%)
Yes	134 (49.4%)
Have you consulted a dietitian (271)	
No	231 (85.2%)
Yes	40 (14.8%)
Weight satisfaction (271)	
No	155 (57.2%)
Yes	116 (42.8%)
Smoking (267)	
No	229 (85.8%)
Yes	38 (14.2%)
Alcohol (267)	
No	260 (97.4%)
Yes	7 (2.4%)
Nutrition Label use (271)	
No	104 (38.4%)
Yes	167 (61.6%)
Food allergy (245)	
No	228 (93.1%)
Yes	17 (6.9%)
Agriculture (270)	
No	253 (93.7%)
Yes	17 (6.3%)
Supplements use (271)	
No	163 (60.1%)
Yes	108 (39.9%)
Vitamin B12 deficiency (270)	
No	195 (72.2%)
Yes	75 (27.8%)
Vitamin D deficiency (271)	
No	194 (71.6%)
Yes	77 (28.4%)
Education (271)	
Less than Tawjihi	5 (1.8%)
Tawjihi	10 (3.7%)
College	6 (2.2%)
Bachelors	224 (82.7%)
Graduate studies	26 (9.6%)
Malnutrition (267)	
No	235 (88.0%)
Yes	32 (12.0%)
Anemia (270)	
No	249 (92.2%)
Yes	21 (7.8%)
Gender (198)	
Males	54 (21.4%)
Females	198 (78.6%)

Table 2: Descriptive means and Standard Deviation (SD) of the study continuous variables.

Variable	Means±SD
Age (y)	25.6±10.0
BMI (Kg/m^2)	24.3±5.9
Vegetables score	3.1±2.0
Proteins score	3.0±1.9
Grains score	1.8±0.9
Fruits score	1.9±1.2
Fat score	1.2±1.1

uses. Participants from refugee camps reported lower use of nutrition label, but this did not reach statistical significance. With regards of lifestyle factors: smoking, alcohol use and supplementation use were significantly different between label user and non-user. On the other hand, being obese, with central obesity, unsatisfied with current weight was not associated with more frequent label use. However, trying to lose weight and consulting dietitian was associated with more frequent use of food label use. The supplement users were more frequently label users but this did not reach statistical significance. Vitamin B12, D deficiency was not related to checking labels, whereas participants who reported having anemia were less likely to check food label, but this did not reach statistical significance. Finally, participants who have any chronic disease or malnutrition were not more frequent users of food labels.

Regarding dietary habits which we measured using Likert scale food frequency questionnaire, we found that participants who were label users were more likely to consume vegetables, fruits, whole grain bread and less likely to consume preserved meat in the last three days compared to other participants who did not used food label.

The average age of our study participants was 25.6±10.0, whereas the range of age was 17-64 y. We stratified age into 4 groups' 17-25 y, 25-35 y, 35-45 y and 45-65 y. Comparison of study demographic, lifestyle and dietary variables are presented in Table 4. Demographic variables were different among age groups, the younger age included more students from village, clearly was not working and hence had lower socioeconomic status. At the same time lifestyle factors such as alcohol use and smoking and supplement use were not significantly different between study groups. However, as expected older age groups had high rate of obesity, low body weight satisfaction and hence more desire to lose weight and consultation of dietitian. Also, chronic diseases and nutrition related problems were more common in older age groups.

Discussion

This is the first study to address the issue of using food labels among Palestinians in Occupied territories. In this study group, we show that in fact most Palestinians use the food label to obtain information on number of calories in food product, serving size, vitamins and minerals, sugar and fat content of food product. Very few of the study participants used the food label to obtain information on sodium, saturated fat and trans fat indicating a gap in knowledge in the Palestinian society with regards to nutritional quality of marketed food products. Reading food label was more common in adults who are trying to lose weight and those who consulted a dietitian, but less

Table 3: Comparison between Study Variables between Label Users and Non-Users.

