Nutritional quality of prepackaged food that carry health or nutritional claims and their compliance with SFDA regulations in Saudi Arabia

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Abstract

Background Products that carry health or nutrition claims may be perceived by consumers as healthier than those that do not carry claims. Therefore, they will have a more favorable attitude towards it and may also be easily misled about the nutritional profile and may misinterpret it. Nutritional quality of those products should be assessed to protect consumers against being misled and ensuring that they receive accurate information about food products carrying a claim.

Methods a cross-sectional survey for a total of 1153 foods were randomly sampled from fourteen stores in Riyadh, Saudi Arabia. The data were collected from nutritional facts present on food labels and evaluated by comparing the mean level of nutrients between products that carried claims and those that did not using the UK nutrient profile model (UKNPM).

Results Overall, 29% of products carried either health or nutritional claims. Only 19.2% of foods that carried health claims met SFDA requirements, while 28.9% of all products that carried nutritional claims met SFDA criteria. The results indicate that products that carried health or nutritional claims were significantly lower in sugar (9.67 g/100 g), fat (9.2 g/100 g), saturated fat (3.2 g/100 g), and sodium (371.36 mg/100 g). According to the UK nutrient profiling model, 46.9% of the products carrying claims were less healthy than those not carrying claims, and statistically significant differences were observed by product origin and category (p=0.005 and p=0.000, respectively).

Conclusion a great need for the regulation and monitoring of claims on food packages for the optimal protection of the population's health.

Background

Companies commonly use health and nutritional claims as marketing tools, since research has shown that companies that present claims on food products experience increases in sales, particularly when health claims link the consumption of the product with a decreased risk of a specific disease. (1) Products that carry claims can impact perceptions around food product quality, as consumers tend to consider products with claims to be healthier than those without claims, ultimately resulting in more favorable attitudes. (2)

However, even if food products carry claims, it does not necessarily mean that these products are healthy. The nutritional profile of products that carry claims could be misinterpreted and mislead consumers. (3) It has been shown that individuals do not usually read nutritional profiles, and those who do are commonly unable to correctly interpret the information and may have difficulty differentiating between similar claims. (4) With the growth of food marketing, food regulators should devote attention to protecting the population from unhealthy products that are promoted as healthy on their packaging. (5)

For instance, food products with low calories or fat may vary in sodium content compared to similar products. (6) People believe that food products with fat-related claims are lower in calories than other

food products, but it has been found that these products are not significantly lower in fat or calories than those without claims, making such claims misleading to consumers. (7)

Worldwide, regulating products with claims has been done in few countries, Denmark, Ireland, Norway, Australia and the United Kingdom which have used a nutrient profile model to control use of claims as marketing strategy and allowing only healthy products to carried claims based on ranking system. (8) Governments play an important role in regulating the food industry due to the potential impact of this industry on quality of life at the individual and population levels. (9) Public intervention by the government could be the most effective strategy to improve lifestyle and nutritional habits at the population level. (10)

In Saudi Arabia, Saudi Food and Drug Authority (SFDA) regulates claims linked to dietary guidelines. Only claims related to eating patterns were recognized by the GCC appropriate national authority. (11) The SFDA reported a list of health claims that the food industry is not allowed to use. (12)

The impact of nutritional regulations on individual nutritional intake has not been examined in Saudi Arabia, nor has the potentially misleading nature of nutritional product labeling regarding health and nutrition. Presently, data on the accuracy of these regulations are lacking and therefore, this gap must be addressed and investigated. In this study, we evaluated nutritional and health claims, and we assessed whether these claims are accurate and follow SFDA regulations. In addition, we assessed the healthiness of prepackaged food products by comparing the mean level of nutrients (e.g., energy, sugar, protein, total fat, saturated fat, and sodium) in products that carried claims to that of products without claims. Additionally, the UK nutrient profile model was scored for products carrying health or nutritional claims.

