Original Article

Association of major dietary patterns with obesity risk among Mongolian men and women

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Mongolia is experiencing changes in its unique nomadic lifestyle and dietary habits in the last two decades with accompanying increase in obesity rate. The dietary pattern approach, which investigates the overall diet in relation to obesity risks, has become appealing in nutrition epidemiology. The aim of this study was to identify major dietary patterns of the Mongolian adults in relation to the risk of having obesity. Dietary intake of a total 418 adults aged ≥ 25 years was assessed by using a food frequency questionnaire with 68 items. An exploratory factor analysis resulted in three dietary patterns: transitional high in processed meat and potato, traditional rich in whole milk, fats and oils and healthy with greater intake of whole grains, mixed vegetables and fruits. Individuals in the upper quintile of the transitional pattern had significantly greater risk of obesity (BMI≥25kg/m^2: OR=2.47; 95% CI=1.04-5.86) while subjects in the highest quintile of the healthy dietary pattern were found to have significantly decreased risk of obesity (OR: 0.49; 95% CI=0.25-0.95). Men in the highest quintile of the transitional pattern had greater risk of abdominal obesity WC≥90cm: OR= 4.08; 95% CI=1.11-14.97) than those in the lowest quintile. Women in the top quintile of the traditional pattern had a greater odds of having abdominal obesity (WC≥80cm: OR=4.59; 95% CI=1.58-13.30) than those in the lowest quintile. The study suggests that public health efforts be targeted at adults in Mongolia to address the undesirable aspects of the transitional and the traditional dietary patterns.

Key Words: dietary pattern, factor analysis, body mass index, waist circumference, Mongolian adults

INTRODUCTION

Obesity is a global epidemic. This epidemic is not restricted to industrialized societies but in fact, obesity is occurring at a faster rate in developing countries than in the developed world.[1] While obesity is basically due to energy imbalance between calorie consumption and expenditure, there are several complex underlying factors related to genetics, environment and behavior that influence the outcome.[2] Among these factors, diet plays a central role. As people take meals that consist of complex combinations of nutrients and non-nutrients, it is important to consider the total meals, rather than single nutrients when relating dietary intake with nutritional status. In light of the complex influence of diet, researchers have become increasingly interested in studying dietary patterns towards understanding the growing problem of obesity.[3]

Owing to interactions and collinearity among the constituents in foods consumed, factor analysis is considered a promising method of analyzing a person's eating pattern.[3-7] The assumption of the factor analysis in nutrition epidemiological studies is that dietary variables (food items) in food frequency questionnaire can be explained, to some extent, by only certain number group of variables (patterns) that reflect an individual's food intake patterns.[7,8] Several epidemiological studies from mainly developed countries have reported dietary patterns of different populations in relation to overweight and obesity.[8-13] Across these studies, dietary patterns that were characterized by higher intake of fruits, vegetables, whole grains, fish and poultry were shown to be related to a lower degree of obesity.[3] Among developing countries, Esmaillzadeh et al[14] recently reported that Iranian women who adopted a healthier pattern of dietary intake was associated with smaller risks of general and central obesity compared to those with less healthy diets.

In Asia, the problem of obesity is rising in the wake of

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economic development and nutrition transition.[15,16] Mongolia is one such example as the country is experiencing rapid economic growth and urbanization with more than 60% of the population residing in cities. The burden of obesity and related chronic diseases is increasingly recognized as the main public health threat in the country.[17,18] The Risk Factors Survey (1993) reported that 11.0 % adults aged 35-64 years were overweight and obesese[19] The prevalence reached 26.5% according to the Second National Nutrition Survey in 1999.[20] The most recent nationwide survey in 2005 reported that 31.6% of Mongolians aged 15-64 years were overweight and 41.6% had central obesity.[22]

Mongolians have a distinctive lifestyle and dietary habits that are characterized by a preference for high protein and fatty foods of animal origin. Such a dietary preference is probably in keeping with the country's extreme continental climate and nomadic lifestyle where meat and meat derivatives are the main sources of energy and nutrients during both winter and spring, while diary products are commonly consumed during summer and autumn. However, shifts in lifestyle patterns and loss of seasonal variations in eating patterns have been observed, and as a result the research question of this study is: to what extent are dietary patterns implicated in the increasing prevalence of chronic non-communicable diseases among Mongolian adults. This study was undertaken to identify the major dietary patterns of Mongolian men and women aged 25 years and over, and to examine the relationship between dietary patterns and obesity in these subjects.

