Original Article

The presence and accuracy of nutritional labelling of pre-packaged foods in Shanghai

Kaimeng Kong MD[1,2], Fu Liu MD[3], Yexuan Tao PhD, MD[1,2]

[1]*Department of Clinical Nutrition, Xinhua Hospital, Shanghai Jiao Tong University, School of Medicine, Shanghai, China*
[2]*Shanghai Key Laboratory of Pediatric Gastroenterology and Nutrition, Shanghai, China*
[3]*Department of Food Science and Technology, Shanghai Jiao Tong University, Shanghai, China*

Background and Objectives: The Chinese government officially enacted the Regulation on the Management of Food Nutrition Labelling in 2007 and the General Rules for Nutrition Labelling of Pre-packaged Foods in 2011. Our investigation examined the presence and accuracy of nutrition labelling of pre-packaged foods in Shanghai and provides baseline data for future studies. **Methods and Study Design:** Nutrition labels on pre-packaged foods were recorded by photograph, transcription, or purchase in four supermarkets in Shanghai. We compared the observed labelling rate with results from a survey conducted in 2008. To assess labelling accuracy, we sent randomly selected foods to an analytical laboratory to test food energy and nutrient content. **Results:** The overall labelling rate was 54.8%, representing a great improvement over the rate measured prior to implementation of the Regulation (35.4%). The labelling rate for energy content and core nutrients were all above 98%, whereas the rates for saturated fat, trans-fatty acids, and iron were 11.5%, 7.0%, and 10.7%, respectively. Pre-packaged foods manufactured by domestic Chinese companies were labelled less frequently (45.8%) than foods manufactured by companies from Taiwan/Hong Kong (67.0%) or overseas (65.7%). The accuracy of carbohydrate content on labels was as high as 100%, while the accuracy of protein and fat content were 94.4% and 96.0%, respectively. **Conclusion:** Pre-packaged food manufacturers and government agencies should collaborate to improve the management of nutrition labelling. Mandatory regulations may be the best way to ensure that nutrition labelling facilitates informed consumer decision-making.

Key Words: nutrition labels, nutrient function claims, nutrition claims, trans-fatty acids, regulations

INTRODUCTION

With a burgeoning interest in the dietary behaviours associated with diseases such as obesity,[1] type-2 diabetes mellitus,[2] and hypertension,[3] consumers are attaching more and more importance to nutrition labels because these are the most direct source of information on food nutritional content. In one study, 67% of Chinese residents changed their purchasing decisions because of the nutrition information on food labels.[4] This suggests that nutrition labelling helps consumers make informed decisions about their diet.

The Guidelines on Nutrition Labelling CAC/GL 2-1985 (Rev. 1 - 1993), formulated by the Codex Committee on Food Labelling, defined nutrition labelling as "a description to inform consumers of the nutritional properties of foods".[5] There are usually two components of nutrition labelling: a standardised nutrition information panel (standardised graphics listing the food's energy and nutrient content) and supplementary nutrition information (text indicating or implying the nutritional properties of a food). In China, nutrition labelling is usually divided into three categories: nutrition information, nutrition claims, and nutrient function claims.[6,7]

Nutrition labelling not only helps individuals to make wise choices when purchasing foods,[8,9] but it also influences manufacturers to protect the interests of consumers. Therefore, it is timely that the government should establish mandatory regulations and legislation to ensure nutrition labelling is implemented and to increase the reliability of nutrition labelling. Nutrition labelling has received much attention in several countries. The European Union (EU) promulgated the Council Directive on nutrition labelling for foodstuffs (Directive 90/496/EEC) in 1990,[10,11] which guided legislation and regulations in other countries. In the USA, the Nutrition Labeling and Education Act of 1990 mandated that pre-packaged foods should carry nutrition labels, except for foods intended for immediate consumption.[12] In 2011, the Chinese government successively promulgated the General Standard for the Labelling of Foods (GB 7718), Labelling of Foods

