



Completeness of nutrient declarations and the average nutritional composition of pre-packaged foods in Beijing, China

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ABSTRACT

Increasing consumption of pre-packaged foods is likely an important driver of diet-related diseases in China. From January 2013 it became mandatory to provide a standardised nutrient declaration on pre-packaged foods in China. We collected data on pre-packaged foods from large chain supermarkets in Beijing in 2013, examined the completeness of the nutrient declaration of core required nutrients and summarised the average nutritional composition of 14 different major food groups. We also illustrated the potential use of the data by comparing sodium levels. Photos of 14,279 pre-packaged foods were collected from 16 chain supermarkets in Beijing. Data for 11,489 products were included in the evaluation of nutrient declarations and data for 10,048 in the summary analysis of average nutritional composition. Compliant nutrient declarations were displayed by 87% of products with 88% of foods displaying data for each of energy, protein, total fat, carbohydrate and sodium. Nutrients not required by the Chinese regulation were infrequently reported: saturated fat (12%), *trans* fat (17%) and sugars (11%). Mean sodium levels were higher in Chinese products compared to UK products for 8 of 11 major food categories, often markedly so (e.g. 1417 mg/100 g vs. 304 mg/100 g for convenience foods). There has been substantial uptake of the recently introduced Chinese nutrition labelling regulation which should help consumers to choose healthier foods. As the comparison against corresponding data about sodium from the United Kingdom shows, the nutrient data can also be used to identify broader opportunities for improvement of the food supply.

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1. Background

Poor diet is now the world's leading cause of non-communicable diseases (Institute for Health Metrics and Evaluation (IHME), 2013) which cause 80% of deaths in China every year (World Bank, 2011). A diverse range of pre-packaged foods are now widely consumed in China due to their convenience, accessibility, palatability and affordability (Wang et al., 2012; Foo et al., 2013; Drewnowski, 2004). Unfortunately, many contain high levels of energy, fat, sugar and sodium (Swinburn et al., 2004; Moodie et al., 2013; Monteiro, 2010) and high intakes of these

nutrients are known risk factors for non-communicable diseases (Popkin and Gordon-Larsen, 2004; Popkin et al., 2012).

China is now one of the largest consumers of pre-packaged foods worldwide with sales of pre-packaged foods increased by 55% from 2003 to 2009 (Euromonitor International, 2011) and a three-fold increase in per capita consumption between 1999 and 2012 (Baker and Friel, 2014). This is driving ongoing changes to dietary patterns in China and accompanying adverse health sequelae (Baker and Friel, 2014; Elliott et al., 2014; Case et al., 2007). With dietary patterns shifting towards the consumption of pre-packaged foods there is an urgent need to track the nature of the pre-packaged food supply in China. Several international public health groups are active in this area (Dunford et al., 2012; Food, 2013) using novel tools and approaches to data collection (Dunford et al., 2014).

Rather little is known about the nutritional composition of pre-packaged foods in China and the low prevalence of nutritional labels on pre-packaged foods (Huang et al., 2014) has been one important

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reason for this. CODEX recommends member states mandate the declaration of energy, protein, total fat, saturated fat, carbohydrate, total sugar and sodium (CODEX ALIMENTARIUS, 1985). China enacted a regulation on nutrition labelling of pre-packaged foods in 2011 (National Standards of People's Republic of China, National Food Safety Standard: Standard for nutrition labelling of pre-packaged foods, GB 28050-2011) effective from January 1, 2013, requiring declarations of energy, protein, total fat, carbohydrate and sodium (Ministry of Health of the People's Republic of China, 2011a).

The objectives of this research were to examine the impact of the 2013 nutrition labelling regulation on the completeness of nutrient declarations in China, and to examine the reported nutritional content of packaged foods. Furthermore, to illustrate how these data might be used to benchmark the healthfulness of different countries food supplies, we compared the sodium levels of Chinese foods against similar products in the United Kingdom, which has been targeting the reduction of sodium in processed foods (Food Standards and Agency, n.d.).

2. Materials and methods

Ethics committee approval was not required for this survey of foods.

2.1. Store selection

The retail outlets targeted for this survey were chain supermarkets and convenience stores in Beijing, China. There are no official statistics describing grocery retailers or market share in Beijing so retailers were identified from Internet searches and one particular website (<http://www.dianping.com/search/category/2/20/g187>). The chain stores identified and targeted were Carrefour, Wal-Mart, Tiankelong, Jingkelong, Merry-Mart, Wu-Mart, Beijing Hualian Group (BHG), Metro-mall, Vanguard, Chaoshifa, Beijing Chengxiang Warehouse Supermarket, Huapu, Lotus, Seven Eleven (7-11), Quick, Diyatiantian, Jenny Lou's, Watsons, Yonghui supermarket, Manning, Unimart, Lotte-Mart, Modern Plaza, Shuang'an Plaza, Parkson and Yansha Youyi Shopping Center.