MATERIAL AND METHODS

Subjects

This cross-sectional study was carried out in August, 2005 among 420 healthy men and women aged ≥25 years. The sample size was calculated based on a margin error of 5%, confidence level of 95%, and the coronary heart disease prevalence of 38.3% among Mongolian adults. Based on these criteria, the minimum number of subjects required was 364, and with an additional 20% for possible non-responses, the estimated number became 436. The study project was approved by the ethical committee of the Ministry of Health of Mongolia and the research council of the Kagawa Nutrition University, Japan.

Probability sampling was applied to select the study sample[26]. Sampling was conducted separately in the urban and the rural areas in four stages. The primary sampling units were the *districts* (Counties) in urban areas and the *soum* in rural areas. The Bayanzurkh district was selected randomly from seven urban districts, while the Murun *soum* was randomly selected from four rural *aimags* in the Khangai region. The Murun soum is a provincial center of Khuvsgul prefecture situated in northwest Mongolia, 700 km from the capital city of Ulaanbaatar. In the Bayanzurkh district, two *Bags* were randomly selected for the study, while one *Bag* was similarly chosen in the Murum Soum . A *Bag* consists of a group of *households registered under the care of particular clinic or doctor.* All adults aged 25 years and over in the selected *Bags* were eligible, and those who gave consent to participate were included in the study. The final total number of subjects recruited was 420, comprising of 262 urban and 174 rural subjects. The results showed only 418 adults because two subjects with extreme values in body weight and waist circumference were excluded.

Assessment of dietary intake

Dietary intake of the subjects was assessed with a semi-quantitative food frequency questionnaire (FFQ) that consisted of 68 food items. The FFQ developed from 24-h dietary recall data from the second Mongolian Health and Nutrition Survey (1999) [20] was applied in this study. The FFQ was validated for Mongolians in the 1999 survey. Subjects were asked by trained interviewers how often, on average, they had consumed each food item during the month prior to the study. Frequency of consumption of each food item was recorded using five exclusive categories ranging from daily, 3-5 times per week, 1-2 times per week, 1-2 times per month and never. These categories of frequency of intake for each food were converted to frequency intake per day. For example, intake of 3-5 times a week was converted to 0.57 times/day, 1-2 times per week to 0.23 times/day, and 1-2 times a month to 0.05 times/day. The portion size for each food item was converted to serving size according to the exchange lists; e.g.1 serving is equal to 30 g bread, 30g beef, 45g egg or 240 ml milk. Then the serving size of each food item was multiplied by the frequency intake per day to compute the number of servings per day.

Food groupings

The classification of the WHO for biologically distinct food groups,[23] comprising of 15 main food groups and 54 subgroups was used to classify the initial food groups. The food items collected in the study were categorized into 11 of the WHO's main groups. The resulting food groups were further disaggregated according to the subgroups in each of the main food groups. The final grouping required consideration of country-specific culinary use of foods. For example, horse meat is considered to be nutritionally more valuable[24] than other ruminants in Mongolia and thus ruminant meat was categorized into two groups separating horse meat from other ruminant meats. Furthermore, compared to the conventional types of food consumed, the subgroups of fruits and vegetables in the WHO's scheme was deemed too broad for this study as a relatively limited range of fruits and vegetables are normally consumed in Mongolia. At the end, a total of 23 food groups were formed as input for factor analysis.