Corresponding Author: Dr Yexuan Tao, Department of Clinical Nutrition, Xinhua Hospital, Shanghai Jiao Tong University, School of Medicine; Shanghai Key Laboratory of Pediatric Gastroenterology and Nutrition, No. 1665, Kongjiang Road, Yangpu District, Shanghai, China.
Tel: Tel: +86-13818334664; Fax: 021-25078922
Email: taoyx@163.com
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for Special Nutrients (GB 13432), and the General Rules for Nutrition Labelling of Pre-packaged Foods (GB 7718-2004), all of which recommended nutrition labelling on pre-packaged foods. In November 2011, the Chinese Ministry of Health enacted the General Rules for Nutrition Labelling of Repackaged foods (GB 7718-2011), which was the first mandatory legislation on nutritional labelling. The General Rules, which were implemented on January 1, 2013, mandated nutrition labels for pre-packaged foods that listed energy, protein, fat, carbohydrate, and sodium content, as well as their percentage nutrient reference value (NRV).

Our study was performed during a transition period before the formal implementation of GB 7718-2011 and after the Regulation on the Management of Food Nutrition Labelling was effective. Therefore, the findings of our survey estimated the prevalence and accuracy of nutrition labelling of pre-packaged foods in Shanghai and provided baseline data for future investigation of the impact of GB 7718-2011.

MATERIALS AND METHODS

Presence of nutrition labelling

Our experiment was conducted in Shanghai, China, between September 2012 and November 2012. At that time, pre-packaged foods accounted for 70% of all products on sale at supermarkets.[13] To expand the scope of investigation into pre-packaged food, we carried out our survey in four randomly selected supermarkets: Carrefour Supermarket (Hongkou Road, Shanghai), Auchan Supermarket (Changyang Road, Shanghai), Tesco Supermarket (Xinsong Road, Shanghai), and NGS Supermarket (Anshan Road, Shanghai).

Following the method of the Food Label and Package Survey (FLAPS),[14,15] we gathered nutrition information from pre-packaged foods by photographing or transcribing labels with the supermarkets' permission. To directly corroborate the nutritional information, we also purchased some foods and submitted these for chemical analysis. We constructed an evaluation table consisting of two sections to summarise our results. One section concerned general label content: name and category of the product, manufacturer location (Hong Kong/Taiwan, Chinese mainland, or overseas), net content, and list of ingredients. The other section contained the nutrition label content: nutrition information panels, nutrition claim, and nutrient function claims. Products were organised into seven categories as per the China Food Composition:[16] beverages, cereals, fish and meat products, snacks, bean products, frozen foods, and condiments.

Rates of nutrition labelling

We examined all of the pre-packaged foods surveyed and determined whether the labels were standardised according to the General Rules for the Labelling of Pre-packaged Foods (GB 7718-2011) and the Standard for the Use of Nutritional Fortifiers (GB 14880-2012).[17] Two criteria were considered: (1) whether the food label listed at least one item under nutrition information, nutrition claims (description of the product's nutritional characteristics), or nutrient function claims (claims that a nutrient affects growth, development or physiological functions); and (2) whether the label was compliant with GB7718-2011.

Accuracy of nutrition information

To assess the accuracy of the nutritional information on labels, we numbered the products and randomly selected 200 using a random numbers table. Of these, 125 were found to have nutritional labels and were subsequently sent for laboratory analysis of their energy, protein, fat, and carbohydrate content. All measurements were conducted at the Instrumental Analysis Center at Shanghai Jiao Tong, which is nationally accredited. As required by GB28050-2011, actual nutrient content during the guarantee period should be ≥80% of the labelled value for protein and carbohydrate, and ≤120% for fat content. More than 70% of products labelled as containing trans-fat acids were randomly selected and tested for their actual trans-fatty acid content.

Statistical analysis

We used EpiData 3.0 to record data and SPSS (version 20.0) to compare pre and post GB28050-2011 labelled values with t-tests and rank-sum tests. All statistics were performed using a 2-sided test and a p-value <0.01 was considered statistically significant.