Methods

A cross-section of prepackaged food products was sampled in Riyadh food chains, established methods from previously published studies were used. (13-15)

Food chains selection:

Nine major food chains represented the largest retail brand in Riyadh, and five neighborhood grocery stores, from the five regions of Riyadh – North, South, Central, West, and East to ensure covering the local products. These stores were chosen to ensure that the selected foods represented all packaged products for sale in Riyadh.

Food categorization & selection:

Products were categorized into product groups using the Codex food classification system (16). These groups were then categorized into ten larger product groups based on their sections in local stores for a regression analysis of the nutrient content of the products. The new categories were beverages, bakery products, canned foods, cereals and cereal products, confectionery, convenience foods, dairy products,

fruits and vegetables, sauces, spreads and snack foods. From each food group, we selected a maximum of ten and a minimum of three products.

Data collection:

Data were collected and analyzed from 1,153 products across the ten food categories. Across all products, 32.6% were local and 67.4% were imported. Imported products were most commonly from Europe (29% of total products), followed by the USA and Canada (13%). The maximum number of items per store was 120, and the minimum was 36. Food items for each specific category were selected randomly based on the inclusion criteria.

The sampling within each grocery store was grouped by category, and then from each group, we selected a maximum of ten and a minimum of three items. All information was entered into a data sheet for each product, with anonymous labeling to conceal companies and food chain. For each packaged product, the data collected included product name, store, category, origin, presence of claims, type of claims, and nutritional facts (energy, carbohydrate, sugar, protein, fat, saturated fat, trans fat, and sodium contents).

Food products that did not require mandatory labeling by SFDA regulations were excluded. Each product was only recorded once, even if it was available at multiple supermarkets, unless the product was marketed as a different brand. If the product to be selected was found in another store, it was excluded, and another item was selected instead.

Claim detection and categorization:

The categorization of nutritional and health claims were based on the Codex guidelines on Nutrition and Health Claims (CAC/GL 23-1997) [17]. Nutritional claims were divided into nutrient content claims, comparative nutrient claims, and no added ingredient claims. Health claims were divided into functional claims, risk reduction claims, and other health claims. Claims were included if they were visible on any surface of the packaging in Arabic or in English. Claims were recorded verbatim.

Reliability:

Kappa was calculated to assess the interrater reliability and the level of agreement between ratings by whether food products carried health or nutrition claims. All disagreements were then discussed to attain consensus if information provided on food products could be considered a health or nutritional claim.

Comparison of the nutritional quality of food products with or without claims:

Initially, the nutritional quality of products with or without claims was assessed using *t*-tests to compare the mean level of nutrients (energy, protein, sugars, fat, saturated fat, and sodium) per 100 g for all products and by food category.

Next, we analyzed nutrient profiles for products using the UK nutrient profile model (UKNPM). Each food product that carried claims was assessed with the UKNPM scoring system, which has been validated by comparing its results with expert opinion. (18)

Data analysis:

Descriptive analyses were conducted to determine the frequency of products carrying claims overall and for each of the food categories. Additionally, compliance with SFDA regulations for food labeling was reported. Chi-square analyses were used to assess differences in the prevalence of claims and compliance with regulation by the products' country of origin and by product category. All statistical analyses were conducted using Stata 12 and p-values <0.05 were considered statistically significant.

Results

Prevalence of products carrying health or nutritional claims:

Overall, 29% of food products carried either health or nutritional claims. Most of these products carried at least one nutritional claim (28.6%), fewer products carried health claims (2.3%). There was good agreement about whether food products carried a health claim or nutritional claim (97.7%). There was a statically significant relationship between the presence of claims and origin of the product and product category (p<0.001). Full results are provided in Table 1.

Types of claims and nutrients referenced:

The most frequent type of claim was the nutritional content claim (17%). Among food products that carried claims, a total of 564 claims were found. Of these claims, nine types of health claims and 38 nutritional claims were identified. Comparative claims followed nutrient content claims (4.7%). The most common claim related to being "light" (43.8%), followed by claims about fat content (31.5%). Moreover, claims about no added ingredients were present in 11.5% of total products.