Factor analysis and dietary pattern derivation

Prior to performing further analysis the data were assessed in terms of factor analysis. The factorability of the correlation matrix was supported by the presence of several correlation coefficients of ≥0.3, the Kaiser-Meyer-Oklin value of >0.698 and the significance of Bartlett's Test of Sphericity.[25]

Principal component factor analysis was applied to derive dietary patterns on the 21 food groups. The number of servings per day was the input value. Prior to rotation, validity requirements of the food groups were examined using two criteria, namely a measure of sampling adequacy in each input variable and communality. The food groups of organ meat, fish and soft drinks did not meet the above criteria with communality of less than <0.50, with no sufficient explanation. These variables were eliminated from further analysis. Meanwhile the alcohol group had an insufficient degree of intercorrelations among other food groups owing to the measure of sampling adequacy being less than 0.50 (0.47). The orthogonal transformation was applied to generate major dietary patterns. With the criteria of Eigenvalues >1.25, four components were retained and further inspection of the Scree plot showed a clear break after the third component. Using Catell's scree test, we decided to retain three components for further investigation. The dietary patterns were named to reflect the food groups with the highest loadings on that factor. A factor score was created for each individual based on daily intake (number of servings/day) of each food group variable weighed by factor loadings.[25,26]

Statistical analysis

The survey database was created in EpiData 3.1, a Microsoft Windows-based program. Data were entered twice using double entry verification to improve the quality of data. Exploratory data analysis was applied for detection of missing data and for handling outliers. Green vegetables and poultry groups remained with uncorrectable skewness after the transformation for normal distribution and were thus omitted. The remaining 21 food groups were used for further analysis.

The subjects were categorized based on quintiles of dietary pattern scores. One-way ANOVA and chi square test were used to compare general characteristics across quintiles, while adjusted means (age and energy intake) were computed using GLM's univariate utility. Logistic regression analysis was used to estimate the relative likelihood between dietary patterns (as expressed by quintiles) and the risk of high BMI and abdominal obesity. The odds ratio (OR) and 95% confidence interval (95% CI) for BMI ≥25 and abdominal obesity were computed. The *p*-values for analysis of linear trends were calculated by scoring the quintiles of a dietary pattern score, from one for the lowest quintile to five for the highest, entering the number as a continuous term (by assigning a median score to each quintile for each dietary pattern) in the regression model.

Multivariate adjusted ORs were calculated by adjusting for age (years), sex (male, female), locality (urban, rural), education level (less than secondary and higher than secondary education), physical activity (active, inactive), smoking status (yes, no) and binge drinking habit (yes, no). Total energy intake (as a continuous variable) was adjusted for the influence of energy intake from the factor scores in the identified dietary patterns. All statistical analyses were performed using SPSS 13 for Windows. A two-sided *p*-value of <0.05 was considered significant.

Assessment of anthropometric measurement

Anthropometric measurements were collected following standardized procedures. Height was measured by using Harpenden portable stadiometer (Holtain Ltd, Crymych, Dyfed, UK). Waist circumference was measured at midway between the lower rib and the iliac crest[42] using an inelastic tape. Body weight was measured using a bioelectrical impedance meter (Professional Body Composition Analyzer TBF 110, Tanita Co., Tokyo, Japan) from which body mass index (BMI) was generated. Subjects with a BMI ≥ 25 kg/m^2 were defined as obese according to the proposed classification for Asian adults by the Western Pacific Region of World Health Organization.[27] Central obesity was defined as waist circumference ≥ 90 cm for men and ≥ 80 cm for women.[27]

Assessment of Covariates

Information on age, current cigarette smoking (yes or no), education level (as uneducated or at least elementary school versus secondary school, high school and college or university degree), physical activity level (at least 600 MET-minutes/week (sedentary)) and binge drinking status (consumption of 5 or more standard drinks for the male and 4 or more standard drinks for the female per drinking day) was collected by questionnaire in accordance with the WHO chronic disease stepwise survey methodology.[22]

RESULTS

Table 1 presents various characteristics of the participants by gender. The majority of both men (77%) and women (78.5%) had at least high school education. More than half of the men (57.5%) were smokers compared to the women (10.1%). A little less than half of the men (43.5%) had a binge drinking habit compared to the women (8.7%).