RESULTS

Labelling rate of pre-packaged foods

The overall labelling rate was 54.8% among the 1995 products we sampled. Snacks, beverages, and frozen foods constituted the majority of the products sampled (Table 1). We found the labelling rate of all products, fish and meat products, and snacks to be significantly higher than in the previous study conducted between December

Table 1. Comparison of current and previous labelling rates of pre-packaged foods

Categories	Current study (2012–2013)			Previous study (2007–2008)			p-value
	Sample	Labelling frequency	Labelling rate (%)	Sample	Labelling frequency	Labelling rate (%)	
Beverages	416	304	73.1	36	21	58.3	0.059
Cereals	25	4	16	176	59	33.5	0.077
Fish and meat products	53	16	30.2	140	14	10	0.001
Snacks	918	591	64.4	307	63	20.5	<0.001
Bean products	17	4	23.5	16	12	75	0.003
Frozen foods	358	129	36.0	†	†	†	†
Condiments	208	46	22.1	†	†	†	†

†The item was not recorded.

Table 2. Labelling rates and GB 7718-2011 compliance by nutrient

Nutrient	Labelling frequency	Labelling rate (%)	GB7718-2011 compliant	
			Frequency	Rate (%)
Energy	1086	99.3	1086	100.0
Carbohydrate	1090	99.6	1090	100.0
Protein	1090	99.6	1081	99.2
Fat	1085	99.2	1078	99.4
Sodium	1076	98.4	1074	99.8
"1+4"†	1070	97.8	1065	99.5
Dietary fibre	148	13.5	144	97.3
Calcium	217	19.9	217	100.0
Iron	117	10.7	117	100.0
Other minerals	102	9.3	‡	‡
Saturated fatty acids	126	11.5	123	97.6
Trans-fatty acids	77	7.0	68	88.3
Vitamins	283	25.9	‡	‡

†"1+4" refers to energy plus the four core nutrients (protein, fat, carbohydrate, and sodium).
‡The item did not provide adequate information.

Table 3. Nutrition labelling rates by food categories and product origin

Categories	Hong Kong/Taiwan		International		Mainland		*p*-value
	Samples	Labelling rate (%)	Samples	Labelling rate (%)	Samples	Labelling rate (%)	
Beverages	34	67.6	199	75.4	183	71.6	0.535
Cereals	0	N/A	0	N/A	25	16.0	N/A
Fish and meat products	5	0.0	0	N/A	48	33.3	0.122
Snacks	81	65.4	391	71.6	446	57.8	<0.001
Bean products	1	0.0	0	N/A	16	25.0	0.567
Frozen foods	60	78.3	52	11.5	246	30.9	<0.001
Condiments	13	53.8	57	40.4	138	11.6	<0.001

2007 and February 2008.[18] By contrast, the labelling rate of bean products decreased from 75% to 23.5% (p=0.003). The labelling rate of beverages and cereals did not change significantly (Table 1).

Of the 1095 pre-packaged products with nutrition labels, 1065 were labelled with energy, protein, fat, carbohydrate, and sodium content, and 99.5% of them met the requirements of GB7718-2011. The labelling rates of carbohydrate and protein content were both 99.6%, which was higher than other nutrients. When we assessed whether the nutrition labels complied with GB7718-2011, and found that the labelling of energy content, carbohydrate, calcium and iron was wholly compliant. Conversely, the compliance of trans-fatty acid labelling was the lowest of all nutrients (Table 2). Overall, 57.4% of the labelled products reported the energy or nutrient content per 100 grams or 100 mL, whereas the remainder were labelled per serving. Most products originated from overseas (55.2%), followed by the Chinese mainland (35.0%), and Hong Kong/Taiwan (9.7%). Labelling rates were lowest for products from the Chinese mainland. There was no difference between the labelling rates of products from Hong Kong/Taiwan and those from overseas (p>0.01). Labelling rates for snacks, frozen foods, and condiments varied significantly by source, but they did not for the other food categories (Table 3).

Ninety-two pre-packaged foods were labelled with nutrition claims. These included sugar (23.0%), zero fat (21%), calcium and mineral content (18%), zero energy (13%), zero cholesterol (8%), low salt (7%), and others (10%).

