How adequate is our food labeling system for patients with chronic diseases?

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Abstract

Food labels displayed on the packed food items provide important nutritional information which is aimed at guiding the consumer. However, due to lack of a globally consistent food labeling system, these labels are often inadequate in imparting the required information. Information on nutrition composition of various food products was collected. Their nutrition tables were evaluated and classified as "adequate" or "inadequate".We conducted a survey on 82 patients with obesity, diabetes, hypertension, chronic kidney disease (CKD) stage 4 and 5 to assess the frequency of buying packed foods, their knowledge on current food labeling, challenges in interpreting its information and options for upgrading them. Of 177 food items assessed, dietary sodium and calcium had maximum reporting (37.8%, 28.8% respectively), dietary fibre had moderate to poor reporting (15.2%) while dietary potassium and phosphorus (4.5%, 5% respectively) had extremely poor reporting. We found 97% labels were inadequate in reporting all the nutrients having disease implications. 91.5% patients reported they wish to have simpler icons on food labels. Current food labeling system is in adequatein reporting nutrients linked with chronic disease implications. It is a genuine need of hour to upgrade these food labels with better user-friendly system and also train the consumers in interpreting the labels in order to avoid making incorrect food choices.

Introduction:

Food/nutrition labels displayed on the packed food items are an important source of information for consumers (1). Food labels offer consumer with information on basic ingredients, serving size, method, date of manufacturing, date of expiry, nutrition composition, etc. However, more often these details are difficult to interpret owing to poor knowledge and lack of training in food selection. Owing to this inefficiency in interpreting, nutrition labels are largely underutilized (2).

Food labeling Regulations in India

The governing authority for all packaged food products sold in India is the FSSAI (Food Safety and Standard Authority of India). FSSAI functions under the Ministry of Health and Family Welfare. For food labeling, the FSSAI has its guidelines provided under the Food Safety and Standards Regulation, 2011 notification.

The food labeling regulations require all "Prepackaged" or "Pre-packed food" to comply with the labeling regulations in India. As per the rules, prepackaged food means food, which is placed in a package of any nature, in such a manner that the contents cannot be changed without tampering it and which is ready for sale to the consumer (3).

Nutrition information on food labels

The Food Safety and Standards Regulation states that all packed food labels need to contain the nutritional information per 100 gm or 100 ml or per serving of the product along with the following information:energy value in kcal; the amounts of protein, carbohydrate (with quantity of sugar) and fat in gram (g) or ml and the amount of any other nutrient for which a nutrition or health claim is made.

The FSSAI mandates that these health claims or nutrition claims or risk reduction claims should be thoroughly evaluated and validated by the food manufacturer and is a subject to scrutiny by the FSSAI authorities. For example, if a food product like a biscuit contains dietary fiber and claims to lower the blood sugar in diabetic population, its effect on lowering this claim should be studied in diabetic population. Similar holds true for health claims on risk reductionby particular food ingredient/item (3).

Prevalence of lifestyle diseases in India

Erratic eating patterns and sedentary lifestyle have largely remained the major causes of obesity and lifestyle diseases like diabetes and hypertension. In India, diabetes and hypertension double the risk of mortality due to its complications like ischemic heart disease, stroke, peripheral vascular disease, etc. With rising prevalence of these diseases, there is an increasing burden of chronic kidney disease (CKD) too (4).With the growing ease in accessibility to packaged foods, consumers lack an understanding in food selection.

Although the current regulations mandate that food labels contain the values of carbohydrate, protein and fats which are major contributors of energy; food manufacturing companies are not mandated to display nutrients with renal implications like dietary sodium, potassium, calcium, phosphorus, fiber, etc. As these nutrients play a major role in management of lifestyle diseases, their presence on the nutrition composition tables holds a significant relevance.

The main aim of the study was to assess

whether the current food labeling system is adequate in incorporating nutrients with obesity, diabetic, hypertensive and renal implications. The secondary aim was to propose options for upgrading current food labeling system for making appropriate food choices.