Table 1. Characteristics of the study subjects

Characteristics	Men (n=200)	Women (n=218)
Age, years (mean±SD)	48.1 ± 12.9*	45.3 ± 12.5
Education level, n(%) secondary/ higher	154 (77)	171 (78.5)
Urban/rural, n (%)	128 (64)	128 (58.7)
Current smoker, n (%)	115 (57.5)***	22 (10.1)
Binge drinking, n (%)	(87) 43.5***	19 (8,7)
Physical inactivity, n (%)	74.5%	76.1%
Daily energy intake (kcal/d)	2609 ± 899**	2276 ± 750
Mean BMI (kg/m^2)	24.4 ± 0.4	24.9 ± 4.4
Waist circumference (cm)	88.2 ±12.1**	83.9±11.3
Overweight (BMI: 25.0-29.9 kg/m^2)	62 (31.0)	75 (34.4)
Obesity (BMI ≥30 kg/m^2)	15 (7.5)*	29 (13.3%)
Central obesity, (WC: men ≥90 cm, women ≥80 cm)	93 (46.5)**	142 (65.1)

Asterisks indicate difference from women, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 2. Factor loading matrix for the three dietary patterns identified among Mongolian adults aged 25 years above*

	Transitional pattern	Traditional pattern	Healthy pattern
1. Mono- gastric meat	0.755		
2. Ruminant meat	0.435		
3. White vegetables	0.773		
4. Dark yellow vegetables	0.697		
5. Potato	0.546		
6. Bread, biscuits	0.337		
7. Milk	-0.245	0.550	
8. Yogurt, kumis (fermented mare milk)		0.519	0.225
9. Fats and oils		0.699	
10. Sugar, confectionery		0.540	
11. Horse meat		0.391	
12. Refined wheat products		0.207	
13. Egg			0.618
14. Grains (barley, whole wheat)			0.593
15. Mixed vegetables			0.514
16. Fruits			0.425
17. Rice, millet.			0.406
Variance explained (%)	16.7	9.6	8.6

Absolute values <0.20 were excluded from the table for simplicity
* Refer to Appendix A for more examples of food items in each category

Table 3. Multivariate adjusted odds ratios and 95% confidence interval for BMI ≥25 by quintiles for factor scores (n=84 for each quintile)

Dietary patterns	Quintile category of dietary pattern			
	Q1 (lowest) (referent)	Q3	Q5	*p* for trend
Transitional diet				
n with BMI ≥25	30	38	40	
Model 1†	1.00	1.77 (0.89-3.52)	2.62 (1.18-5.79)	.017
Model 1 ‡	1.00	1.73 (0.86-3.48)	2.47 (1.04-5.86)	.040
Traditional diet				
n with BMI ≥25	28	34	40	
Model 1 †	1.00	1.11 (0.57-2.16)	1.56 (0.79-3.08)	.201
Model 1 ‡	1.00	0.99 (0.49-1.99)	1.12 (0.47-2.69)	.795
Healthy diet				
n with BMI ≥25	42	36	29	
Model 1†	1.00	0.94 (0.49-1.79)	0.53 (0.28-1.03)	.063
Model 1 ‡	1.00	0.90 (0.47-1.72)	0.49 (0.25-0.95)	.035

†Adjusted by age (years), sex (male, female), locality (urban, rural), educational attainment (less than secondary and secondary or higher), alcohol use (binge drinker or not), current smoker (yes, no), physical activity (active, sedentary).
‡ Further adjusted for total energy intake

Men consumed more energy (2609 ± 899) than the women (2276 ± 750). The mean BMI for men and women was 24.4±0.4 kg/m^2 and 24.9±4.4 kg/m^2 respectively. There was no statistically significant difference in the prevalence of overweight between men (31%) and women (34.4%). Prevalence of obesity was higher in women (13.3%) than the men (7.5%). Women were significantly more centrally obese (65.1%) compared to the men (46.5%).