Accuracy of nutrition information

Laboratory testing verified that the label accuracy of carbohydrate content was as high as 100%, while the accuracies of protein and fat content were 94.4% and 96.0%, respectively. Although the test values of protein content were not always over 80% of the labelled value, all products exceeded 70%. Test values of fat content were sometimes more than 120% of the labelled value, but not higher than 125%. The accuracy of the protein content reported on 67 snacks (95.5%) was higher than that reported for 35 beverages (91.4%).Accuracy of protein content was also higher than that of fat content (97.6% vs. 94.3%). There were 20 Hong Kong/Taiwan brands, 37 overseas brands, and 68 Chinese mainland brands among the selected 125 pre-packaged foods. There were no statistical differences in the accuracy of protein content among the Hong Kong/Taiwan, overseas, and Chinese mainland brands (95.0%, 94.6% and 94.1%, respectively). The same was true for fat content. All foods with nutrition labels values of "zero", including trans-fatty acids, had test values that were less than 300 mg/100g, for an accuracy of 100%.

DISCUSSION

The USA was the first country to implement a system of food nutrition labelling, with special regulations for pre-packaged foods, trans-fatty acids, allergens, genetically modified foods, and others.[19-23] Compared with systems in other countries, the US food system not only attached enough importance to nutrition labels on processed and pre-packaged foods, including information about un-

healthy nutrients, but also menu labelling in chain restaurants. American style nutritional labelling schemes were developed via a process of enrichment and gradual improvement, which could serve as an example for China. The US Food and Drug Administration evaluated the health benefits of the Nutrition Labelling and the Education Act of 1990 over the first 20 years of its implementation. The total cost was nearly $1.5 billion USD, which covered program management, ingredient testing, printing, and inventory. The total benefit, however, was estimated to be nearly $4.2 billion USD. This was based on reductions of 35,179 cases of cancer and 4,024 cases of coronary heart disease. This highlights that relatively small changes in energy and nutrient intake can generate large public health benefits.[24]

Compared with our 2008 survey,[18] labelling rates have increased for fish and meat products, snacks, and overall. This confirms the positive impact of the GB7718-2011, which was enacted in 2011, but will not be officially implemented before 2013. Improvements may be warranted, however, because the labelling rate of foods from China remained significantly lower than for foods from Hong Kong/Taiwan or overseas.

Consumer demand for food labels was a key factor in the implementation of nutrition labels. A large-scale investigation of eight cities showed that 77.5% of consumers considered nutrition information on pre-packaged food to be essential, but only 6.6% could define a nutrition label.[25]This reflects basic lack of knowledge about nutrition labels; thus, nutrition educators should participate in popularizing nutrition labels. Another survey indicated that 46.8% of consumers did not trust nutrition labels and that only 2.1% were very satisfied with existing labels.[26] Commercial enterprises also play an important role in the full implementation of nutrition labelling. In 2006, Coca-Cola Company, Danone, Kraft Foods Inc., Nestle, Pepsi Co., Unilever, and Key Logic Group issued a joint statement declaring they would provide nutrition information on their food products sold in Europe,[27] which has influenced other enterprises to do the same. Most large-scale enterprises in China are willing to provide nutrition labels, because these companies frequently export their products to other countries with strict nutrition labelling regulations. Moreover, several enterprises have advocated for standardised nutrition label requirements to reduce the costs of advertising and increase sales.[26] However, smaller manufacturers have been reluctant to implement nutrition labelling because of the associated costs. According to our 2008 study, the labelling rates of Hong Kong/Taiwan products (13.6%) were lower than Chinese mainland products (31.6%).[18] Now, however, the labelling rate of Hong Kong/Taiwan products is significantly higher. These changes may be caused by the implementation of mandatory nutrition labelling in Taiwan in 2008 and in Hong Kong in 2010.

