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Short Communication

Validity and reproducibility of a food frequency questionnaire among Chinese women in Guangdong province

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Objective: To evaluate the validity and reproducibility of a food frequency questionnaire (FFQ) developed for assessing the association between dietary factors and breast cancer risk among Chinese women in Guangdong. Methods: 61 women (24-64 years) were recruited from the community in Guangzhou city. An 81-item FFQ was administered twice, one year apart (FFQ1, FFQ2). In the mean time, six 3-day dietary records (DRs) were collected at two month intervals within the year. Daily consumption of nutrients and foods from the FFQs and DRs, correlation coefficients between the two FFQs and the FFQ with DRs were calculated. Results: Median intakes of nutrients and food group items are higher in FFQ1 than FFQ2. The energy-adjusted Pearson correlation coefficients between the FFQ1 and FFQ2 ranged from 0.46 to 0.71 for nutrients and 0.36 to 0.66 for food group items, respectively. In the validation study, energy-adjusted correlation coefficients were 0.25 to 0.65 for nutrients and 0.30 to 0.68 for food groups. Mean proportion of subjects being classified into the same quartile of nutrients and foods intake from the FFQ and DRs was 36% and 43%, respectively. Mean misclassification of subjects into opposite quartiles was 5% for nutrients and 3% for foods. Bland-Altman analysis showed that no linear trend existed between the differences and means for nutrients. Conclusions: The 81-item FFQ has satisfactory reproducibility and reasonable validity, and is useful in assessing the usual consumption of major nutrients and food groups among Chinese women in Guangdong.

Key Words: food frequency questionnaire, reproducibility, validity, women, China

INTRODUCTION

The food frequency questionnaire (FFQ) is the most used method for measuring dietary intake in epidemiologic studies.[1] The FFQ describes the habitual dietary intake over a relatively long reference period and is thus more relevant than measurements of short-term intake in the evaluation of study hypotheses. The popularity of the FFQ is also because of the comparatively lower administration cost compared with other methods.

The validity and reproducibility of a FFQ needs to be documented prior to its use, as a null association between dietary intake and health could be due to a lack of variation in dietary exposure in the study population or to the inability of the dietary assessment method to detect existing differences in dietary intakes.[1] The reproducibility of a FFQ is the degree to which a method yields similar results on two different occasions[2] while its validity is the determination of the degree to which it produces a true and accurate assessment of what it intends to measure. Methods used to assess and interpret the validity of FFQs have tended to rely on the correlation analyses of nutrients and/or foods measured by two or more dietary assessment methods.[3] However, the correlation coefficient measures the strength of the relationship between two variables, but not the agreement between them. A relatively new method to assess the validity of FFQs is the application of the Bland–Altman plots,[4] which measures the agreement between dietary assessment methods and provides additional information that cannot be obtained from correlation coefficients.[4,5]

The validity and reproducibility of FFQ has been assessed in a number of studies in China[6-12] and other countries.[13-18] However, because FFQs are culture specific, even within a population they can perform differently among various demographic groups and subcultures. Thus, the validity and reproducibility of a FFQ needs to be evaluated for the specific population of concern. An FFQ was developed to assess the association of dietary factors and breast cancer risk among Chinese women residing in Guangdong. The aim of the present study was to examine the validity and reproducibility of the FFQ in Guangdong Chinese women.

MATERIALS AND METHODS

Subjects

Potential subjects were recruited from the community in Guangzhou city through community advertisements and

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participant referrals. Subjects who met the following criteria were enrolled in the study: female subjects who were natives of Guangdong province or had lived in Guangdong province for at least 5 years, and would not leave Guangzhou City in the following year. Sixty-one subjects were enrolled in the study. In-person interviews were conducted in subjects' home or office to collect information about diet and other information such as occupation, economic condition, smoking, drinking, and reproductive history.

Study design

The research design is outlined in Figure 1. The participants completed the same FFQ twice, one year apart (FFQ1 and FFQ2). The FFQ1 was carried out in June 2007. One month after completing the first FFQ, each participant recorded food intake for three consecutive days. The process of keeping a 3-day diet record (DR) was repeated at intervals of two months to obtain a total of six 3-day DRs. One month after the sixth DR, a second FFQ, identical to the first, was completed. To improve compliance, participants were given a souvenir (worth RMB ￥20) as token appreciation for their effort.

