



## **Highlights on the Labels of Packaged Foods Sold in Jordanian Market from A Cross-sectional Study**

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### **Abstract**

Jordan has adapted a strategy to prevent chronic diseases. Accordingly, Ministry of Health is looking for controlling food labeling particularly food fat, trans-fat, and caloric content. This study aimed to screen the food label of products that are sold in Jordanian market in terms of serving size, energy, macronutrient, fiber, total and added sugars, saturated and trans fat, cholesterol, dietary fiber, and micronutrient contents. A cross-sectional study was performed to screen the food label for the food products based on the standards of The United States Food and Drug Administration (FDA) regulations of 2016 and Jordan Food and Drug Administration (JFDA). Generally, food labels were not clear. The screened products were compliant with JFDA standards and not in compliance with some FDA standards. In addition, many products were found to be sources of added sugars, Na, and saturated fats. Stakeholders and legislators are called to focus on developing new laws, regulations, and polices for developing food label. Food manufacturers are needed to work hardly on developing informative, clear, easy-to-understand, and attractive food labels. The legislators of food label policies are called to look for ways to indicate the presence of high amounts of dietary risk factors such as sugars, added sugars, Na, saturated, and trans fats in packaged foods.



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### **Introduction**

Nutrition label is a display of food ingredients used to guide consumers toward healthy food choices.<sup>1,2</sup> According to the food Act (number 30 for the year

2015), Jordan Food and Drug Administration (JFDA) defined food label as any label, designation, photograph, description whether written, printed, attached to a food.<sup>3</sup> To achieve the aim of better

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food choosing, food label should be clear and well understood by the consumers.<sup>1</sup>

Overweight and obesity occur when there is an imbalance between food intake and physical activity.<sup>4</sup> The World Health Organization (WHO) reported that in 2016, 1.9 billion adults were obese.<sup>5</sup> Obesity increases the risk for other comorbidities such as cardiovascular diseases (CVDs) and diabetes mellitus type II.<sup>4</sup> The prevalence of obesity and its related comorbidities in Jordan is high. In 2015, the WHO reported that obesity affects 30% of the Jordanian population. In addition, CVDs and diabetes contribute to 75.6% and 7.6% of mortality in Jordan respectively.<sup>6</sup> The rising prevalence of obesity necessitated developing an action plan to combat obesity. Hence, between 2010 and 2015, Jordanian government has adapted a strategy to combat obesity and enhance physical activity.<sup>7</sup> Moreover, in 2015, Jordanian government adapted the national strategy and plan of action against obesity, diabetes, hypertension, and dyslipidemia.<sup>8</sup> Based on this strategy, one of the actions intended by Jordan Ministry of Health (MOH) was to develop a policy framework including the necessary regulations and laws that cover all areas relevant to promotion of healthy eating pattern and physical activity. The policy of food labelling is the framework which is based on a set of laws and regulations that support healthy diet and deliver information to the consumer about food quality, drawing consumer attention to the potential health benefits and risks of certain diseases, motivating manufacturers to produce better food products, and motivating consumers to select better food choices.<sup>9</sup>

In terms of eating pattern, Jordan MOH is looking to control labeling of food products particularly their fat and trans-fats content, caloric content, and coloring substances. According to this vision, national labeling standards are being developed and updated for locally-produced and imported foods.<sup>8</sup>

The dietary guidelines for Americans recommend lower intakes of solid fats (saturated and trans fats), cholesterol, sugar, and increase dietary fiber intake.<sup>10</sup> For this purpose, the Food and Drug Administration (FDA) mandates setting the amounts of total fat, saturated fat, trans fats, cholesterol, sodium, fiber, sugars, and added sugars within the food label. Moreover, the percent daily values

(% DV) of fat and saturated fat, cholesterol, sodium, dietary fiber, sugar and added sugars are required to be displayed.<sup>11</sup> On the other hand, Jordanian law for food labelling requires the product name, net weight, manufacturers name and address, lot number, production and expiry dates, ingredient list,<sup>3</sup> and fortifying matters (for powdered milk only). The dietary reference intake values are not required.<sup>12</sup> On the other hand, foods that are exported imported from/to Jordan must comply with food legislation in other relevant countries and any conditions and standards set out in the bilateral agreements between Jordan and the importing country or with the approval of the competent authorities of the importing country.<sup>3</sup>