Among all health claims, the most common types were related to being suitable for individuals with diabetes, assisting with weight reduction, being healthy, improving digestion, enhancing immunity, and other claims related to bone, skin, heart, and brain health. (Table 2&3).

Nutritional claims and SFDA requirements:

Overall, 28.88% (n=92) of total products carried nutritional claims met the SFDA criteria. Meeting the SFDA criteria was significantly associated with product origin (P< 0.001). Moreover, a significant relationship was also found between meeting the SFDA criteria and the product category for products with nutritional claims (P< 0.001) (Table 2).

Health claims and SFDA requirements:

Among products that made health claims, only 19.2% met SFDA requirements, while 80.8% did not. The product category was significantly associated with meeting the SFDA criteria ($p<0.001$) while no association was observed with the country of origin ($P = 0.052$)

Quality of prepackaged products carried claims:

Table 4 shows the difference in the mean nutrient levels between products with and without claims. Food products with claims were lower in sugar (9.7 g/100 g), fat (9.2 g/100 g), saturated fat (3.2 g/100 g), and sodium (371.4 mg/100 g) than those without claims, and these differences were statistically significant ($p=0.0055$, $p=0.0001$, $p=0.0048$, and $p=0.0202$, respectively). Differences in energy and carbohydrate content were not significant.

Comparison of prepackaged food products that carried claims and without claims by category:

Table 5 compares energy, sugar, total fat, saturated fatty acid, proteins, and sodium content between food categories with and without health or nutritional claims. There were few significant differences in mean nutrient levels between foods with and without claims between categories. There was no difference in energy except for products in the cereal and cereal products category ($p=0.0355$) while sugar levels were significantly different in many categories like bakery products and cereal products ($p=0.0149$, $p=0.0329$). Fat content was significantly different in dairy and snack products ($p=0.0009$, $p=0.0099$), and saturated fat varied in dairy products only ($p=0.0073$). Meanwhile, sodium did not show any significant differences between foods with and without claims by food category.

Evaluation of prepackaged food products that carries claims according to the UK nutrient profile model:

According to the UK nutrient profiling model, 46.9% of products carrying claims were less healthy than those without claims, and statistically significant differences were observed by product origin and category ($p=0.005$ and $p=0.000$, respectively). By food category, more than the half of products in different categories were considered less healthy (Table 6).

Fat, sodium, and sugar level in products with fat, sodium, and sugar claims:

Of the 88 products with fat claims (including claims about saturated fat and trans fats), 19 (21.6%) were high in sugar and high in sodium. Sixteen (18.2%) products that carried fat claims contained hydrogenated fat. Among products with sodium claims (n=16), 2 (12.5%) were high in sugar, 11 (68.8%) were high in fat, and only one (6.3%) contained hydrogenated fat. Among the 56 products with sugar claims, 26 (46.4%) were high in fat, 3 (5.4%) were high in sodium, and 11 (19.6%) contained hydrogenated fat.

Discussion

This study was included major products from a variety of food categories and provided new insights into the use of nutrition and health claims on packaged food in the Saudi Arabian marketplace which had

never been studies in terms of nutritional quality before. In this study, 29% of products carried either health or nutritional claims on their labeling. It was found that nutritional claims were more common than health claims; compared to products from other countries, Saudi Arabian products had fewer health claims. This lower prevalence is most likely due to SFDA regulations, which include a specific list of products that should carry health claims and ban products that carry other types of health claims. More attention should be focused on the regulation of nutritional claims.

Data about the prevalence of claims in Saudi Arabia or any other country in the region were not available for comparison. In general, few surveys have assessed claims use worldwide. A study from the UK in 2016 reported that 15% of products carried at least one health claim and 29% carried at least one nutritional claim [19]. In Europe, it was found that the majority of the claims were nutrition-related (64%), followed by health-related (29%) [20]. In the Irish market, 47.3% of products carried a nutritional claim, and 17.8% carried a health claim [5]. Similar studies in the United States reported that the prevalence of products with nutritional claims was 49% [21] compared to 9% of products carrying health claims. [22] In Australia and New Zealand, 14% of food products were found to make health claims [23].