Variable	Nutrition Label		Chis-sq	p-value
	No	Yes		
Do you work (269)				
No	75/198 (37.9%)	123/198 (62%)	0.054	0.82
Yes	28/71 (39.4%)	43/71 (60.6%)		
Income (n=156)				
Less than 2000 shikel	32/87 (36.8%)	55/87 (63.2%)		
2000-4000 shikel	13/37 (35.1%)	24/37 (64.9%)	1.63	0.65
4000 shikel	7/21 (33.3%)	14/21 (66.7%)		
6000 shikel	6/11 (54.5%)	5/11 (45.5%)		
Chronic disease (271)				
No	96/249 (39%)	153/249 (61.4%)	0.04	0.84
Yes	8/22 (40.9%)	14/22 (63.6%)		
Place (269)				
city	45/116 (38.8%)	71/116 (61.2%)		
village	47/132 (35.6%)	85/132 (64.4%)	4.6	0.2
Refugee Camp	8/12 (66.7%)	4/12 (33.3%)		
Israel	4/9 (44.4%)	5/9 (55.6%)		
Region (254)				
Northern West Bank	79/197 (40.1%)	118/197 (59.9%)	0.25	0.88
Southern West Bank	10/26 (38.4%)	16/26 (61.5%)		
Ramallah and Jerusalem	11/31 (35.5%)	20/31 (64.5%)		
Obesity (271)				
No	76/205 (37.1%)	129/205 (62.9%)	0.61	0.44
Yes	28/66 (42.4%)	38/66 ((57.6%)		
Android (270)				
No	72/192 (37.5%)	120/192 (62.5%)	0.29	0.59
Yes	32/78 (41%)	46/78 (59%)		
Weight Loss (271)				
No	60/137 (43.8%)	77/137 (56.2%)	3.4	0.06
Yes	44/134 (32.8%)	90/134 (67.2%)		
Dietitian (271)				
No	94/231 (40.7%)	137/231 (59.3%)	3.6	0.06
Yes	10/40 (25.0%)	30/40 (75%)		
Weight Satisfaction (271)				
No	62/155 (40%)	93/155 (60%)	0.4	0.53
Yes	42/116 (36.2%)	74/116 (63.8%)		
Smoking (267)				
No	88/229 (38.4%)	141/229 (61.6%)	0.02	0.9
Yes	15/38 (39.5%)	23/38 (60.5%)		
Alcohol (267)				
No	100/260 (38.5%)	160/260 (61.5%)	0.06	0.81
Yes	3/7 (42.8%)	4/7 (57.1%)		
Allergy (245)				
No	87/224 (38.8%)	137/224 (61.1%)	0.004	0.95
Yes	8/21 (38.1%)	13/21 (61.9%)		
Supplement (271)				
No	68/163 (41.7%)	95/163 (58.2%)	1.93	0.17
Yes	36/108 (33.3%)	72/108 (66.7%)		
Vit B12 deficiency (270)				
No	74/195 (37.9%)	121/195 (62.1%)	1	0.76
Yes	30/75 (40%)	45/75 (60%)		
Vit D deficiency (271)				
No	75/194 (38.7%)	119/194 (61.3%)	0.02	0.88
Yes	29/77 (38%)	48/77 (62%)		
Education (271)				
Less than Tawjihi	1/5 (20%)	4/5 (80%)		
Tawjihi	4/10 (40%)	6/10 (60%)	2.54	0.64
College	2/6 (33.3%)	4/6 (66.7%)		
Bachelors	90/224 (40.2%)	134/224 (59.8%)		
Graduate studies	7/26 (27%)	19/26 (73.1%)		
Anemia (271)				
No	92/249 (36.9%)	157/249 (63.1%)	1.96	0.16
Yes	11/21 (52.3%)	10/21 (47.6%)		
Malnutrition				
No	88/235 (37.4%)	147/235 (62.6%)	1.1	0.3
Yes	15/32 (46.9%)	17/32 (53.1%)		

	Mean±SD		t-score	p-value
Age (y)	24.1± 8.6 104	26.6±10.8 167	-2	0.052
BMI (Kg/m^2)	24.1± 6.1 104	24.4±5.8 167	-0.3	0.8
Vegetables score	2.7± 2.0 104	3.4±1.9 165	-3.1	0.002
Protein score	2.9± 1.6 102	3.0±2.0 165	-0.7	0.46
Grains score	1.85± 0.85 103	1.76±0.90 165	0.9	0.38
Fruits	1.54± 1.2 104	2.1±1.2 166	-3.9	0
Fat	1.2± 1.1 102	1.22± 1.1 166	-0.3	0.79
Red meat	0.21±0.43 100	0.19±0.43 166	0.32	0.75
Preserved meat	0.31±0.55 102	0.18±0.43 164	2.2	0.03
Brown bread	0.17±0.49 103	0.35±0.66 163	-2.44	0.01
Fish	00	0.04±0.20	-2.13	0.003

Table 4: Comparison of study variables between age groups.