Food frequency questionnaire

The FFQ used in this study was adapted from the Shanghai Women's Health Study (SWHS) which was designed to capture the usual intake of nutrients and major foods from women in urban Shanghai. The SWHS FFQ includes 77 food items and food groups and has previously been validated among women in Shanghai. [8] The food list was revised based on the dietary habits of the Guangdong population so some food items not consumed or infrequently consumed in Guangdong were eliminated. In addition, some commonly consumed foods that were not included in the original questionnaire were added (e.g. papaya, mango, durian and Chinese double-stewed soup). So the final FFQ consisted of 81 food items, grouped under subheadings like cereals (12 food items), soy, beans and nuts (8 items), vegetables (18 items), fruits (12 items), meats (18 items), eggs (2 food items), dairy products (8 items) and drinks (3 items). The food items were organized on the basis of physical composition and cultural use. A commonly used portion size was specified for each food (e.g. slice, glass or unit such as one apple, one banana). For vegetables and animal foods, liang (1 liang = 50 g), a common unit in the study area and familiar to the study subjects, was used to estimate their usual portion size. During the interview, each woman was asked to report their usual frequency of consumption as the number of times per day, per week, per month, per year, or never during the previous year and the average amount of food eaten each time.

Dietary records

The DR was used as a reference method for validation purposes. The first DR was administered one month after FFQ1. Six DRs for three consecutive days randomly selected within the six 2 month intervals over a 12-mo period were obtained from each participant. The days of DR were chosen to assure a balanced representation of weekdays and weekend days. In total, fourteen weekdays and 4 weekend days were included. Each participant was instructed by the trained interviewer to record the name and amount of foods they consumed on a structured form. They were also required to provide detailed descriptions of each food, including brand and method of preparation and recipes whenever possible. After completion, the researcher collected and checked the records. Any incomplete or missing information would be further verified and obtained from the participants.

Statistical analysis

Average daily intakes of nutrients and food groups were calculated separately based on the FFQ and DRs. The Chinese Food Composition Table[19] was used to estimate the intake of major nutrients for the study participants. For calculation from the FFQs, we developed a food composition table that corresponded to the items listed in the questionnaire. A composite nutrient value for each food group was established by calculating the average of each nutrient of each of the food items. Since the intakes of most food groups and nutrients were right-skewed, intakes of nutrient and food groups were log-transformed to improve the normality of the distribution before further analysis. And the median intake was used to express the

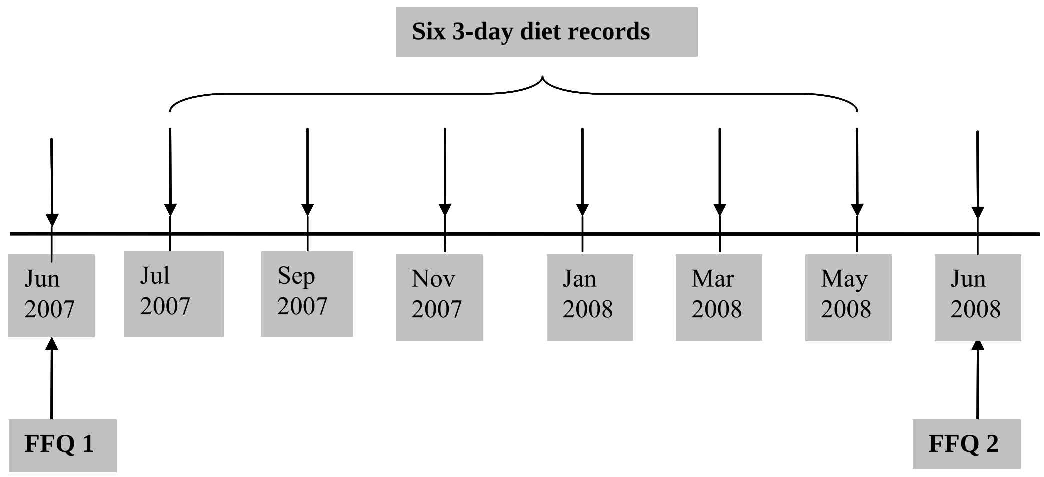

Figure 1. Study design to assess the validity and reproducibility of a food frequency questionnaire among Chinese women in Guangdong.

average levels of nutrients and foods.

