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Exploring the dietary intake and eating patterns of New Zealand European women aged 16-45 years

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Abstract

Background/Aim: Analysing dietary intakes gives insight to an individual or groups nutritional status. Investigating dietary patterns provides an alternative measure to identify combinations of foods that are related to excess adiposity. The aim of this study is to investigate dietary intakes and eating patterns of New Zealand European (NZE) women with different body composition profiles, participating in the women's EXPLORE (Examining the Predictors Linking Obesity Related Elements) study.

Methods: Post-menarche, pre-menopausal NZE women (16-45 years) (n=231) completed a validated 220-item, self-administrated, semi-quantitative food frequency questionnaire (FFQ) assessing dietary intake over the previous month. Quetelet's body mass index (BMI) was calculated (kg/m^2) from height and weight measurements; body fat percentage (BF%) was measured using air displacement plethysmography (BodPod). Participants were categorised into one of three body composition profile (BCP) groups: normal BMI (18.5-24.9 kg/m^2), normal BF% ($\geq 22\%$, $< 30\%$) (HH); normal BMI, high BF% ($\geq 30\%$)(NH); high BMI ($\geq 25 \text{ kg}/\text{m}^2$), high BF% (HH). Dietary intakes, macronutrient profiles and diet quality for the total NZE women and the BCP groups were analysed. Dietary patterns were identified using principal component factor analysis and broken into tertiles (T1, T2, T3). Associations between dietary patterns, age, BMI and BF% were investigated.

Results: Many NZE women consumed insufficient vitamin D (55%), iron (82%), calcium (28.5%), folate (48%) and dietary fibre (28%) intakes. Mean \pm SD percentage of energy intake for carbohydrate (41.9 \pm 7%) was below and for saturated fat (13.9 \pm 3.5%) above the acceptable macronutrient distribution range for the total NZE women. The top 40 food items consumed by the NZE women included water, bread, tea, coffee, milk and yoghurt. Diet soft drinks were only present in the HH BCP group. Four dietary patterns were identified: P1: 'Snacking' pattern; P2: 'Energy-dense meat' pattern; P3: 'Fruit and vegetable' pattern; P4: 'Healthy' pattern, which explained 6.9, 6.8, 5.6 and 4.8% of variation in food intake, respectively. Younger (16-24 years) (P=0.035) and overweight (26.4 \pm 26.7 kg/m^2) (P=0.036) women were significantly associated with P2, loading highly in T3. No significant associations were found with BF%. Intakes of vitamin A, E, D, and zinc were comparable between normal BF% and high BF% BCP groups.

Conclusion: NZE women consume inadequate iron, vitamin D, folate, calcium and dietary fibre intakes irrespective of body fatness. Dietary patterns of NZE women can be linked to specific body compositions, specifically, women with a high BMI high BF% were associated with a diet characteristic of meat, high fat sauces, puddings and fried foods. Regardless of BF%, NZE women follow a diet low in carbohydrate and high in saturated fat. Diet quality of vitamin A, D, E, iron, and zinc in women with a high BF% is comparable to that of women with normal BF%'s showing good diet quality. Targeted interventions can be developed based on these findings to increase nutrient intakes of NZE women and improve the health status of those with excess adiposity.

Key words: Dietary intake, dietary patterns, factor analysis, food frequency questionnaire

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Abbreviation List

ADP	Air Displacement Plethysmography
BCP group	Body Composition Profile Group
BF%	Body Fat Percentage
BP	Blood Pressure
BMR	Basal Metabolic Rate
BIA	Bioelectrical Impedance Analysis
BMI	Body Mass Index
CHD	Coronary Heart Disease
CVD	Cardiovascular Disease
CHO	Carbohydrate
DASH	Dietary Approach to Stop Hypertension
DQ	Diet Quality
DXA	Dual Energy X-ray Absorptiometry
EXPLORE study	Examining Predictors Linking Obesity Related Elements
FFQ	Food Frequency Questionnaire
GI	Glycaemic Index
GL	Glycaemic Load
HC	Hip Circumference

HFCS	High Fructose Corn Syrup
HH	High Body Mass Index; High Body Fat Percentage
HN	High Body Mass Index; Normal Body Fat Percentage
KMO	Kaiser-Meyer-Olkin
LDL-c	Low Density Lipoprotein Cholesterol
MAMC	Mid Arm Muscle Circumference
NN	Normal Body Mass Index; Normal Body Fat Percentage
NH	Normal Body Mass Index; High Body Fat Percentage
NL	Normal Body Mass Index; Low Body Fat Percentage
NZE	New Zealand European
NZWFFQ	New Zealand Women's Food Frequency Questionnaire
PCA	Principal Component Analysis
SSB	Sugar- Sweetened Beverage
T2DM	Type 2 Diabetes Mellitus
TC	Total Cholesterol
WHO	World Health Organisation
WC	Waist Circumference
W:H ratio	Waist-to-Hip Ratio