Variable	Age Groups				Chis-sq	p-value
	15-25	25-35	35-45	45-65		
Do you work (269) No Yes	 165(89.2%) 20 (10.8%)	 18 (54.5%) 15 (45.5%)	 8 (27.6%) 21 (72.4%)	 7 (31.8%) 15 (68.2%)	80.7	<0.0001
Income (n=156) Less than 2000 shikel 2000-4000 shikel 4000 shikel 6000 shikel	 66 (81.5%) 12 (14.8%) 3 (3.7%) 0 (0%)	 14 (48.3%) 8 (27.6%) 4 (13.8%) 3 (10.3%)	 3 (11.5%) 12 (46.2%) 6 (23.1%) 5 (19.2%)	 4 (20%) 5 (25%) 8 (40%) 3 (15%)		
Chronic disease (271) No Yes	 181 (97.3%) 5 (2.7%)	 33 (97.1%) 1 (2.9%)	 22 (75.9%) 7 (24.1%)	 13 (59.1%) 9 (40.9%)	36	<0.0001
Place (269) city village Refugee Camp Israel	 65 (35.3%) 107 (58.2%) 5 (2.7%) 7 (3.8%)	 19 (55.9%) 14 (41.2%) 1 (2.9%) 0	 17 (58.6%) 8 (27.6%) 2 (6.9%) 2 (6.9%)	 15(68.2%) 3 (13.6%) 4 (18.2%) 0	32	<0.0001
Region (254) Northern West Bank Southern West Bank Ramallah and Jerusalem	 131 (74.9%) 22 (12.6%) 22 (12.6%)	 30 (90.9%) 1 (3%) 2 (6.1%)	 19 (73.1%) 1(3.8%) 6(23.1%)	 17 (85%) 2 (10%) 1(5%)	7.9	0.163
Obesity (271) No Yes	 153 (82.3%) 33 (17.7%)	 26 (76.5%) 8 (23.5%)	 16 (55.2%) 13(44.8%)	 10 (45.5%) 12 (54.5%)	21.9	<0.0001
Android (270) No Yes	 145 (78%) 41 (22%)	 22 (64.7%) 12 (35.3%)	 15 (53.6%) 12 (46.4%)	 10 (45.5%) 12 (54.5%)	16.2	<0.0001
Weight Loss (271) No Yes	 105 (56.5%) 81 (43.5%)	 19 (55.9%) 15 (44.1%)	 5 (17.2%) 24 (82.8%)	 8 (36.4%) 14 (63.6%)	17.6	<0.0001
Dietitian (271) No Yes	 164 (88.2%) 22 (11.8%)	 29 (85.3%) 5 (14.7%)	 20 (69%) 9 (31.0%)	 18 (81.8%) 4 (18.2%)	7.58	0.056
Weight Satisfaction (271) No Yes	 101(54.3%) 85 (45.7%)	 17 (50.0%) 17 (50.0%)	 22 (75.9%) 7 (24.1%)	 15 (68.2%) 7 (31.8%)	6.6	0.09
Smoking (267) No Yes	 156 (85.2%) 27 (14.8%)	 31 (91.2%) 3 (8.8%)	 24(85.7%) 4 (14.3%)	 18 (81.8%) 4 (18.2%)	1.14	0.78
Alcohol (267) No Yes	 178 (96.7%) 6 (3.3%)	 33 (100%) 0	 28 (100%) 0	 21 (95.5%) 1 (4.5%)	2.27	0.52
Allergy (245) No Yes	 153 (90.5%) 16 (9.5%)	 28 (93.3%) 2 (6.7%)	 25 (92.6%) 2 (7.4%)	 18 (94.7%) 1 (5.3%	0.62	0.89
Supplement (271) No Yes	 121 (65.1%) 65 (34.9%)	 17 (50%) 17 (50%)	 14 (48.3%) 15 (51.7%)	 11(50%) 11(50%)	6	0.11