Methods:

Information on nutrition composition of various food productslike cereals, milk and milk products, instant gravy mixes, confectionaries and desserts, etc was collected. Based on the sources of nutrients present in the food items, their nutrition tables were evaluated for nutrients like dietary sodium, potassium, calcium, phosphorus, fiber,vitamin D and food additives.Food items were considered as "adequate"in above mentioned diseased population if their nutrition tables contained all the necessary nutrients along with their values. Those which did not have these nutrients listed were considered "inadequate". We also conducted a survey on patients with obesity, diabetes, hypertension, CKD stage 4 (conservative management) and CKD stage 5 (on hemodialysis)to assess their experience in understanding nutrition tables, challenges in interpreting them and options for upgrading them so as to make them user friendly.

Results:

We gathered nutrition information from 19 food categories including breads, biscuits, milk, curd, paneer, cheese, cream, butter, ice creams, chocolates, instant gravies, farsan, jams, pickles, papads, sauces, soup mixes, chocolates, cold drinks and fruit juices. In all, food labels of 177 products were evaluated as given in table 1.

We studied 177 food labels for nutrients linked with obesity and diabetes (dietary fibre), hypertension (dietary sodium and potassium) and kidney disease (dietary sodium, potassium, calcium, phosphorus, vitamin D, food additives).

Table 1 shows that there is no uniformity in reporting the nutrition information even amongst food products belonging to same categories but different manufacturing companies. For example; in case of cheese, there is no uniformity in reporting the nutrition information as16 variants of cheese have reported their dietary calcium content while 4 have not.

Dietary fiber

Dietary fiber has been associated with a number of diseases including obesity, hypertension, diabetes, breast and colon cancer, etc. Although packed food sources are inferior sources of fiber as compared to fresh food items, it is vital to have the knowledge of dietary fiber contribution by any packed food item. In our study, we found dietary fiber reporting on food labels was as low as 15.8% which includes fiber accounted from breads, biscuits, gravies only. Milk and milk products, cold drinks, juices and other packed items have been

excluded as they are poor sources of fiber.

Dietary sodium

Dietary sodium is the major contributor to hypertension and is known to increase cardiovascular mortality. Limiting dietary sodium is the key therapeutic regime for nutritional management of a number of diseases including renal stones, gout, proteinuria, hypertension, cardiac and renal diseases. In our study, we found moderate to poor reporting of dietary sodium in all packed food items. The overall reporting of dietary sodium on food labels was just 5.5%, 7.4% and 77.7% in breads, biscuits and chocolates respectively. From bakery and confectionary products which are known to have higher amount of sodium to instant gravy mixes (33.3%), the overall sodium reporting has been lacking considerably.

Dietary potassium

Dietary potassium is a key ingredient in dietary management of hypertension as well as kidney diseases. The American Heart Association (AHA) recommends limiting dietary sodium for management of hypertension. The KDOQI guidelines suggest limiting dietary sodium to 2-4 grams for patients with kidney disease and severe restriction for those undergoing hemodialysis.Amongst all packed foods, instant gravies, soup mixes, packed fruit juices, cold drinks, chocolates, jams and sauces can be considered as major contributors of potassium. However, the overall reporting was 0% in instant gravies, soup mixes, cold drinks and chocolates. While it was 37.5% in packed fruit juices,18.1% in jams and 16.6% in sauces.

Dietary calcium and phosphorus

Dietary calcium plays a key role in bone and teeth health along with dietary phosphorus. While deficiency of calcium is related to osteoporosis; especially seen in women, the role of this mineral is not only limited to bone health. It also has renal implications, for example a low calcium diet can lead to calcium oxalate stones. The major contributors of dietary calcium include milk and milk products. In our study, we found dietary calcium was reported in 28.8% food products with highest level of reporting found in cheese (80%), milk (76.1%) and curd (66.6%).