The lack of mandating adequate nutritional information on the label might contribute to consumer misleading despite that achieving the aim of better food choosing needs a clear and well-understood food label.<sup>1</sup> The aim of the current research is to put some highlights on a sample of packaged foods sold in Jordanian market regarding their food labels in terms of following the JFDA and FDA food label guidelines in an attempt to raise the attention toward a modification of policies, laws, and regulations of food label in Jordan. Moreover, the current research aims at exploring some sources of fat, saturated fat, trans fats, cholesterol, sugar and added sugar in a sample of packaged foods that are sold in Jordanian market. Knowing the sources of the abovementioned components may put some information for Jordanian consumers as they are risk factors for the most common causes of death worldwide.

### Materials and Methods

This is a cross sectional study which aimed to screen the products that are sold in Jordanian market for their food label. Undergraduate students of 3<sup>rd</sup> and 4<sup>th</sup> classes studying in the Department of Nutrition/Faculty of Pharmacy and Medical Sciences/ University of Petra/Amman/Jordan and Department of Clinical Nutrition and Dietetics/ Faculty of Applied Health Sciences/ The Hashemite University/Zarqa/ Jordan were thankfully asked to examine and record the food labels of foods in the supermarket as well as their homes. Data were recorded and analyzed using an excel sheet. As well, students were asked to capture clear photos for every checked food label to check the validity of their records. For each

group of 10 students, a team leader was assigned to check the similarity of the written information and the captured photos. A second data check was performed by the authors.

JFDA criteria were used to check the food labels in terms of product name, brand name, net weight, manufacturer name and address, lot number, production and expiry dates, and ingredient list.<sup>3</sup> In addition, United States FDA regulations of 2016 (for regular labels and new labels)<sup>13</sup> were used to check the label in terms of product name, brand name, serving size, energy, macronutrient (total fat, total protein, total carbohydrates), saturated fat, trans fat, cholesterol, dietary fiber, total sugars, added sugar, micronutrient contents (Na, Ca, vitamin D, Fe, and K). The content of these nutrients was checked in the units that are specified by the FDA (2016) regulations i.e. serving size (in common measures and weight), energy (Kcal.), total fat, saturated fats, total carbohydrates, and dietary fiber (in grams and % daily values (% DV), trans fats and protein (in grams), cholesterol, Na, Ca, Fe, K, and vitamin C (in milligrams and % DV), the vitamins A and vitamin D (in micrograms and % DV). DVs were checked based on 2000 Kcal. and 2500 Kcal. diet recommendations. Additionally, food item name and groups according to the American Dietetic Association (ADA) exchange system for diabetes<sup>14</sup> categories (i.e. carbohydrates: starch, fruits, vegetables, other carbohydrates, fats: monounsaturated fats, polyunsaturated fats, saturated fats, protein: plant-based protein, lean protein, medium fat protein, and high fat protein, and combination foods), sweets, desserts, and other

carbohydrates, free foods, and combination foods were checked.

The criteria which was set to evaluate nutrient sources are that set by FDA i.e. FDA sets foods which contains a nutrient in amounts that contributes to  $\geq 20\%$  of DV are rich sources of that nutrient, those containing 10-19% DV are good sources, and those containing 5%DV are low sources.<sup>15</sup>

## Results

A total of 663 packaged products were screened. Only 22% (145 products) of these products were local. Three products didn't contain nutritional information on their packages. It is noteworthy to indicate that there was a general observation from the students who screened the products that food labels were not clear in terms of small font and inconsistent between Arabic and other language versions. In this study, checking the label showed that the screened products were compliant with JFDA standards. However, they were not in compliance with some FDA standards. Tables 1-4 show the numbers and percentages of compliant products with the FDA standards in terms of energy, macronutrient, and fiber contents in g/serving and as % DV (Table 1), sugars, added sugars, saturated and trans fats, and cholesterol in g or mg/serving and as % DV (Table 2), the vitamins A, C, and D in  $\mu\text{g}$  or mg/serving and as % DV (Table 3), the minerals Na, K, Fe, and Ca in mg/serving and as % DV (Table 4). Table 1 shows that very few of the screened products (15 out of 663) displayed the serving size in both measures (Tables 1 -5).