Vit B12 deficiency (270) No Yes	 150 (81.1%) 35 (18.9%)	 23 (67.6%) 11(32.4%)	 12 (41.4%) 17 (58.6%)	 10 (45.5%) 12 (54.5%	29.2	<0.0001
Vit D deficiency (271) No Yes	 153(82.3%) 33 (17.7%)	 22 (64.7%) 12 (35.3%)	 13 (44.8%) 16 (55.2%)	 6 (27.3%) 16 (72.7%)	42.7	<0.0001
Education (271) Less than Tawjihi Tawjihi College Bachelors Graduate studies	 7 179	 3 31	 4 25	 7 15		
Anemia (271) No Yes	 173 (93.5%) 12 (6.5%)	 28 (82.4%) 6 (17.6%)	 29 (100%) 0	 19 (86.4%) 3 (13.6%)	8.5	0.04
Food Label No Yes	 76 (40.9%) 110 (59.1%)	 16 (47.1%) 18 (52.9%)	 7 (24.1%) 22 (75.9%)	 5 (22.7%) 17 (77.3%)	6.3	0.096
Malnutrition No Yes	 164 (88.6%) 21 (11.4%)	 30 (88.2%) 4 (11.8%)	 25 (89.3%) 3 (10.7%)	 16 (80.0%) 4 (20.0%)	1.3	0.72
	Mean± SD				**F-score**	**P-value**
	184	33	28	22		
BMI (Kg/m^2)	23.0±5.6	24.7±5.1	27.4±4.4	30.3±6.7	15.3	<0.0001
Vegetables score	3.1±2.0	2.6±1.8	3.4±1.8	3.8±2.0	1.9	0.13
Protein score	3.0±1.8	2.6±2.0	2.4±1.7	3.9±2.0	3	0.03
Grains score	1.9±0.9	1.5±0.8	1.6±0.8	1.8±0.9	2.4	0.07
Fruits	1.7±1.2	2.0±1.3	2.3±1.2	2.9±1.0	7.7	<0.0001
Fat	1.2±1.1	1.3±1.4	0.9±1.0	1.5±0.9	1.2	0.32
Red meat	0.21±0.43	0.22±0.50	0.15±0.4	0.14±0.4	0.31	0.82
Preserved meat	0.27±0.5	0.33±0.60	0.04±0.19	0.00±0.000	4.11	0.007
Brown bread	0.22±0.55	0.27±0.57	0.46±0.74	0.55±0.80	3	0.03
Fish	0.02±0.15	0.00±00	0.10±0.31	0.00±0.00	2.87	0.04

common in obese adults after adjustment for covariates.

Largest proportion of the study participants used the food label to make informed choices about the food product. This could be related to the fact the level of education of the studied group was high. The prevalence of label use in our study group was comparable to the levels reported in USA [3] and in Canada [15] despite the fact that Palestinian Occupied territories is considered low income countries and as is shown in our study, very small proportion of participants earned more than 6000 shikel. Also, income was not significantly related to use of food label. However in study in USA, 80% of participants reported using food labels including checking food ingredients, serving size and health benefits, unlike our study participants with lower socioeconomic status and from rural areas were less likely to use food labels [16].

Age in our study was a significant predictor of use of food label both in adjusted and unadjusted models which parallels attempting to lose weight in the older age group (data not shown). A fact that could justify that one fourth of the group that checked the food label in fact did that to obtain information on the number of calories in the product and 9% for information the serving size. The relationship between age reading food label is not consistent in literature with some studies indicating it has no relationship to label reading [17] and other indicated a role for age, however, unlike our study group, younger age groups are more likely to read food label than older age groups, whereas in our study older age groups were more likely to read food label [6]. This could be justified by two factors; we had only 4.1% of our group older than 50 y and the fact that the group older than 30 y were more likely to have, higher income, education and better attitudes towards their dietary habits. Also, the different age groups in our study differed significantly in their demographic and lifestyle characteristics.