Products marketed with low-fat claims were common (19.1% of total claims), which could be beneficial, as high fat has been found to contribute to many common diseases in Saudi Arabia (e.g., cardiovascular diseases, diabetes, and hypertension)[24]. Moreover, sodium claims were found in only 3.1% of all claims.

Products claiming fortification with calcium, vitamin D, and iron were less common than other claims (5.4%, 4%, and 1.3% of total claims, respectively). It would probably be beneficial to increase the number of products fortified with these nutrients, as vitamin D deficiency [25] and anemia (especially in women) are common in Saudi Arabia [26]. However, a previous study found that snack foods that carried vitamin-fortified claims may mislead customers to make less healthy food choices [27]. Therefore, restrictive criteria should be established to prevent less healthy food from carrying health claims. As found in previous studies, functional claims were the most common health claim. However, even with SFDA restrictions on product claims, the prevalence of health claims that meet the SFDA requirements was low (19.2%).

Furthermore, 28.9% of total products that carried nutritional claims met the SFDA requirements, and meeting the requirements was significantly related to the product origin. This trend can be explained by countries' adherence to Codex regulations. Nutrient content claims commonly follow SFDA requirements (70.8%), as it is easy to identify and compare the information, resulting in more technical regulations.

The poor compliance of products that carried health and nutritional claims observed in this study indicate that illegal claims were not identified by regulators and that more resources need to be allocated to improve compliance assessment. However, there are many possible causes of noncompliance of food products with Saudi Arabia's regulations. Due to the priority given by the regulation agencies to other areas (e.g., food safety), we may find that the food standards enforcement tends to react to complaints

rather than proactively monitor violations. Consumers may assume that products carrying health or nutritional claims are healthy and that the claim is true, which could be potentially misleading.

Recently, the SFDA published a report that found 56% of Saudi citizens believed the claims made on food products. The SFDA may allow health and nutritional claims to be used as a marketing tool even for unhealthy food products without a reference score that defines which food products should carry health or nutritional claims. This issue has been identified in Australia and contradicts efforts to ensure that only healthy foods can be promoted by adding a score for all products that carried claims [28].

Our survey found that food carrying health or nutritional claims had significantly lower levels of sugar, sodium, fat, and saturated fats than products without claims. In a similar study, researchers found that foods carrying health or nutritional claims had lower levels of energy, protein, total sugars, saturated fat, and sodium. (29) These products were promoted as healthier products that could mislead consumers. (30) However, when we compared content between food categories, there were few significant differences in the nutrient levels.

Previous studies included a small number of food groups to evaluate the nutritional quality of food products carrying claims. (31–33) One study done in UK found that products carrying claims had a slightly healthier nutritional profile than foods that did not. This study found a significant difference in fat and saturated fat, and no differences in sugar or sodium levels. (19) Another from Australia found that 31% of products that carried claims failed to reach the nutrient profile criteria. These products were ineligible to carry health or nutritional claims based on Australian regulations. (34) Additionally, a study done in five European countries showed that products carrying health claims have slightly healthier nutrition profiles than products without claims. (29)

For food products in our study, no differences were observed in energy except in the cereal and cereal products category. The levels of sugar were significantly different in bakery wares, cereal and cereal products, confectionary products, convenience foods, and sauces and spreads, while the protein levels were significantly different in canned food only. Fat levels were significantly different in dairy and snack foods, saturated fat varied in dairy content only, and no differences were observed in sodium content between food categories for products with or without claims.

For further analysis, we used the UKNPM, which is a valid tool to assess the quality of products that carried nutrition claims. The results raise concern over the poor quality of the nutritional contents of products carrying claims worldwide. However, 46.9% of food that carried health or nutritional claims was scored as less healthy by the UKNPM, with origin and category variance observed. To the best of our knowledge, the nutritional quality of products with claims has not been studied in Saudi Arabia or any Gulf country markets.