**Table 1. Status of the screened products in terms of energy, macronutrient and fiber contents (in Kcal. or g per serving, and % DV based on 2000 and 2500 Kcal.) as number and percentages.**

Component of the food label	N (%) of products containing the component	N (%) of products not containing the component	N (%) of local products containing the component	N (%) of local products not containing the component
Serving size	650 (98)	13 (2)	2 (1)	143 (99)
Serving size (in common measures+in weight measures)	9 (1)	654 (99)	9 (0)	145 (100)
Energy				
Kcal./serving	652 (98)	11 (2)	1 (1)	144 (99)
% DV (based on 2000 Kcal./day)	651 (98)	12 (2)	1 (1)	144 (99)
% DV (based on 2500 Kcal./day)	626 (94)	37 (6)	5 (3)	140 (97)
Carbohydrate				

g/serving	662 (100)	1 (0)	0 (0)	145 (100)
% DV (based on 2000 Kcal./day)	661 (100)	2 (0)	1 (1)	144 (99)
% DV (based on 2500 Kcal./day)	46 (7)	617 (93)	18 (12)	127 (88)
<b>Fat</b>				
g/serving	652 (98)	11 (2)	1 (1)	144 (99)
% DV (based on 2000 Kcal./day)	471 (71)	192 (29)	3 (2)	142 (98)
% DV (based on 2500 Kcal./day)	46 (7)	617 (93)	8 (6)	137 (94)
<b>Protein</b>				
g/serving	652 (98)	11 (2)	1 (1)	144 (99)
% DV (based on 2000 Kcal./day)	163 (25)	500 (75)	5 (3)	140 (97)
% DV (based on 2500 Kcal./day)	0 (0)	663 (100)	117 (81)	28 (19)
<b>Fiber</b>				
g/serving	651 (98)	12 (2)	3 (2)	142 (98)
% DV (based on 2000 Kcal./day)	15 (2)	648 (98)	3 (2)	142 (98)
% DV (based on 2500 Kcal./day)	1 (0)	662 (100)	1 (1)	144 (99)

**Table 2. Status of the screened products in terms of sugar, added sugar, saturated, and trans fats (in g per serving, and % DV based on 2000 and 2500 Kcal.) as number and percentages**

<b>Component of the food label</b>	<b>Number (and percentage) of products containing the component</b>	<b>Number (and percentage) of products not containing the component</b>	<b>Number (and percentage) of local products containing the component</b>	<b>Number (and percentage) of local products not containing the component</b>
<b>Sugars</b>				
g/serving	651 (98)	12 (12)		
% DV (based on 2000 Kcal./day)	658 (99)	5 (1)	1 (1)	144 (99)
% DV (based on 2500 Kcal./day)	662 (100)	1 (0)	1 (1)	144 (99)
<b>Added sugars</b>				
g/serving	659 (99)	4 (1)		
% DV (based on 2000 Kcal./day)	660 (100)	3 (0)	0 (0)	145 (100)
<b>Saturated fats</b>				
g/serving	657 (99)	6 (1)		
% DV (based on 2000 Kcal./day)	393 (59)	270 (41)	0 (0)	145 (100)
% DV (based on 2500 Kcal./day)	631 (95)	32 (5)	10 (7)	135 (93)
<b>Trans fats</b>				
g/serving	22 (3)	641 (97)		
% DV (based on 2000 Kcal./day)	127 (19)	536 (81)	6 (4)	139 (96)
% DV (based on 2500 Kcal./day)	1 (0)	662 (100)	4 (3)	136 (97)
<b>Cholesterol</b>				
mg/serving	9 (1)	654 (99)	1 (1)	144 (99)
% DV	8 (1)	665 (99)	2 (1)	143 (99)

Tables 1-4 show that most of the screened products (including local products) abide the instructions of FDA in terms of setting the serving size, energy, macronutrient, fiber, sugars, added sugars, saturated fat, Na contents (in Kcal. and g) and as %

DV. However, in terms of protein, fiber, trans fats, and cholesterol, contents (as %DV), most of the product manufacturers didn't set the values. In addition, the product contents of K, Fe, Ca, the vitamins A, C,

and D (in mg and  $\mu\text{g}$ /serving) and as % DV were not displayed in most of the screened foods. Also, these tables show that most of local products obey all of the FDA standards.