The reproducibility of the FFQ was assessed by calculating the Pearson correlation coefficients between the first and second FFQ. The validity of the FFQ was assessed by comparing the median nutrient and food intake using the Wilcoxon's signed rank test, and calculating correlations between intakes derived from the second FFQ and the mean values derived from the 18-day DRs. In addition to crude correlation coefficients, we computed coefficients with adjustment for total energy intake by the residual method.[20] We also divided both FFQ and DR nutrients and food intakes into quartiles to examine their joint classification.

The Bland-Altman method was used to assess the agreement between the two dietary assessment methods across a range of intakes. The differences between the two methods were plotted against the average of the two methods. Natural-log transformations were performed in order to narrow the limits of agreement (LOA) and to assist interpretation, as recommended by Bland and Altman.[4] To permit further interpretation of the transformed data, the antilogs of the limits were calculated, providing a ratio FFQ/DR of the data. The ratios were multiplied by 100 and are therefore expressed as percentages with 100% representing an ideal agreement [9].

RESULTS

Sixty-one female subjects completed the six 3–day DR and the two FFQs administered at 1-year interval. They had a mean (SD) age of 44.6 (8.6) years and a mean body mass index (BMI) of 22.1 kg/m^2. Of the women, 95.1% were married; 54.1%, 37.7% and 8.2% were administrators or other white collar, blue-collar and farmer/others, respectively. With regard to the level of education, 3.3%, 59.0% and 37.7% respectively had formal education of primary school or below, middle school, college or above levels of education (Table 1).

Table 1. Characteristics of subjects in the validation study

	Number	%	Mean (SD)
Age at recruitment year			44.6 (8.6)
Height (cm)			158.4 (4.2)
Weight (kg)			55.5 (7.0)
BMI			22.1(2.6)
Marital status			
Married	58	95.1	
Unmarried/ Divorce/ Widowed	3	4.9	
Educational level			
Primary school or below	2	3.3	
Middle school	36	59.0	
College or above	23	37.7	
Income (yuan/ month)			
< 2000	15	24.6	
2001-5000	14	23.0	
5001-8000	13	21.3	
> 8001	19	31.1	
Occupation			
Administrator or other white collar	33	54.1	
Blue collar worker	23	37.7	
Farmer/others	5	8.2	

Table 2 presents the median daily nutrient intakes derived from FFQ1, FFQ2, and from the mean of the six 3–day DR, as well as correlation coefficients between the two FFQs, and correlation coefficients between FFQ2 with DRs. Dietary intakes of total energy and nutrients obtained from FFQ2 were all lower than that assessed from FFQ1. Except for protein and fat, the nutrient intakes estimated from FFQ2 were higher than that estimated from the DRs. The nutrient intakes assessed by the two FFQs correlate reasonably well. The correlation coefficients of nutrient intakes between the two FFQs were consistently higher than those observed between FFQ2 and DRs. Adjusting for energy intake had little effect on the correlation coefficients.

Similar sets of analyses were conducted for food groups. As shown in Table 3, except for cereals, vegetable, fruit, and red meat, median intakes of food groups (g) were higher from the second than that from FFQ1. Compared to DRs, consumption of soy, egg, dairy products was higher from the FFQ2 while the consumption of cereals, vegetables, fruits, red meat, poultry, and fish was lower in estimations from FFQ2. The energy-adjusted correlation coefficients ranged from 0.36 to 0.66 comparing foods/ food groups between the two FFQ and 0.30 to 0.68 comparing FFQ2 with DRs.

Cross classifications of nutrients and food group intakes obtained by FFQ2 and DR into quartiles showed that between 21 to 54% of nutrient intakes and between 36 and 54% of food intake fall into the same quartiles (Table 4). The mean misclassifications (the rates for classifying nutrients and foods into the opposite quartiles) were 5% and 3% for nutrients and foods respectively.