The factor loading matrices for the three dietary patterns are shown in Table 2. The first pattern with high loadings for monogastric meat (pork, sausages), white vegetables (cabbage, onion), dark yellow vegetables (carrot, tomato), potato, ruminant meat (beef, mutton, goat meat), and pastry (bread and biscuits) was labeled “Transitional” dietary pattern. The second pattern, which loaded heavily on whole milk, yogurt, fats and oils, sugar and confectionery, and horse meat was named “Traditional”, because the food items reflect the diet of Mongolians during summer. The last pattern had high loadings for egg, grains (barley, whole wheat bread), mixed vegetables, fruits, rice plus other cereals (millet, farina) was labeled “Healthy”. Together these three dietary patterns accounted for 34.5% of the variances in the original dietary intake. The Transitional dietary pattern was the most dominant type in the population explaining for 16.7% of the variance.

Multivariate adjusted odds ratios (ORs) for BMI≥25 across quintiles of all three dietary patterns are presented in Table 3. Individuals in the upper quintile of the transitional diet were more likely to have a higher BMI (OR: 2.47; 95% CI: 1.04–5.86) than those in the lowest quintile. As for the healthy dietary pattern, subjects in the top quintile had a lower likelihood of being obese (OR 0.49;

Table 4. Multivariate adjusted odds ratios and 95% confidence interval for abdominal obesity by quintiles for factor scores (n=84 for each quintile)

Dietary patterns	Quintile category of dietary pattern			
	Q1 (lowest) (referent)	Q3	Q5	*p* for trend
Transitional diet				
Men				
n with abdominal obesity	12	19	27	
Model 1 †	1.00	1.46 (0.50-4.22)	4.3 (1.31-14.5)	0.016
Model 1 ‡	1.00	1.42 (0.48-4.19)	4.08 (1.11-14.97)	0.034
Women				
n with abdominal obesity	31	28	28	
Model 1†	1.00	0.92 (0.33-2.54)	1.75 (0.52-5.85)	0.364
Model 1‡	1.00	0.72 (0.25-2.06)	1.03 (0.27-3.87)	0.958
Traditional diet				
Men				
n with abdominal obesity	22	16	19	
Model 1†	1.00	0.35 (0.12-1.00)	0.81 (0.27-2.37)	0.702
Model 1‡	1.00	0.26 (0.08-0.79)	0.33 (0.08-1.35)	0.125
Women				
n with abdominal obesity	22	25	39	
Model 1 †	1.00	0.93 (0.37 -2.36)	4.59 (1.58-13.3)	0.005
Model 1 ‡	1.00	0.86 (0.32-2.33)	3.74 (0.92-15.2)	0.065
Healthy diet				
Men				
n with abdominal obesity	19	23	12	
Model 1 †	1.00	1.39 (0.52-3.72)	0.76 (0.25-2.27)	0.626
Model 1 ‡	1.00	1.31 (0.49-3.50)	0.64 (0.21-1.99)	0.449
Women				
n with abdominal obesity	33	20	32	
Model 1†	1.00	0.50 (0.19-1.33)	0.60 (0.24-1.51)	0.283
Model 1‡	1.00	0.44 (0.16-1.18)	0.47 (0.18-1.23)	0.127

†Adjusted by age (years), locality (urban/ rural), education (less than secondary/higher), alcohol use (binge drinker or not), current smoker (yes, no), physical activity (active/ sedentary).
‡ Further adjusted for total energy intake

95% CI: 0.25–0.95), after controlling for potential confounders and making further adjustment for energy intake. Multivariate adjusted odds ratios (ORs) for abdominal obesity across quintiles of the three dietary patterns are shown in Table 4. Men in the highest quintile of the transitional diet had greater odds of abdominal obesity (OR: 4.08; 95% CI=1.11–14.97) than those in the lowest quintile after adjustment for potential confounders and energy intake. No significant association was found among women in this respect.