**Table 3. Status of the screened products in terms of minerals (sodium, potassium, iron, and calcium) (in mg per serving, and % DV based on 2000 and 2500 Kcal.) as numbers and percentages**

Component of the food label	Number (and percentage) of products containing the component	Number (and percentage) of products not containing the component	Number (and percentage) of local products containing the component	Number (and percentage) of local products not containing the component
Na				
mg/serving	656 (99)	7 (1)	0 (0)	145 (100)
% DV (based on 2000 Kcal./day)	652 (98)	11 (2)	2 (1)	143 (100)
% DV (based on 2500 Kcal./day)	654 (99)	9 (1)	1 (1)	144 (100)
K				
mg/serving	3 (0)	660 (100)	0 (0)	145 (100)
% DV	2 (0)	661 (100)	0 (0)	145 (100)
Fe				
mg/serving	5 (1)	658 (99)	0 (0)	145 (100)
% DV	9 (1)	654 (99)	5 (3)	140 (97)
Ca				
mg/serving	5 (1)	658 (99)	2 (1)	143 (99)
% DV	10 (2)	653 (98)	4 (3)	141 (97)

**Table 4. Status of the screened products in terms of vitamins (A, C, and D) (in mg and  $\mu\text{g}$  per serving, and % Recommendation based on 2000 and 2500 Kcal.) as numbers and percentages**

Component of the food label	Number (and percentage) of products containing the component	Number (and percentage) of products not containing the component	Number (and percentage) of local products containing the component	Number (and percentage) of local products not containing the component
Vitamin A				
$\mu\text{g}$ /serving	4 (1)	659 (99)	1 (0)	144 (100)
% DV (based on 2000 Kcal./day)	154 (23)	509 (77)	8 (1)	137 (99)
Vitamin C				
mg/serving	46 (7)	617 (93)	12 (2)	133 (98)
% DV	54 (8)	609 (92)	54 (8)	91 (92)
Vitamin D				
$\mu\text{g}$ /serving	1 (0)	662 (100)	0 (0)	145 (100)
% DV	1 (0)	662 (100)	0 (0)	145 (100)

**Table 5: Status of local products in terms of energy, macronutrient, fiber, and micronutrient contents (in Kcal. or g per serving, and % DV based on 2000 and 2500 Kcal.) as numbers and percentages.**

Component of the food label	Number (and percentage) of products containing the component	Number (and percentage) of products not containing the component
Serving size	143 (99)	2 (1)
Serving size (in household measures +in weight measures)	6 (4)	139 (96)
Energy		
Kcal./serving	143 (99)	2 (1)
% DV (based on 2000 Kcal./day)	40 (28)	105 (72)
% DV (based on 2500 Kcal./day)	18 (12)	127 (88)
Carbohydrate		
g/serving	23 (16)	122 (84)
% DV (based on 2000 Kcal./day)	124 (86)	21 (14)
% DV (based on 2500 Kcal./day)	18 (12)	127 (88)
Fat		
g/serving	25 (17)	120 (83)
% DV (based on 2000 Kcal./day)	25 (17)	120 (83)
% DV (based on 2500 Kcal./day)	17 (12)	128 (88)
Protein		
g/serving	25 (17)	120 (83)
% DV (based on 2000 Kcal./day)	3 (2)	142 (98)
% DV (based on 2500 Kcal./day)	145 (100)	0 (0)
Fiber		
g/serving	16 (11)	129 (89)
% DV (based on 2000 Kcal./day)	17 (12)	128 (88)
% DV (based on 2500 Kcal./day)	11 (8)	134 (92)
Sugars		
g/serving	13 (9)	132 (91)
% DV (based on 2000 Kcal./day)	1 (1)	144 (99)
% DV (based on 2500 Kcal./day)	1 (1)	144 (99)
Added sugars		
g/serving	0 (0)	145 (100)
% DV (based on 2000 Kcal./day)	0 (0)	145 (100)
% DV (based on 2500 Kcal./day)	0 (0)	145 (100)
Saturated fats		
g/serving	100 (69)	45 (31)
% DV (based on 2000 Kcal./day)	98 (68)	47 (32)
% DV (based on 2500 Kcal./day)	5 (3)	140 (97)
Trans fats		
g/serving	128 (88)	17 (12)
% DV (based on 2000 Kcal./day)	142 (98)	3 (2)
% DV (based on 2500 Kcal./day)	143 (99)	2 (1)
Cholesterol		
mg/serving	11 (8)	134 (92)
% DV	79 (54)	66 (46)
Na		
mg/serving	19 (13)	126 (87)
% DV (based on 2000 Kcal./day)	103 (71)	42 (29)