The overall agreement between intake of nutrients measured by FFQ2 and DRs was assessed using Bland-Altman plots which indicated that no linear trend existed between the differences and means for nutrients. The Bland-Altman plots for energy and vitamin C are presented in Figures 2-3. Anti-logging rendered mean agreement and the LOA of 104.3% (95% CI 68–160) and 104.5% (95% CI 39–282), respectively for energy and vitamin C. This suggests that compared with that derived from DR, on average, the FFQ overestimates intake of energy and vitamin C by 4.3% and 4.5 %, respectively. The FFQ also overestimates consumption of protein, fat, and carbohydrate by 1.0%, 2.3% and 5.0%. For food groups, FFQ overestimates intake of vegetable, egg and dairy products by 1.8%, 11.7% and 15.5%, whereas underestimates intake of cereals, fruit, red meat and fish by 3.6%, 1.2%, 16.8% and 17.5% (data not shown).

DISCUSSION

This study examines the validity and reproducibility of an 81-item FFQ specifically developed to assess the relationship between diet and breast cancer risk of Chinese women in Guangdong. The 18-day DRs completed by

Table 2. Validity and reproducibility of the FFQ for the consumption of nutrients

	FFQ1		FFQ2		DRs		FFQ2/ FFQ1	FFQ2/ DRs	Correlation coefficients between FFQ1 and FFQ2		Correlation coefficients between FFQ2 and DRs	
	Median	P25, P75	Median	P25, P75	Median	P25, P75			Unadjusted	Adjusted	Unadjusted	Adjusted
Energy (kcal)	1441	1235, 1740	1356	1146, 1608	1302	1168, 1457	0.94	1.04	0.62		0.46	
Protein (g)	62.0	49.7, 77.9	56.1	48.8, 70.5	57.4	50.1, 66.1	0.90	0.98	0.53	0.52	0.46	0.46
Fat (g)	29.4	23.2, 39.6	27.4	21.5, 41.7	30.0	23.9, 35.5	0.93	0.91	0.62	0.62	0.58	0.53
Carbohydrate (g)	240.6	204.3, 293.1	214.2	191.3, 260.2	206.8	185.4, 233.3	0.89	1.04	0.70	0.71	0.57	0.65
Dietary fiber (g)	11.0	8.6, 13.1	8.7	7.0, 10.7	8.4	7.3, 10.4	0.79	1.04	0.54	0.55	0.25	0.25
Vitamin A (μg RE)	847.7	534.3, 1145.4	654.1	492.4, 861.2	576.8	486.3, 754.8	0.77	1.13	0.57	0.57	0.35	0.32
Carotene (μg)	3843	2418, 5475	2856	2019, 4102	2609	2153, 3653	0.74	1.09	0.53	0.55	0.35	0.32
Retinol (μg)	143.1	104.7, 189.8	143.6	105.9, 199.1	121.7	87.1, 151.3	1.00	1.18	0.55	0.56	0.32	0.31
Thiamin (mg)	0.9	0.8, 1.1	0.8	0.7, 1.0	0.8	0.7, 0.9	0.89	1.00	0.56	0.54	0.41	0.41
Riboflavin (mg)	0.97	0.7, 1.2	0.9	0.6, 1.1	0.8	0.7, 0.9	0.93	1.12	0.62	0.62	0.54	0.49
Niacin (mg)	13.7	11.1, 17.4	12.8	10.3, 15.9	12.8	11.4, 14.9	0.93	1.00	0.51	0.46	0.35	0.33
Vitamin C (mg)	132.4	93.3, 182.6	111.6	75.3, 163.4	107.4	83.3, 132.9	0.84	1.04	0.64	0.64	0.33	0.32
Vitamin E (mg)	12.9	9.5, 16.8	11.0	9.3, 14.5	8.7	6.7, 10.7	0.85	1.26	0.55	0.55	0.25	0.25
Calcium (mg)	501.3	376.3,668.6	472.8	310.9, 586.1	396.5	288.2, 483.5	0.94	1.19	0.57	0.57	0.57	0.48

Table 3. Validity and reproducibility of the FFQ for the consumption of food/food groups