Dietary phosphorusrestriction is recommended from early stages of CKD in order to avoid Mineral Bone Disorders (MBD)which can further lead to predisposition of vascular calcification. The current KDIGO nutrition guidelines suggest limiting dietary phosphorus to <800mg/day to reduce CVD mortality. All packed foods contain inorganic phosphorus in the form of food additives which need to be accounted for as inorganic phosphorus is >90% absorbed by the gut. Due to its higher absorption it is a potent elevator of serum phosphorus

in patients with CKD. In our study, we found that overall dietary phosphorus was reported in only 5% food items.

Vitamin D

Natural plant based foods are poor sources of vitamin D while animal sources like milk, curds, cheese are good sources. Food fortification is an important source of vitamin D in packed food items. The prevalence of vitamin D deficiency in Indian healthy population ranges between 40-85%. Deficiency of vitamin D has been linked to a number of diseased conditions including cardiac diseases. Hence, reporting of vitamin D; in case of fortification is extremely essential. In our study, we found vitamin D was reported in 14.2% in milk packs, 33.3% in curds and 10% in cheese packs.

Food additives

Researches highlight that food additives are contributors of sodium, potassium and inorganic phosphorus.In our study, the overall reporting of food additives was 36.7%. Whether these food additives contribute to sodium, potassium, phosphorus is unclear.

Our observations from 177 food labels suggest that none of the food items currently marketed hold the food labels which can be considered "adequate" for marketing.

Out of 82 patients, 19(23.1%) subjects had obesity, 15 (18.2%) had diabetes, 17 (20.7%) had hypertension, 18 (21.9%) had CKD stage 4 and 13 (15.8%) had CKD stage 5 and were on chronic hemodialysis. From this survey, it was found that 24.3% patients buy packed foods once in 2-3 days, 69.7% once in a week and 10.4% patients buy packed foods every 8-10 days. While purchasing these foods, it was observed that 16.5% patients do not read the food labels. 56% patients reported that they do not read the ingredients listed and 89% patients reported that they could not interpret the nutrition composition tables. 91.5% patients reported they wish to have simpler icons for different disease conditions for making appropriate food choices.

Discussion:

There is no international consensus on the need for a consistent nutrition information profilefor packed food labels(5). Whether the packaged food supplies are able to cater healthy nutritional food remains a question (6). In a study conducted by Alexandra J et al in 2017, the overall mean healthiness of 1450 food products sources from 19 Indian food manufacturing companies was low. They reported that while most of the companies reported the basic nutrients as per the guidelines by FSSAI; but ingredients with disease implications like dietary sodium remained absent (7). In our study, we found moderate to poor reporting of dietary sodium in all packed food items, ranging from 5.5% in breads to 77.7 % in chocolates.

In a study conducted by Johnson C et al

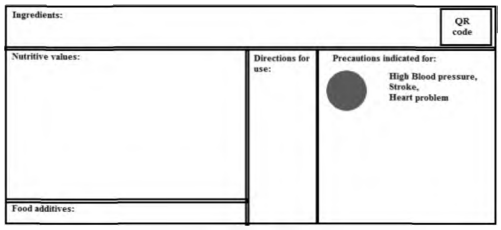
in 2017, which was aimed at examining the sodium levels in packed food items, it was reported that several packed foods contains higher levels of dietary sodium rendering a major concern for the disease burden caused due to it (8).

In a study conducted by Vemula SR et al in 2014, it was reported in 1832 subjects that about 45% consumers bought packaged foods at least once a week and taste, quality, convenience and ease of use were the main reasons for buying these packed foods. Although 90% of their patients from all age groups reported reading the food labels but majority from them read only to check labels for date of expiry and signs for vegetarian and non-vegetarian content. Of those who read these food labels, only 30.3% reported checking the nutrition information and remaining 69.7% did not check the nutrition information as it was too technical to understand (9). Our study reports similar findings that as the nutrition information tables were difficult to interpret and hence 91.5% reported the need for simpler icons to make correct food choices.