Importantly, we found that the labelling rate of trans-fatty acids was as low as 7.0%, although trans-fatty acids are considered detrimental.[28] The General Rules state that trans-fatty acids must be listed in the nutrition information panel if the ingredients contain hydrogenated fat and/or partially hydrogenated fat, or if these are used in the production process. Clearly, this requirement is often not followed. For instance, we found 64 kinds of tea and coffee drinks that contained creamer, but only 12 of these reported the trans-fatty acid content. Given the notoriety of trans-fatty acids, companies may be reluctant to label the trans-fatty acid content of their foods to avoid declines in sales. On June 16, 2015, the U.S. Food and Drug Administration announced that the use of artificial trans-fatty acids in food would be gradually eliminated over the coming 3 years to reduce the incidence of heart disease. Several critics considered that it is unlikely that the Chinese government will issue a similar policy statement,[29] because trans-fatty acids account for only a fraction (0.16%) of total energy intake in Chinese residents,[30] Moreover, this intake is far lower than that seen in western developed countries and below the recommended limit (1%) recommended by the WHO. However, trans-fatty acid content labelling is necessary to inform consumers when making a purchase. It would allow them to decide whether or not to purchase a product whose trans-fatty acids content might have a negative impact on their health status, particularly if they have diseases, such as atherosclerosis, that may be aggravated by the consumption of trans-fatty acids. With the westernization of dietary habits, we believe that trans-fatty acid consumption will increase and begin to adversely affect the health of the Chinese population. Trans-fatty acid consumption should be tested annually to determine whether mandatory regulations need to be implemented to introduce trans-fatty acid food labeling.

We found that several alleged protein-containing beverages posed potential health risks. Many protein beverages are nutrient-poor and obesogenic, and contain large amounts of sugar and additives, providing more energy but fewer nutrients than milk. In our survey, we found that 95 beverages with complete and standardised nutrition information panels had protein levels of 1.3±0.6 g/100 mL, which was significantly lower (p<0.001) than the lower limit for pure milk (2.9%), as specified by a new national standard. The average carbohydrate content was as high as 8.48 g/100 mL (SD=4.047 g/100 mL), approaching that of beverages with high sugar content, such as sodas. In 1998, the average drinks consumption of beverages by children was 329.1 mL/day. This increased to 528.8 mL/day in 2008. [31] Previous studies have shown that increases in soft drink intake are closely associated with increases in body weight and risk for chronic diseases, such as diabetes.[32]

Nutrition labelling on pre-packaged foods could be improved if several issues were resolved. First, most enterprises labelled the mandatory “1+4” core nutrients, but the labelling rate of alternative nutrients, such as iron, calcium, and zinc, was very low. For example, the labelling rates of trans-fatty acids and saturated fatty acids were 7% and 11.5%, respectively, compared with 97.8% for core nutrients. Second, not enough importance is attached to nutrition claims, which were found on only 4.6% of pre-packaged products. Third, the rounding interval of nutrient amounts usually did not accord with the legal requirement. Although GB7718-2011 clearly stipulates how to produce labels, several companies were lax in their labelling. For example, “energy: 100 kcal” should be expressed as “energy: 418 kJ”, and nutrient contents

should be labelled with specific values instead of terms "≥XX", "XX-XXX", or "X%". According to the regulations, nutrition claims cannot be made if a product does not contain a specific amount of nutrient. Nevertheless, we found nutrition claims presented as simply "high calcium, low fat, or high protein". One investigation found that many consumers are skeptical of nutrition claims and nutrient function claims. [25] We attributed this to frequent adverse events caused by foods, which are mainly caused by a lack of regulatory oversight. However, we believe nutrition and nutrient function claims will assisting help individuals to make wiser purchasing decisions choices when purchasing foods, when the format of nutrition label was format is standardised.