In our study, 21.6% of food products that carry fat claims were high in sugar and high in sodium. A previous study found that more than half of products with fat claims were not significantly lower in fat or calories compared to similar products without fat claims, suggesting that foods with fat claims may be

misleading to consumers. (7) Another study found that products with low fat can vary in sodium depending on food category. (6) No similar data was found to compare products that carry sodium and sugar claims in our study.

As a cross-sectional survey, we had some limitations include absence of nutritional analysis in the lab due to limited resources and all statistics were depend on nutritional facts validity. Also, lack of nutritional quality studies on the region to compare our data with it. We hope to set the start point to increase population and regulators attention to the nutritional quality of prepackaged food products as one product and stop looking to it in view of separate nutrients. The results of this study will provide useful baseline data for regulators to assess the effect of proposed changes in health and nutritional claim regulations in Saudi Arabia.

Conclusion

The marketing of unhealthy products using misleading claims hinders individuals' ability to select healthy food options. To improve the quality of prepackaged food products that carry claims, implementation a rating system could help to improve the nutritional composition of products, which can have important implications on people's ability to make wise food choices and eventually improve public health.

Abbreviations

SFDA
Saudi Food and Drug Authority.
WHO
World Health Organization.

Declarations

Ethics approval:

The study was approved by King Abdullah International Medical Research Center (SP16/070).

Availability of data:

The datasets used and analysed during the current study are available from the corresponding author on reasonable request.

Competing interests:

Both authors didn't have any conflict of interest and the funding agency provided grant to support data collection and possible publication fee only.

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Authors' contributions:

First author collected and entered the data while the second author working on designed the study. Both authors were working on analyzed data, interpreted results and drafted manuscript.

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Tables

Table 1 Proportion of all products carrying claims meeting SFDA requirements by product category in a random sample of food products available in different food chains in Riyadh, Saudi Arabia

Category	Any claim	Health claims		Nutritional claims	
	Proportion	Proportion	Met SFDA requirements	Proportion	Met SFDA requirements
	N (%)	N (%)	N (%)	N	N
ges (n=126)	47 (37.3)	0	0	47 (14.2)	8 (17)
vares (n=138)	31 (22.5)	4 (3)	0	30 (9.1)	9 (30)
food (n=61)	14 (23)	0	0	14 (14.2)	1 (7.1)
eal products (n=170)	82 (48.2)	9 (5.3)	4 (44.4)	80 (24.2)	33 (41.3)
onery (n=118)	19 (16.1)	1 (1)	0	19 (5.8)	8 (42.1)
ıce food (n=84)	12 (14.3)	0	0	12 (3.6)	3 (25.6)
ducts (n=148)	65 (44)	7 (4.7)	0	63 (19.1)	23 (36.5)
getables (n=76)	21 (27.6)	4 (5.3)	0	21 (6.4)	2 (9.5)
spreads (n=125)	18 (14.4)	0	0	18 (5.5)	1 (5.6)
ood (n=107)	26 (24.3)	2 (2)	0	26 (7.9)	4 (15.4)
al (1153)	335 (29.1)	27 (2.3)	4 (14.8)	330 (28.6)	92 (27.9)

Table 2 Prevalence of health and nutritional claims in a random sample of food products (n=1153)

Claim Type	No. of products with claims	No. of claims	% of product with claims	95% CI for % of products with claims
utritional Claim	330	523	28.6	26-31.2
utrient content claim	196	312	17	14.8-19.2
utrient comparative claim	54	73	4.68	3.5-5.9
on-added claim	132	138	11.5	9.6-13.3
ealth claim	27	41	2.3	1.4-3.1
unctional claim	22	27	1.9	1.1-2.7
isk reduction claim	2	2	0.2	-.07-0.4
ther	2	12	0.2	-0.07-0.4
ealth or nutritional claim	335	564	29.1	26.4-31.7