	FFQ1		FFQ2		DRs		FFQ2/ FFQ1	FFQ2/ DRs	Correlation coefficients between FFQ1 and FFQ2		Correlation coefficients between FFQ2 and DRs	
	Median	P25, P75	Median	P25, P75	Median	P25, P75			Unadjusted	Adjusted	Unadjusted	Adjusted
Cereals (g)	288.4	226.4, 327.2	250.4	210.3, 301.6	258.5	231.8, 314.1	0.87	0.97	0.66	0.66	0.67	0.68
Soy (g)	47.9	19.1, 108.6	48.0	23.4, 71.8	27.5	10.8, 43.9	1.00	1.74	0.68	0.61	0.51	0.45
Vegetables (g)	383.1	258.6, 513.3	312.8	230.2, 441.1	314.7	264.7, 386.5	0.82	0.99	0.51	0.57	0.38	0.37
Fruits (g)	189.2	128.3, 307.1	161.9	115.3, 239.6	180.6	115.6, 225.8	0.86	0.90	0.64	0.64	0.63	0.56
Red meat (g)	61.3	40.3, 101.3	56.2	35.2,107.8	69.2	56.1, 87.5	0.92	0.81	0.26	0.36	0.60	0.59
Poultry (g)	20.4	10.9, 36.1	25.4	13.2, 46.4	39.7	26.5, 63.3	1.24	0.64	0.46	0.54	0.56	0.50
Fish (g)	38.3	21.4, 72.0	51.4	25.7, 75.9	62.2	46.6, 83.9	1.34	0.83	0.52	0.55	0.37	0.30
Eggs (g)	23.2	14.7, 43.9	24.0	14.4, 36.0	19.4	12.3, 31.1	1.03	1.24	0.50	0.55	0.39	0.39
Dairy products (g)	107.1	39.6, 183.6	116.8	39.2, 184.8	84.7	41.7, 157.8	1.09	1.38	0.59	0.59	0.66	0.48

Table 4. Cross classification of intake of nutrients and food groups between the second FFQ and the mean of six 3-day dietary records among 61 Chinese women in Guangdong

	Same quartile	Adjacent quartile	One quartile apart	Opposite quartile		Same quartile	Adjacent quartile	One quartile apart	Opposite quartile
Nutrients					Food groups				
Energy (kcal)	38	44	13	5	Cereals (g)	46	46	8	0
Protein (g)	34	53	10	3	Soy (g)	44	43	11	2
Fat (g)	38	48	11	3	Vegetables (g)	43	29	18	10
Carbohydrate (g)	41	41	15	3	Fruits (g)	48	29	23	0
Dietary fiber (g)	21	46	28	5	Red meat (g)	38	44	16	2
Vitamin A (µg RE)	33	38	20	9	Poultry (g)	39	35	23	3
Carotene (µg)	30	43	16	11	Fish (g)	36	43	15	6
Retinol (µg)	49	36	10	5	Eggs (g)	39	38	21	2
Thiamin (mg)	31	44	22	3	Dairy products (g)	54	31	10	5
Riboflavin (mg)	43	39	15	3					
Niacin (mg)	35	41	21	3					
Vitamin C (mg)	28	33	31	8					
Vitamin E (mg)	31	34	28	7					
Calcium (mg)	54	31	12	3					
Mean	36	40	19	5	Mean	43	38	16	3