% DV (based on 2500 Kcal./day)	12 (8)	133 (92)
K		
mg/serving	0 (0)	145 (100)
% DV	0 (0)	145 (100)
Fe		
mg/serving	8 (6)	137 (94)
% DV	9 (6)	136 (94)
Ca		
mg/serving	10 (7)	135 (93)
% DV	9 (6)	136 (94)
Vitamin A		
µg/serving	12 (8)	133 (92)
% DV (based on 2000 Kcal./day)	64 (44)	81 (56)
Vitamin C		
mg/serving	126 (87)	19 (13)
% DV	81 (56)	64 (44)
Vitamin D		
µg/serving	9 (6)	136 (94)
% DV	0 (0)	145 (100)

**Table 6: Some sources of added sugars, Na, and saturated fats among the screened products\***

Classification	Foods
Good sources of added sugars	Deep frozen potatoes, Barbecue sauce, Crunchy oats & honey, Raisin bran roasted bran flakes, Dark chocolate
Rich sources of sodium	Cheddar cheese, <i>Foul mudammas</i> (broad beans packed in oil and brine), Powder chicken mix, Barbecue sauce, Pan cake and waffle mix, Nacho cheese sauce, Chickpea dip ( <i>Hummus</i> ), Tomato paste, Italian dressing, Mayonnaise, Soy sauce, Macroni & cheese, Chickpeas, Sliced bread
Good sources of sodium	Pasta sauce (garlic and herbs), Triple chocolate fudge cake mix, <i>Falafel</i> mix, Samosa leaves (ready-to-use dough sheets), Low carb waffle and pan cake mix, Sand wick biscuits, Spring roll pastry, Soy non-dairy beverage, Bread <i>tanour</i> (Arabic bread), Sports drink, Instant oat meal maple syrup, Corn flakes cereal, Bread crumbs, Cream cheese spread, Instant pudding and pie filling, Puff pastry squares, <i>Labneh</i> , Popcorn, Chickpea dip, Chips
Rich sources of saturated fats	Digestive sweet meal biscuits, Muffin mix, Low fat cheddar cheese, Ice cream, Puff pastry, Tahini (sesame paste), Creamy dressing (Ranch), Chocolate topping, Turkish <i>labneh</i> , Popcorn, Triple chocolate cake mix, Noodles
Good sources of saturated fats	<i>Halawa</i> with pistachios, Crunchy peanut butter, <i>Falafel</i> mix, Sesame <i>tahini</i> , Chips, Dates with bran, Cappuccino, Dark chocolate, Deep frozen potato, Taco shells, Caramel macchiato, Nacho cheese sauce, Chips, Cocoa powder, Pistachio filled cookies, Lasagna, Sweetened fat cocoa powder, Crunchy oats and coconut, Hot cocoa mix, Tomato ketchup chips

\* Products were classified into (good) and (rich) based on the FDA criteria were a serving of rich sources provides with  $\geq 20\%$  of DV and a serving of good sources provides with 10-19% of DV<sup>15</sup>

**Table 7: Classification of the screened foods which were found as hidden sources of added sugars, Na, and saturated fats according to the ADA exchange system for diabetes**