On the other hand, women in the highest quintile of the traditional diet had greater odds of having abdominal obesity (OR: 4.59; 95% CI: 1.58–13.30) than those in the lowest quintile. However, the association was attenuated after further adjustment for total energy intake were made (OR: 3.74; 95% CI: 0.92–15.2).

DISCUSSION

The study reported a high prevalence of obesity and abdominal obesity among Mongolian adults from urban and rural areas. Three major dietary patterns were identified and their relationship with obesity risk was investigated. The Healthy dietary pattern was positively associated with a decreased risk of overall obesity after adjustment of socio-demographic and lifestyle factors. On the other hand, subjects who followed the Transitional dietary pattern were found to have a greater risk of obesity. Meanwhile, both the Transitional and the Traditional dietary patterns were positively associated with an increased risk of abdominal obesity.

Among the few studies on Asian populations on dietary patterns, Okubo[13] found the Healthy pattern among Japanese women aged 18-20 years to be associated with a decreased risk of obesity, whereas the Western dietary pattern was shown to relate to a greater risk of obesity. Iranian women aged 40-60 years who followed a Healthy dietary pattern had a lower risk of general and central obesity. Mizoue et al [28] identified three dietary patterns in a study of 2106 Japanese men. They were the high-dairy, high fruit and vegetables, high starch, low alcohol (DFSA) pattern (quite similar to the Healthy dietary pattern among Mongolians), the animal food pattern (similar to the Transitional pattern for Mongolians), and the Japanese dietary pattern. The latter was positively associated with impaired glucose tolerance. In an urban Chinese population, three dietary patterns were defined by relatively higher intakes of 1) fruit and milk, 2) red meat and 3) refined cereals.[29] They found the high refined cereals group to be associated with low B vitamins and high homocysteine.

A review of 30 cross-sectional studies revealed a negative relationship between diets high in fruits and vegetables and BMI, while diets high in meats and fat was positively associated with BMI.[3] In Iran, Esmaillzadeh et al.[14] identified three major eating patterns among women (healthy, Western and Iranian). After controlling for potential confounders, subjects in the highest quintile of the healthy pattern was less likely to have dyslipidemia and hypertension compared with the lowest quintile. In United States, major dietary patterns were found to predict risk of coronary heart disease (CHD), independent of other lifestyle variables.[30-32] The "prudent" pattern" characterized by higher intake of vegetables, fruit, legumes, whole grains, fish and poultry was associated with lower CHD risk, in contrast with the "Western pattern" based on higher intake of red meat, processed meat, refined grains, French fries, high-fat dairy products, sweets and dessert. Newby et al.[33] identified the Healthy food pattern, that is high in fiber, reduced fat dairy products and fruits, to be positively associated with smaller gains in BMI for women and waist circumference for both sexes. Fung et al.[34] also reported a positive correlation between the Western diet pattern and plasma biomarkers of obesity among American men. In addition, several cross-sectional studies found a positive association with the Western type dietary pattern and obesity risk.[10-12]

The Transitional dietary pattern identified among Mongolians is similar to the Western pattern in being characterized by higher intake of meat, processed meat, and potato. This pattern was associated with a greater risk of general and abdominal obesity in Mongolian adults. Likewise, Maskarinec et al [9] identified "Meat" pattern among Hawaiian women to be positively associated with BMI levels. van Dam et al[35] observed that among those in the Dutch population who consumed high amounts of red meat and potatoes had higher BMI levels.