Our study shows that the nutrition labelling rate of pre-packaged foods in supermarkets in China was only 57.8% and that label formats were not standardised. Thus, the government should attach more importance to the implementation of nutrition labelling, especially as it was the government who played an important role in improving peoples' trust in nutrition labels and in ensuring industry compliance. On the one hand, to increase the availability of nutrition labels, the government, in collaboration with nutrition educators, should devote more effort in communicating the benefits and reliability of nutrition labels through nutrition education. On the other hand, regulatory authorities in China should offer technical guidance to food enterprises, which should include establishing a nutrition database, developing labelling guidelines, providing technical training, and forming partnerships with key players in the food industry.[33] We believe that the joint efforts of government, consumers and commercial enterprises would make a difference in increasing the popularity and application of nutrition labels of pre-packaged foods in China.

Our findings are the most recent estimates of nutrition labelling on pre-packaged foods before the implementation of GB7718-2011 in 2013, providing reference data for estimating the impact of the new regulations in future studies.

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REFERENCES

1. Rautiainen S, Wang L, Lee IM, Manson JE, Buring JE, Sesso HD. Higher intake of fruit, but not vegetables or fiber, at baseline is associated with lower risk of becoming overweight or obese in middle-aged and older women of normal BMI at baseline. J Nutr. 2015;145:960-8. doi: 10.3945/jn.114.199158.
2. Fischetti N. Correlates among perceived risk for type 2 diabetes mellitus, physical activity, and dietary intake in adolescents. Pediatr Nurs. 2015;41:126-31.
3. Huhn S, Kharabian Masouleh S, Stumvoll M, Villringer A, Witte AV. Components of a Mediterranean diet and their impact on cognitive functions in aging. Front Aging Neurosci. 2015;7:132. doi: 10.3389/fnagi.2015.00132.eCollection2015.
4. Chen WP, Niu MC. The consumer's use and its determinants of nutritional food label. Journal of the Renmin University of China. 2009;4:105-113. doi: 10.13982/j.mfst.1673-9078.2011.05.005. (In Chinese)
5. Codex Alimentarius Commission, Joint FAO/WHO Food Standards Programme. Guidelines on Nutrition Labelling. CAC/GL 2-1985 (Rev. 1 - 1993) 1985 [cited 2016/1/8]; Available from: http://www.fao.org/docrep/005/y2770e/y2770e06.htm#fn17.
6. Comprehensive Coordination of Food Safety and Health Supervision Bureau of Ministry of Health of the People's Republic of China (MOH). The Interpretation of Regulations on foods Nutrition Labelling Management. China: People's Medical Publishing House; 2009.
7. The Ministry of Health of the People's Republic of China (MOH). The General Rules for Nutrition Labelling of Pre-packaged foods (GB28050-2011). 2011/10/12 [cited 2016/1/8]; Available from: http://www.spsp.gov.cn/Data Center/Standard/PDFView.aspx?ca=i3jN4Bw0sS4=&Token=$Token$&First=First.
8. Campos S, Doxey J, Hammond D. Nutrition labels on pre-packaged foods: a systematic review. Public Health Nutr. 2011;14:1496-506. doi: 10.1017/S1368980010003290.
9. Variyam JN, Cawley J. Nutrition Labels and Obesity. National Bureau of Economic Research. 2006/01 [cited 2016/1/8]; Available from: http://www.nber.org/papers/w11956.pdf.
10. Gorny D. The status of the implementation of the Nutrition and Health Claims Reglution. ERA Forum. 2012;13:103-11. doi: 10.1007/s12027-012-0250-3.
11. Reuterswärd AL. The new EC Regulation on nutrition and health claims on foods. Scand J Food Nutr. 2007:51:100-6. doi: 10.1080/17482970701685625.
12. US foods and Drug Administration. Guide to Nutrition Labelling and Education Act (NLEA) Requirements. Silver Spring, MD: Division of Field Investigations, Office of Regional Operations, Office of Regulatory Affairs, US foods & Drug Administration; 1994.
13. Questions and answers about the management standard of food nutrition labeling. Chinese Journal of Food Hygiene. 2008;20:374-9. (In Chinese)
14. US Food and Drug Administration. Food Label and Package Survey 2000 - 2001. 2015/06/11 [cited 2016/1/8]; Available from: http://www.fda.gov/Food/FoodScienceResearch/ ConsumerBehaviorResearch/ucm122396.htm.
15. Brecher SJ, Bender MM, Wilkening VL, McCabe NM, Anderson EM. Status of nutrition labelling, health claims, and nutrient content claims for processed foods: 1997 Foods Label and Package Survey. J Am Diet Assoc. 2000;100:1057-62. doi: 10.1016/S0002-8223(00)00308-4.
16. National Institute for Nutrition and Health Chinese Center for Disease Control and Prevention. China food composition. Beijing: Peking University Medical Pres; 2009. (In Chinese)
17. Ministry of Public Health. The national food safety standards of food nutrition fortifier use standard. Beijing: China Standards Press; 2012. (In Chinese)
18. Tao Y, Li J, Lo YM, Tang Q, Wang Y. Foods nutrition labelling practice in China. Public Health Nutr. 2011;14:542-50. doi: 10.1017/S1368980010002065.
19. Wei SJ. Current status and countermeasures of food labeling regulations at home and abroad. China Standards Review. 2011;8:15-7. (In Chinese)
20. Alcohol and Tobacco Tax and Trade Bureau. Major food allergen labeling for wines, distilled spirits and malt beverages. Federal Register. 2006;71:422602-70.
21. Bai XN. US State Department approved genetically modified food labeling act. Pesticide Science and Administration. 2014;35:32. (In Chinese)