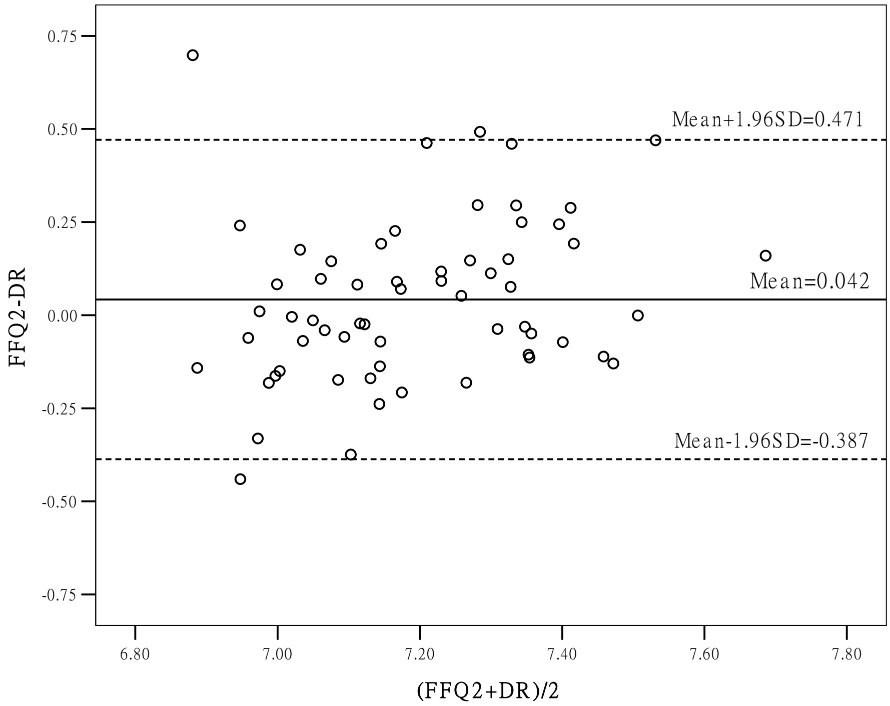

Figure 2. Bland-Altman plot: assessing agreement between the FFQ2 and dietary record (DR) for total energy intake

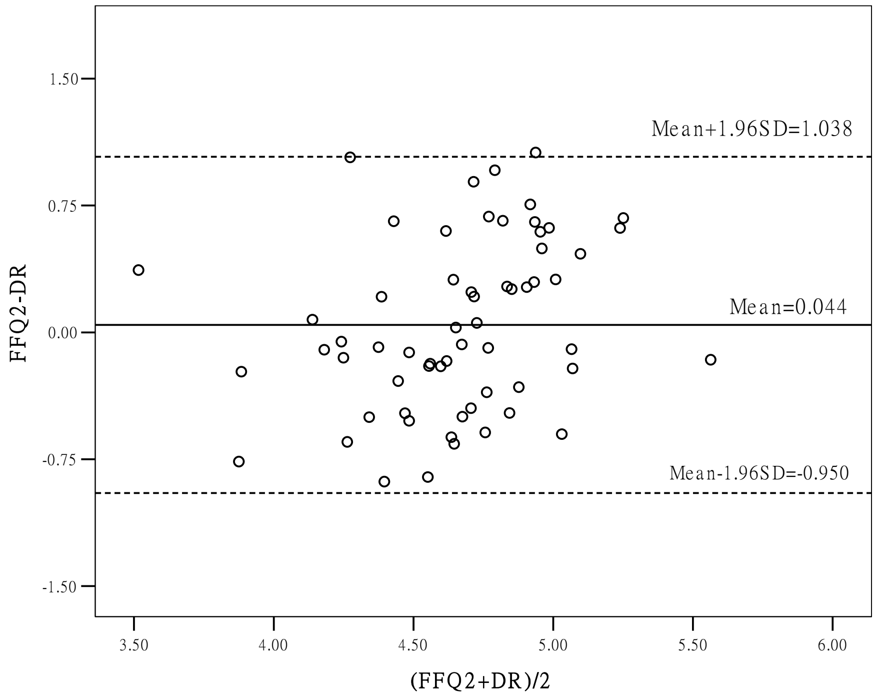

Figure 3. Bland-Altman plot: assessing agreement between the FFQ2 and dietary record (DR) for vitamin C intake

the 61 participants served as the reference method. Different statistical approaches, like comparing median intakes, correlation analysis and quartile categories, and the Bland–Altman method were used to assess the validity of the FFQ. The results suggest that the developed FFQ has reasonable comparative validity and reproducibility for application in the study population.

Consistent with findings from other studies,[8,13] we found that the median daily intakes of nutrients and most food groups derived from FFQ1 were in general higher than that obtained from FFQ2, even though some differences were not statistically significant. Possible reasons may include that participants were clearer regarding their diets and could quantify their food intake better at the second administration of the questionnaire. The FFQ gave generally higher estimates of intakes of nutrients and some food group items than that from DR. An overestimation by FFQ in comparison with other dietary methods is a common problem as reported by other authors, [8,13,16,21,22] probably due to the use of long lists of foods and difficulties in estimating an accurate frequency of food consumption and an overestimation of the portion sizes.