Table 3 Nutrients and ingredients referred to in health and nutritional claims

Nutrient	Nutritional Claims	% of all nutritional claims	Health claims	% of all health claims
Energy	6	1.2	0	0
Protein	14	2.7	1	2.4
Carbohydrate	1	0.2	0	0
Sugar	56	10.7	0	0
Fat	68	13.00	0	0
Saturated fatty acid	8	1.5	0	0
Omega 3 fatty acid	5	0.96	0	0
Fiber	45	8.6	5	12.2
Sodium/Salt	16	3.1	0	0
Cholesterol	12	2.3	2	4.9
Folic Acid	4	0.8	1	2.4
Vitamin C	17	3.3	0	0
Vitamin D	21	4.00	0	0
Calcium	28	5.4	4	9.8
Magnesium	2	0.4	0	0
Vitamin B complex	18	3.4	1	2.4
Iron	7	1.3	0	0
Niacin	1	0.2	0	0
Vitamin K	1	0.2	0	0
Vitamin A	15	2.9	0	0
Trans Fat	12	2.3	0	0
Vitamin E	6	1.2	0	0
Zinc	2	0.4	0	0
Multiple nutrients	55	10.5	4	9.8
Unspecific nutrient	103	19.7	23	56.1
Total	523	100	41	100

Table 4 Mean level of nutrients in products that carried claims and those without claims:

Nutrient	Products with claims	Products without claims	P-value
Energy	2162.315	2171.167	0.9955
Carbohydrate	669.81	612.37	0.9123
Sugar	9.657	12.637	0.0055
Protein	7.10	6.645	0.3277
Fat	9.2	14.48	0.0001
Saturated fat	3.198	4.713	0.0048
Trans fat	.0037	.0911	0.0675
Sodium	371.36	490.61	0.0202

Table 5: Difference in the nutritional quality of products carrying health or nutritional claims compared to those without health or nutritional claims for a random sample of food products (*n*=1053) available in Riyadh, by product category.

category	Energy		Sugar		Protein		Fat		Saturated		Sodium	
	Diff.	*P*	Diff.	P	Diff.	P	Diff.	P	Diff.	P	Diff.	P
Beverages (*n*)	+3.8	0.7344	-1.5	0.255	+0.03	0.8694	-3.5	0.329	-0.44	0.2394	-21.05	0.4111
Bakery wares	+30.8	0.4265	-7.9	0.015	+1.7	0.0949	-2.04	0.3468	-0.1	0.9408	+172.4	0.0802
Canned food	+50.2	0.2396	-1.2	0.3652	+10.5	0.0002	-2.9	0.7263	-0.38	0.565	-317	0.3395
cereals and cereal products	+42.3	0.0355	+4.7	0.0329	+1.1	0.1035	+0.5	0.6408	+0.03	0.945	+56.41	0.346
Confectionery	-26.0	0.57	-15.4	0.009	+0.33	0.8361	-0.6	0.8557	+0.1	0.9571	-12.98	0.9487
convenience food	-2.9	0.9502	+2.2	0.0280	-1.7	0.3581	-1.8	0.4094	+0.22	0.8438	+0.7	0.9968
Dairy products	-29.8	0.216	+1.8	0.1133	-0.03	0.9816	-7.1	0.0009	-3.57	0.0073	-57.04	0.6025
fruit & Vegetables	+6.3	0.849	+2.2	0.6637	+1.2	0.4086	-2.8	0.1634	-1.33	0.296	-265.1	0.3868
Sauces and spreads	+82.9	0.1513	-0.4	0.0036	+2.8	0.1813	+8.02	0.1514	+0.6	0.5897	-67.78	0.763
snack food	-43.6	0.423	-2.4	0.146	+0.32	0.8111	+7.21	0.0099	+2.96	0.4212	+125.7	0.4866

Table 6: Evaluation of prepackaged food products that carry health or nutritional claims in the Saudi market, according to the UK nutrient profile model

Food Category	Total products	Less-Healthy	
	N	N	%
Beverages	47	32	68
Bakery wares	31	19	61
Canned food	14	2	14
Cereals and cereal products	82	51	62
Confectionery	19	12	63
Convenience food	12	3	25
Dairy products	65	15	23
Fruit & Vegetables	21	7	33
Sauces and spreads	18	7	39
Snack food	26	9	35