In a review conducted by Temple NJ et al in 2014 in US and Canada, it was suggested that both Front of Page (FOP) and Back of Page (BOP) are ineffective in helping the consumers make correct food choices and there was a need for better redesigning them. They suggested the use of traffic light system for creating an ease in selection (2,10).

In our study, we recommend similar designing system in addition to building a digitalized information network. Through the digitalized information network, detailed nutrition information can be made accessible to the consumers. For interpreting this nutrition information, use of simple icons can help make correct food choices. For example, a packed biscuit should contain a bar code on its label. On scanning the bar code, the consumer should be able to view it comprehensive nutrition composition table containing sodium, potassium, fiber (soluble and insoluble), calcium, phosphorus, vitamins and other minerals. Use of simple icons for easy interpretation like traffic light system can prove to be beneficial. Making correct food choices can thereby prevent nutritional challenges and help gain positive outcomes.

Figure 1: Representative image for nutrition information on BOP of food labels:



Basic knowledge of nutrition precedes dietary pattern in terms of food selection. Hence, ideally imparting basic knowledge on interpretation of food labels and icons may prove to be beneficial in our patient population (1). This activity can be conducted through posting educative images on social media sites and on government websites. All food manufacturing companies must be mandated to conduct this educative campaign.

Conclusion:

The current food labeling system is inadequate in addressing the requirements for chronic diseases. With the ever increasing dependability on packed food items, it is essential to have food labels which provide knowledge about macro and micro nutrients as they enormously affect the health profile of consumers. The current inadequacies can lead to wrong food choices and therefore worsening of diseases. We propose the need for upgrading food labeling system in order to help consumers make healthier food choices. We propose the need for educative drives and campaigns to enable consumers select food items wisely. Use of simple icons can help in gaining positive outcomes.

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Table 1: Dietary values reported on food packets of various food items.

Food category	No of variants assessed	Dietary sodium	Dietary potassium	Dietary calcium	Dietary phosphorus	Dietary fiber	Vitamin D	Food additives
Breads	18	1/18	0/18	6/18	0/18	0/18	NA,NS	7/18
Biscuits	27	2/27	0/27	3/27	0/27	4/27	NA,NS	10/27
Milk	21	1/21	0/21	16/21	1/21	NA,NS	3/21	7/18
Curd	3	1/3	0/3	2/3	1/3	NA, NS	1/3	0/3
Cheese	20	19/20	0/20	16/20	3/20	NA, NS	2/20	2/20
Paneer	1	0/1	0/1	1/1	0/1	NA, NS	0/1	1/1
Butter	5	1/5	NA, NS	NA, NS	0/5	NA, NS	NA, NS	1/5
Cream	4	1/4	0/4	1/4	0/4	NA, NS	0/4	0/4
Instant gravies	6	2/6	0/6	3/6	3/6	0/6	NA, NS	5/6
Ice creams	10	1/10	0/10	1/10	1/10	NA, NS	0/10	2/10
Chocolates	9	7/9	0/9	0/10	0/10	3/9	NA	1/9
Soup mixes	3	3/3	0/3	0/3	0/3	3/3	0/3	0/3
Cold drinks	10	2/10	0/10	1/10	0/10	NA, NS	NA	3/10
Pickles	8	5/8	1/8	1/8	0/8	0/8	NA, NS	5/8
Jams	11	10/11	2/11	0/11	0/11	0/11	NA, NS	10/11
Sauces	6	6/6	1/6	0/6	0/6	0/6	NA, NS	4/6
Fruit juices	8	3/8	3/8	0/8	0/8	0/8	0/8	5/8
Papads	7	2/7	0/7	0/7	0/7	0/7	NA	2/7

NA: Not available NS: Not significant