Food item	Exchange list
Sliced bread, Bread <i>tanour</i> (Arabic bread), Corn flakes cereal, Popcorn, Noodles, Instant oat meal maple syrup, Bread crumbs, Tomato paste, Roasted bran flakes, Raisin bran, Pan cake and waffle mix, Low carb waffle and pan cake mix, Soy non-dairy beverage, Sandwich biscuits, Digestive sweet meal biscuits	Carbohydrates
Barbecue sauce, Triple chocolate fudge cake mix, Dark chocolate, Sports drink, Instant pudding and pie filling, Muffin mix, Ice cream, Chocolate topping, Triple chocolate cake mix	Sweets, desserts, and other carbohydrates,
Soy sauce	Free foods
Marconi & cheese	Combination foods
Chickpeas, Chickpea dip, <i>Falafel</i> mix, Cheddar cheese, Low fat cheddar cheese, Foul <i>mudammas</i> (broad beans packed in oil and brine), Cream cheese spread	Protein
Chips	Carbohydrates + fats
<i>Tahini</i> (sesame paste), Mayonnaise	Fats
Deep frozen potatoes, Nacho cheese sauce, Italian dressing, Pasta sauce (garlic and herbs), Creamy dressing (ranch), Crunchy oats & honey, Puff pastry squares, Digestive sweet meal biscuits, <i>Samosa</i> leaves (ready-to-use dough sheets), <i>Labneh</i> , Turkish <i>labneh</i> , Powder chicken mix, Spring roll pastry	Not listed

Table 5 shows the status of compliance with FDA standards for the local products. This table shows that most of these products contain serving size, energy content (Kcal./serving), carbohydrate content (g/serving), protein content (% DV based on 2500 Kcal. diet), saturated fats in g/serving and % DV based on 2000 Kcal. diet, trans fats in g/serving and as % DV, cholesterol as % DV, Na as % DV, and vitamin C as mg/serving and as % DV. In addition, this table shows that the screened local products were inconsistent in setting nutrition label information. Some products display the % DV based on 2000 Kcal. diet, other display it based on 2500 Kcal diet, and many manufacturers didn't display the content at all.

In this survey, the products were screened for hidden sources of added sugars, Na, saturated and trans

fats since these components are considered as dietary risk factors for obesity, CVDs, and diabetes; the top ten killers in Jordan.<sup>6</sup> Table 6 shows some sources of added sugars, Na, and saturated fats among the screened products. The classification of sources was based on FDA criteria i.e. FDA sets foods which contains a nutrient in amounts that contributes to  $\geq 20\%$  of DV are rich sources of that nutrient, those containing 10-19% DV are good sources, and those containing 5% DV are low sources.<sup>15</sup>

Table 7 shows the classification of the screened foods which were found as hidden sources of added sugars, Na, and saturated fats according to the exchange system for diabetes.<sup>14</sup> It is obvious from the table that most (16 products) of these products were classified in the carbohydrate list, some



(9 products) of them in the (sweets, desserts, and other carbohydrates) list, others (7 products) in the protein list, one product is classified in the free food

list, one product in the combination food list, two in the fat list, and one in the carbohydrate and fat list.

**Table 8: Position of the American Dietetic Association (ADA) exchange lists from the sources of added sugars, Na, and saturated fats found in this survey**

Risk factor	Food source	Position of the ADA
Added sugars	Barbecue sauce, dark chocolate	Highlighted
	Deep frozen potatoes, Crunchy oats and honey, Raisin bran roasted bran flakes,	Not highlighted
Sodium	Cheddar cheese, Tomato paste, Soy sauce, Macroni & cheese, Bread crumbs,	Highlighted
	Foul <i>mudammas</i> (broad beans packed in oil and brine), Powdered chicken mix, Barbecue sauce, Spring roll pastry, Nacho cheese sauce, Chickpea dip ( <i>Hummus</i> ), Italian dressing, Mayonnaise, Pasta sauce (garlic and herbs), Triple chocolate fudge cake mix, Falafel mix, Samosa leaves (ready-to-use dough sheets), Low carb waffle and pan cake mix, Spring roll pastry, Soy non-dairy beverage, Bread <i>tanour</i> (Arabic bread), Sports drink, Instant oat meal maple syrup, Corn flakes cereal, Cream cheese spread, Instant pudding and pie filling, Puff pastry squares, Labneh, Popcorn, Chips, Pan cake and waffle mix, Sandwich biscuits,	Not highlighted
Saturated fats	Ice cream, Muffin mix, Puff pastry, <i>Tahini</i> (sesame paste), Creamy dressing (ranch), Chocolate topping, Turkish <i>labneh</i> , Triple chocolate cake mix, Noodles, <i>Halawa</i> (a sweet made form sesame paste, dried milk, and sugar) with pistachios, Crunchy peanut butter, Chips, Dates with bran, Cappuccino, Dark chocolate, Deep frozen potato, Taco shells, Caramel macchiato, Nacho cheese sauce, Chips, Cocoa powder, Pistachio filled cookies, Lasagna, Sweetened fat cocoa powder, Crunchy oats and coconut, Hot cocoa mix, Tomato ketchup chips.	Not highlighted