2.2. Data collection and processing

Six university students from Beijing were recruited, trained and provided with a smartphone application for data collection which was done between August and December in 2013. The George Institute Data Collector Application enables smartphone users around the world to scan the barcode of a pre-packaged food and to take and store photos of the food packaging (front of the food package, nutrition information panel and ingredient list) (Food, 2013). Photos were then uploaded to a central content management system for processing.

Each data collector was assigned specific food groups to collect data for and requested to visit any Beijing outlet of the identified retailers. Data collectors were asked to first collect foods that were displayed at mid-level on the shelves of the outlets to make sure the most commonly consumed foods were captured first and then to expand their data collection to the products on the shelves at higher and lower levels.

Data entry of nutritional composition for each product (Table 1) was done by four university students trained to enter data into a bespoke content management system held by The George Institute for Global Health (Dunford et al., 2012). The barcode was used as the unique identifier for each product since usual industry practice is for every stock keeping unit to have a different barcode. Nutritional data entry was checked, and corrected if necessary in the content management system, by a fifth student.

2.3. Categorization of foods

The content management system included a food categorization system developed by the Food Monitoring Group (Aad et al., 2014) that

Table 1
Variables collected and their format.

Variable	Format
Product name	As per product label
Brand name	As per product label
Serves/Pack	As per product label
Serve Size	Grams or millilitres
Energy	Kilojoules/100 g or 100 ml or per serve
Protein	Grams/100 g or 100 ml or per serve
Fat, total	Grams/100 g or 100 ml or per serve
Saturated	Grams/100 g or 100 ml or per serve
Trans	Grams/100 g or 100 ml or per serve
Polyunsaturated	Grams/100 g or 100 ml or per serve
Monounsaturated	Grams/100 g or 100 ml or per serve
Carbohydrate	Grams/100 g or 100 ml or per serve
Sugars	Grams/100 g or 100 ml or per serve
Fibre	Grams/100 g or 100 ml or per serve
Sodium	Milligrams/100 g or 100 ml or per serve
Calcium	Milligrams/100 g or 100 ml or per serve
Gluten	Milligrams/100 g or 100 ml or per serve

places products into 18 major food groups (Supplementary data-Appendix A: bread and bakery products, cereal and cereal products, confectionery, convenience food, dairy and dairy products, edible oils and oil emulsions, eggs, fish and fish product, fruits and vegetables, meat and meat products, non-alcoholic beverages, sauces and spreads, snack foods, sugars, honey and related products, foods for specific dietary use, unable to be categorized, vitamins and supplements, and alcoholic beverages) with option for the addition of further major sub-categories and minor sub-categories within these as might be required for each country. Several additions to the categorization system were made after reviewing the People's Republic of China Standards for Uses of Food Additives: GB2760-2011 (Ministry of Health of the People's Republic of China, 2011b) and on the basis of actual foods collected- sub-categories for soy bean products, edible fungi and algae, canned fruit, candied and preserved fruit were added to the fruit and vegetable group; and sub categories for MSG and chicken essence, and cooking wines were added to the sauces and spreads group. Foods were categorized on the basis of brand name and product name by a Chinese Masters student with a background in food nutrition and a comprehensive understanding of the Chinese food supply. The analyses presented here are at the major food group level which constitutes the same 18 food groups for every country involved in the Food Monitoring Group (Dunford et al., 2012).

2.4. Outcomes

The primary outcome for evaluation of the completeness of nutrient declaration was the presence of all five mandated nutrients (energy, protein, total fat, carbohydrate and sodium). Secondary outcomes were the proportions of products displaying each individual mandated nutrient and three other nutrients important to health but not required by the Chinese regulation (saturated fat, *trans* fat, and total sugars). Mean levels and standard deviation of nutrients were also determined.

Several food types are exempt from mandatory nutrition labelling under the Chinese regulation and were excluded from our analysis – 1) fresh foods like fresh meats, fresh fish, fresh vegetables, fresh fruits and fresh eggs; 2) beverages with more than 0.5% alcohol; 3) foods with package area less than 100 cm² or maximum surface area less than 20 cm²; 4) non-pre-packaged foods sold on site; 5) bottled drinking water; 6) food with recommended daily intake of less than 10 g or 10 ml. It is possible that some foods falling under exclusions 3) and 6) may have been included in the analysis because the data required for evaluation of these characteristics were not available. Finally, the 2013 Chinese regulation does not apply to health products and other foods that have special functions, so foods categorized as foods for

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