Previous studies have reported generally good reproducibility of FFQ in assessing dietary intakes. The Nurses Health Study evaluated the reproducibility by administering the FFQ twice at an interval of approximately 1-year apart among 173 women aged between 35 and 59 years. The Pearson correlation coefficient for log-transformed nutrient intake was between 0.52 and 0.71.[17] Shu et al[8] obtained correlation coefficients varying between 0.30-0.59 for nutrients and 0.37-0.66 for food groups from the two FFQs that were administered approximately 2 years apart. In this study, the energy-adjusted Pearson correlation coefficients ranged between 0.46 and 0.71 for nutrients, and 0.36 and 0.66 for food groups. The reproducibility thus seems to be comparable to the values reported by Willett et al.[17] and Shu et al,[8] and other studies designed for use in women[22-26] and other populations.[6,13,15,17] The results indicate a reasonably good reproducibility of the FFQ developed for Chinese women in Guangdong.

Information regarding the validity of a dietary assessment method is important in interpreting the study results.[1] In the present study, the energy-adjusted correlation coefficients between the FFQ2 and the DRs ranged from 0.46 to 0.65 for macronutrients, from 0.25 to 0.49 for micronutrients, and from 0.30 to 0.68 for food group items, respectively. Except for fiber and Vitamin E (r = 0.25) correlations of most nutrients and selected food groups were moderately good ($r \geq 0.30$). In the Nurses Health Study, [17] the energy-adjusted correlation coefficients for nutrients derived from the second FFQ and the mean of the four DRs were between 0.47 and 0.61 for macronutrients and 0.36-0.66 for micronutrients. Our results compared well with these cited values and values obtained from other validation studies, for both nutrients [6,10,13-18,26] and food group items.[15,16,21,27-29]

A wide LOA indicates the potential for large differences and thus poor agreement between methods.[9] The LOA of our study was comparable with values reported by Villegas et al,[9] but narrower than those reported in other previous studies.[5,30] The Bland-Altman analysis of our study revealed that the regression line for energy and other nutrients did not indicate a significant linear trend. In other words, the difference in nutrient intake derived from the FFQ and DR did not appear to depend on the "true" intake as assessed by the DR. Thus, the misclassification in nutrient intake is less likely to cause systematic biases.

Epidemiologic studies of diet and disease relationships seek to compare disease risks across categories of intake. Thus, correct classification of the individuals is essential.[31] We evaluated the extent to which intake from the second FFQ assigned the subjects into the same quartile of the distribution as defined by the DR. The mean percentage of participants classified into the same quartile by the two methods was 36% for nutrients and 43% for food groups. This level of agreement is comparable to that reported in other studies.[6,8,10,15,16,32] Misclassification into extreme quartiles tended to be low (5% for nutrient and 3% for foods). Our results showed that the FFQ had a satisfactory ability to categorize subjects for intake of most food groups and nutrients.

Our FFQ was adapted from the Shanghai Women's Health Study FFQ. Although the reproducibility of our FFQ was similar to that reported,[8] the validity was not as good, especially for fiber and most of the vitamins. In SWHS, estimates of the correlation between the questionnaire and 24-hour dietary recalls for nutrients ranged from 0.41 to 0.64 and for foods it ranged from 0.41 to 0.66. One possible explanation for this difference is that our results were based on a small sample size. Due to limited manpower and time and the intensity of the interview, we only recruited 61 subjects for this validation study. A small sample size limits its representativeness of the target population and may result in widely varying estimates of within-person nutrient and food intakes and lowers the precision in the estimates of correlation coefficients.

There is debate whether crude nutrient and/or food values, or their energy-adjusted values should be considered for the validation of FFQ and further epidemiologic studies.[33,34] In this study, correlations based on energy-adjusted values were similar to those based on unadjusted intake values for most nutrients and food groups. The results may demonstrate that the variability of the nutrient and food consumptions in this population was not related to energy intake and thus the adjustment for energy by residual method did not improve the correlation coefficients. These results are in accordance with other reports. [8,13,16,18,35,36] However, Willett et al,[17] Wengreen et al,[37] and Cardoso et al[38] reported higher coefficients after energy adjustment.