The Traditional dietary pattern of Mongolians also shares some common elements with the Western pattern with high loadings for whole fat dairy products, fats and oils, sweets and horse meat. However, it should be noted that the types of dairy products in this diet may be desirable for the Mongolians since this pattern is low in meat, and thus milk (of cow, sheep and goat; yogurt and fermented horse milk) serves as their major source of energy, protein and fat. The positive association between the Traditional diet and increased risk of abdominal obesity among Mongolian women may be due to their high intake of fats and oils, as well as sweet and confectioneries. Esmaillzadeh et al.[14] also reported a positive association between the Western dietary pattern (high fat dairy products, sweets and desserts) and central obesity among Iranian women. Perhaps, having a body composition that shows a preference for centrally-deposited fat is a form of adaptation to living in very cold climatic condition, in that the abdominal fat is thermogenic and also provides padding against the cold).[36]

The present study has some limitations. Being cross-sectional in design, causal inference is fraught with errors due to the fact that temporality is unclear in such studies. Measurement errors inherent in the use of FFQs such as self-reporting of dietary intake and the use of proxies for food consumption can lead to biases in intake. Although the FFQ used contained 68 food items initially, it was shorter than the FFQs that were used to derive dietary patterns in other studies. However, the number of items included was deemed adequate in reflecting the commonly eaten foods among Mongolian adults. Seasonal variations in food availability and food preferences can affect the characteristics of estimated diet patterns. The use of factor analysis to define dietary patterns has been criticized for its subjective nature, including the consolidation of food items into food groups, the number of factors to extract, the methods of rotation, and the labeling of the patterns.[31,25] Hence, methodological limitations such as few subjects across quintiles, physiological characteristics and the biological effect of local foods can obscure true relationships. The results obtained may not be replicated across populations or even within the same population.[6] The present study has attempted to replicate dietary patterns reported from other epidemiological studies by using similar steps in the subjective decision making process.

In conclusion, this study identified three major dietary patterns and their independent associations with obesity risk among Mongolian adults. Understanding dietary exposure should precede planning of public health nutrition policy and designing of preventive nutrition interventions to address the rise in cardiovascular disease, Mongolia's leading cause of mortality. The study results suggest that public health efforts be targeted at population subgroups to address undesirable consequences of the Transitional, as well as the Traditional eating patterns.

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AUTHOR DISCLOSURES

Authors have no conflict of interest.

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Original Article

Association of major dietary patterns with obesity risk among Mongolian men and women

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蒙古男性及女性主要飲食型態與肥胖風險之相關

蒙古人在過去 20 年來，隨著特殊的遊牧生活方式及飲食習慣改變，肥胖率也有上升情形。目前營養流行病學趨向使用飲食型態方法，調查整體飲食與肥胖危險的相關。本研究目標為針對蒙古成人，找出與肥胖風險相關之飲食型態。對象為 418 位年齡大於 25 歲之成年人，使用 68 項食物頻率問卷評估其飲食攝取。由探索性因素分析歸納出三種飲食型態：變遷飲食含多量加工肉品及馬鈴薯、傳統飲食富含全脂奶和油脂，最後一種為健康飲食攝取全穀類、蔬菜及水果。將各飲食型態分數，依五分位法分組比較，發現變遷飲食分數最高之受試者會顯著增加肥胖之風險(BMI>25 kg/m^2: OR=2.47，95% CI=1.04-5.86)；而健康飲食型態分數最高者肥胖危險顯著較低(OR=0.49; 95% CI=0.25-0.95)。男性變遷飲食型態分數最高者，腹部肥胖(腰圍>90cm)風險較大(OR=4.08; 95% CI=1.11-14.97)。女性傳統飲食型態最高分數者，腹部肥胖機率亦比較高(腰圍>80 cm: OR=4.59; 95% CI=1.58-13.3)。本篇研究顯示，公共衛生目標應針對蒙古成年人闡明變遷及傳統飲食型態之不利影響。

關鍵字：飲食型態、因子分析、身體質量指數、腰圍、蒙古成年人