22. US Food and Drug Administration, Center for Food Safety and Applied Nutrition. Allergen Labelling and Consumer Protection Act of 2004 (Public Law 108-282, Title II); 2004.
23. Wang Y, Yu YG, Jin H. Comparison of Chinese and American regulations, standards and guidelines for food labels. Journal of Anhui Agricultural Sciences. 2013;19:8295-7. doi: 10.3969/j.issn.0517-6611.2013.19.080. (In Chinese)
24. Zarkin GA, Dean N, Mauskopf JA, Williams R. Potential health benefits of nutrition label changes. Am J Public Health. 1993;83:717-24. doi: 10.2105/AJPH.83.5.717.
25. Xu AP. Study on the status and consumers and food sellers' cognitive of nutrition labelling. Beijing: Peking Union Medical College; 2009. (In Chinese)
26. Zhang J. Study on the consumers' cognitive ability of nutrition labels in Taiyuan city and the compliance of food production enterprises in nutrition labeling in Shanxi province. Shangxi: Shangxi Medical University; 2012. (In Chinese)
27. Xu X. Regulations and application of domestic and international nutrition labelling-development and present situation of nutrition labelling regulations in different countries. China Foods Industry. 2007;5:10-2. doi: 10.1108/eb059110. (In Chinese)
28. Yang H, Li N. Safety problems and management of trans fatty acids. Journal of Chinese Institute of foods Science and Technology. 2010;10:8-13. doi: 1009-7848(2010)04-0008-06. (In Chinese)
29. Shen HP. How does China to supervise trans-fat acids. China Food Safety. 2015;22:60-1. doi: 10.16043/j.cnki.cfs.2015.22.033. (In Chinese)
30. China National Center for Food Safety Risk Assessment. Dietary intake of trans fatty acids in Chinese population and its risk assessment. 2013/06/27 [cited 2015/12/14]; Available from:http://www.cfsa.net.cn/Article/News.aspx?id=57BDA291C511BD8EA59546A6CDFAE1F724055CDF525A9AE57E2948C42FFB94F5C6423B2FC2E414C3.
31. Hu XQ. Status quo of Chinese students' beverage intake. Symposium--Beverage Consumption and Health; 2010 October 10; Beijing, China. (In Chinese)
32. Vartanian LR, Schwartz MB, Brownell KD. Effects of soft drink consumption on nutrition and health: a systematic review and meta-analysis. Am J Public Health. 2007;97:667-75. doi: 10.2105/AJPH.2005.083782.
33. Xu R, Guo LY, Li JH, Wang MJ, Wand ZG. Development of nutrition labeling management in China. Food and Nutrition in China. 2013;19:5-8. doi: 10.3969/j.issn.1006-9577.2013.09.001. (In Chinese)