Finding a gold standard for assessing the validity of a dietary instrument for measuring long-term dietary intake poses a challenge in nutritional studies. In this validation study, DRs of up to 18 days were used as the reference method. Compared to using 24-hour dietary recalls as the comparison method, DR usually represents an optimal comparison method because sources of error are largely independent of error associated with a FFQ. Also the DR method does not depend on memory, is open-ended, and allows direct measurement of portion sizes.[1] The length of time covered by the reference method is important because of the large daily variation in individual nutrient intakes.[18] Similar to most studies, we used one year as the reference time frame. The collection of comparison data over a 1-year period is appropriate so that seasonal effects and other poorly defined fluctuations in diet can be incorporated.[1] To improve data quality, the dietary instruments in this study were interviewer-administered rather than self-administered. Although it was time-consuming and required more manpower, interviewer-administered FFQ could increase subjects' interest, reduce misunderstanding and enable better quantification of consumptions.[39]

The participants of our validation study were self-selected volunteers and not a random sample from the general population, but most validation studies are based on volunteers.[18] The most difficult aspect of conducting a validation study was to recruit subjects who would be willing to keep DR and remain cooperative for the one-year long study. Volunteer subjects are thought to be suitable for validation studies if they do not differ from the source population in age or gender.[40] In this validation study, subjects were self-selected participants recruited through community advertisements and participant referrals with a higher proportion of administrators or other white collar workers than that of the general population. As such, the participants might have different dietary habits; and were probably able to provide more accurate responses to questionnaires.[25] Therefore, the generalization of the findings in this study should be treated with caution. It may be necessary to re-evaluate the performance of the questionnaire in a larger sample that is more representative of Chinese female populations in Guangdong.

In conclusion, this study shows that the validity and reproducibility of this FFQ is comparable to that of other FFQs developed for other ethnic populations. This FFQ is useful in the assessment of usual intakes of major nutrients and consumption of food groups among Chinese women in Guangdong, as well as the examination of relationships between dietary factors and health outcomes.

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AUTHOR DISCLOSURES

We declare that we have no conflict of interest.

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Short Communication

Validity and reproducibility of a food frequency Questionnaire among Chinese women in Guangdong province

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中國廣東女性食物頻數問卷效度和信度的評價

目的：爲研究中國廣東女性膳食因素與乳腺癌發病的關係，研製了食物頻數問卷。本研究的目的在于評價該食物頻數問卷（81 個食物條目）的效度和信度。方法：61 名年齡在 24-64 歲來自廣州市社區的女性參與本研究，采用三天的膳食記錄法作爲標準方法。調查對象一共完成兩次食物頻數問卷，間隔時間爲一年；在此期間，每隔兩個月完成一次連續三天的膳食記錄，共計六次。計算兩種膳食調查方法所得每日營養素和食物的攝入量以及相關係數。結果：對于營養素和大部分食物條目，第一次食物頻數問卷測得的平均攝入量高于第二次。兩次食物頻數問卷用熱量校正後的營養素相關係數範圍在 0.46 到 0.71，食物的相關係數範圍在 0.36 到 0.66。效度測試方面，熱量校正的營養素相關係數範圍在 0.25 到 0.65 之間，熱量校正的食物相關係數範圍為 0.30 到 0.68。根據營養素攝入量，以四分位法將研究對象分組，在兩種膳食調查方法中被分到同一組的調查對象平均佔 36%，有 5%被分到極端的兩組。對食物來說，平均 43%的調查對象被分到同一組，3%的對象被分到極端的兩組。Bland-Altman 分析顯示食物頻數問卷和膳食記錄兩種方法測得的營養素攝入的差值和均數之間不存在綫性關係。結論：本研究結果顯示該食物頻數問卷具有滿意的信度和合理的效度，可用于評價中國廣東女性的營養素和食物的攝入。

關鍵詞：食物頻數問卷、信度、效度、女性、中國