The most common information that were obtained from food label were regarding calories, serving size which reflects that more than half of our study participants in fact were having low weight satisfaction and hence they are trying to control weight gain or losing weight. 16% of the study group who used the food label will likely use the label for food information on minerals and vitamins, whereas very few obtained information on harmful forms of fat or sodium. Up to the authors' knowledge, this conflicting information indicate that Palestinian society is highly aware of common nutrition problems such as vitamin D and B12 deficiencies which was common in our study group, whereas issues like high sodium intake, harmful types of fat are often ignored in the Palestinian health debates, although information on fat are obtained by 10.7% of label users. More studies and programs are needed in the Palestinian society to spread nutrition awareness and literacy. Nutrition awareness played role in the increase in the use of food label among 500 UK students and this was very much related to BMI [18].

Not checking on sodium on food label could indicate a gap in nutrition awareness in the Palestinian society. Previous studies concluding that salt/sodium intake is positively associated with stroke risk [19] and stroke [20]. High salt intake also independently predicts cerebrovascular events, especially stroke [21]. In addition, studies found that sodium intake by 100 mmol/d increment was associated with an increased risk of stroke incidence and stroke mortality [22]. Specifically, high sodium intake was associated with 10.7% of deaths due to stroke [23].

Our study indicates that nutrition awareness seems to play a positive association with food label use. Participants who tried losing some weight, or those who consulted a dietitian were more likely to read food label. Moreover, using food label was associated with more use of vegetables, fruits and whole grains and less frequent use of preserved meats. Previous studies indicated significant associations between nutrition knowledge and nutrition label use. For example, in a mail survey of 1162 Swiss adults, Hess, Visschers, and Siegrist [6] found that both subjective and objective measures of nutrition knowledge were significantly associated with self-reported nutrition label use, even after taking account for demographic and health-related variables in a multivariate model. An online survey of a randomly selected group of 500 college students in the UK also found that prior nutrition knowledge was associated with self-reported food label use [18]. However, Norazlanshah et al. [24] found that nutrition knowledge was unrelated to self-reported frequency of use that was assessed for specific areas within the nutrition label (e.g., serving size, fat). Another study reported only indirect effects of nutrition knowledge, going to show that knowledge influenced the use of self-reported nutrition labels by their impact on behaviors [25].

Chronic disease was not associated with higher use of food labels, this outcome was confirmed in a study using data from the Korea National Health and Nutrition Examination Survey which showed that there was no significant difference in the use of nutrition labels in chronic disease participants, such as hypertension, diabetes, and hyperlipidemia, compared to the use in those without chronic diseases [26]. However, this contradicts previous studies. For example, a study using data from the US National Health and Nutrition Examination Survey (NHANES) reported that chronic disease patients who had received nutrition education were 50% more likely to read nutrition labels. Furthermore, those who read nutrition labels tended to consume less calories, saturated fatty acids, and carbohydrates [27].

This study is not without limitation including its cross sectional design, low representation of males, refugee camps. However, our study was the first in Palestinian territories to address use of food label.

Conclusion

Among 271 Palestinian adult older than 18 y, lable use was common especially among slightly older adults, or adults trying to lose weight, most probably in attempt to control amount of calories intake. However, checking information such as sodium and saturated and transfat was very minimal. Nutrition education campaigns are very important to teach Palestinians of diet and its relationship to human disease.

Author Contributions

NN designed the study, collected data, analyzed data and wrote part of the manuscript. M.T obtained IRB approval, revised the manuscript and wrote part of it. MA wrote part of the discussion.

Ethical Approval

This study was approved by Najah University IRB board.

Consent Form

The goals of the study were discussed in social media platforms and participants were asked to fill online survey if they want to participate in the study and filling the form was considered consent to participate in the study.

Data Availability

The datasets generated and/or analyzed during the current study are not publicly available due [being kept confidential for future work] but are available from the corresponding author on reasonable request.

Consent for Publication

All the study authors read and approved the manuscript for publication.

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