## Discussion

Setting clear information on the food label enables consumer to follow the guidelines and to achieve the intended purposes of the food label.<sup>16</sup> Labeling requirements which were set by Jordanian Institute of Standardization and Meteorology (JISM) require food labels to be in Arabic and permits an Arabic label stick.<sup>12</sup> In addition, the FDA encourages label clarity.<sup>16</sup> It is recommended, thus, to ascertain the clarity of food label presentation and the consistency between Arabic and other language versions of the food label for the sake of consumer following guidelines and health and wellbeing accordingly. Legislators as well as monitoring parties are responsible for controlling clarity and authenticity

of different languages of food labels. Manufacturers are called to set clear labels. As well, it is the role of consumers to read label and choose better foods. Serving size is the amount food set on the food label indicating the recommended amount to be consumed in an eating session/episode.<sup>16</sup> Setting serving size on the food label indicates a reference point for the consumer, reflects the real amounts consumed, affects food consumption,<sup>17</sup> and enables consumer to compare between different products in order to consume better food choices in terms of nutritive value as well as price.<sup>15,18</sup> The FDA doesn't require displaying the serving size both in common measures and weight measures. Compliant with this, very few of the screened

products displayed the serving size in both measures (Tables 1 and 5). The FDA recommends, rather, setting serving size in household measures in order to develop consumer awareness and understanding of nutrition information and choosing healthier food alternatives.<sup>16,19</sup> During this survey, it has been found that most of the screened products set serving size. This finding encourages mandating setting serving size on the food label for the sake of the above-mentioned benefits for the consumer. Some countries such as USA, Canada, European countries, Australia, and New Zealand obligate the present of serving size.<sup>20</sup> Standardization is, thus, common and allows compromise in food information, benefits, facilitate following laws and regulations, and encourages adopting healthier dietary pattern.<sup>20</sup> What will be-then-the better choice for the consumer to be taken into consideration? Is it setting the common serving size based on the culture and Jordanian population eating pattern or that based on the ADA exchange lists. Setting the serving size based on the culture and Jordanian population eating pattern will accommodate Jordanian culture while the other choice might suit the products that are exchanged between Jordan and other countries. % DV is one of the numerical methods for presenting nutrient content of foods that is relevant to nutrient content claims. It represents how much a serving provides from the recommended amount of nutrients.<sup>10</sup> This method is based on scientific information chronic disease risk reduction. The presence of such figures allow the consumer to compare between different products.<sup>9,21</sup> In addition, setting the % DV enhances food marketing.<sup>22</sup>

The WHO stated that the most common causes of death in Jordan are cardiovascular diseases (CVDs) accounting for 37% of deaths. Cancers, communicable, maternal, perinatal, and nutritional conditions, and diabetes are of the ten most common causes of death in Jordan accounting for 12%, 11%, and 6% of deaths in Jordan respectively.<sup>6</sup> Nutrition and diet affect the rate of these causes of death specially in the developing countries. Among these dietary factors are consumption of increased amounts of energy and macronutrients, refined grains with low fiber content, sugar and sugar-sweetened beverages, edible animal fats and oils, and processed foods containing saturated and trans fats, Na, reduced consumption of Ca and K.<sup>23</sup> In addition, obesity is central to CVDs, diabetes

mellitus, and some types of cancers. Jordanian food processing market is growing<sup>24</sup> and the consumption of processed and packaged foods is increasing. There is an increased interest in the nutrition information extracted from the food label. Consumers want standardized, "easy to understand" information, colorful, and attractive labels.<sup>25</sup> Consumers feel that they are motivated by reading nutrition information on foods.<sup>26</sup> However, some food labels may mislead consumers.<sup>27</sup> Food label draws attention to the food products and motivates purchasing. The label format and content affect understanding the nutritional value of food. These facts necessitate the reform of polices, laws, regulations related to the food label. The reform requires looking to the benefits of food label in a broader context, standardizing the guidelines for displaying the food label, and recognizing the use of nutrition labelling as a major motivator for product reformulation and innovation.<sup>28</sup> This requires the collaboration of stakeholders, governmental and non-governmental related agencies, food manufacturers, scientists and educators, and consumers. Scientists and educators are called to educate consumers about the context and importance of food labels. It is noteworthy to mention controlling food label needs educational campaigns for consumers to reduce barriers<sup>26</sup> and allow better understanding for issues such as serving size and % DV.<sup>29</sup> Stakeholders, scientists and educators are required to develop curriculum related to education about food label context and importance. Stakeholders and legislators are called to focus on developing new related laws, regulations, and polices without any increase in food costs neither for the manufacturer nor for the consumer. Food manufacturers are needed to work hardly on developing informative, clear, easy-to-understand, and attractive food labels.

Among the screened products, some unexpected sources of added sugars, Na, and saturated fats were found. Fortunately, some agencies such as the American Dietetic Association (ADA) highlighted these components for the consumers.<sup>14</sup> The foods which were found as hidden sources of added sugars, Na, and saturated fats according to the exchange system for diabetes.<sup>14</sup> It is obvious from the table that most of these products were classified in the carbohydrate list, some of them in the (sweets, desserts, and other carbohydrates) list, others in the protein list, one product is classified in the free food

list, one product in the combination food list, two in the fat list, and one in the carbohydrate and fat list. What is noteworthy is that many of the products (13 products) are not listed (as they are) in the ADA exchange lists. Nonetheless, some of these unlisted products are presented within the exchange lists in another way such as prepared version. For example: deep frozen potatoes are not listed within the exchange list but fried potatoes are listed there. The same applies to triple chocolate fudge cake mix, *falafel* mix, instant pudding and pie filling, pan cake and waffle mix. Other products are not listed *per se* but the exchange lists contain similar products such as whole wheat sweet meal biscuits (listed as biscuits). Other foods are unique to the Arab or other cuisines such as: *Samosa* leaves (ready-to-use dough sheets), *Labneh*, and Turkish *labneh*.

The ADA exchange lists highlight the presence of high amounts of salt, fat, and fiber in the listed foods by symbols.<sup>14</sup> The ADA didn't highlight the presence of saturated fats, trans fats, and added sugars. It is recommended, thus, that agencies such as ADA and scientists highlight the presence of added sugars, Na, and saturated fats within these and other food items. The legislators are called to look for ways to indicate the presence of high amounts of dietary risk factors such as sugars, added sugars, Na, saturated, and trans fats in packaged food sold in Jordanian markets taking into consideration cultural and educational backgrounds. The use of colors and symbols in food labels was successful experience and enhanced consumer health in many countries such as United states,<sup>30</sup> Britain,<sup>31,32</sup> Canada,<sup>33</sup> and Sweden.<sup>34</sup>

This study is the first study of its kind that was performed to screen the products sold in the Jordanian market against USFDA as well as JFDA standards of food label. In addition, this study identified some hidden sources of Na and saturated fats. This study is limited by cross sectional design. Results of this research shows that most of the screened products abide the food label laws and regulations of JFDA. However, most of the products

didn't follow the FDA guidelines of food labelling. In addition, different products displayed different patterns of food labeling information. Furthermore, the food label of some screened products showed that there are some hidden sources of added sugars, Na, and saturated fats.

Jordanian government is working to control food label. JFDA laws and regulations related to food label requires the product name, net weight, manufacturers name and address, lot number, production and expiry dates, ingredient list, and fortifying<sup>3</sup> matters for milk powder). Food label laws and regulations are called to be reformed in accordance with FDA food label guidelines in order to be more informative for the sake of consumer health and manufacturer benefits. Legislators, stakeholders, scientists and educators and manufacturers are called to share knowledge and experience to reform laws and regulations related to food label. Scientists and educators are called to develop curricula related to consumer and manufacturer education regarding the context and importance of food label. In addition, they are called to identify foods that are known to be sources of dietary risk factors for chronic diseases.

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#### **Conflict of interest**

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