Copyright is owned by the Author of the thesis. Permission is given for a copy to be downloaded by an individual for the purpose of research and private study only. The thesis may not be reproduced elsewhere without the permission of the Author.
Investigating eating behaviours as predictors of body composition and dietary intake in New Zealand European, Māori and Pacific women – the women’s EXPLORE study.

A thesis presented in partial fulfilment of the requirements for the degree

Master of Science

in

Nutrition and Dietetics

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Abstract

**Background/Aim:** Internationally, eating behaviour has been linked with an optimal and adverse body composition in women. However no study to date has examined eating behaviour in female New Zealand ethnic groups. Therefore, the aim of this study was to investigate eating behaviours as predictors of different body composition factors and dietary intake in New Zealand European (NZE), Māori and Pacific women, aged 16-45 years, participating in the women’s EXPLORE study.

**Methods:** Women (N=368) were assessed for basic anthropometry, total adiposity, regional adipose distribution and lean mass using height, weight, circumferences, dual x-ray absorptiometry and air-displacement plethysmography. Body composition profiles (normal-fat, hidden-fat and apparent-fat) were established using parameters of body mass indices and body fat percentages. The validated Three-Factor Eating Questionnaire (TFEQ) and New Zealand Women’s Food Frequency Questionnaire were both used to examine eating behaviour and dietary intake, respectively. The TFEQ examined Restraint (Flexible and Rigid), Disinhibition (Habitual, Emotional and Situational) and Hunger (Internal and External). Combinations of behaviour (sub-groups) were established from the main categories and also examined.

**Results:** Restraint was significantly higher in NZE than Pacific women ($p = 0.015$). Disinhibition) was significantly higher in the apparent-fat profile than normal-fat profile ($p < 0.001$). Likewise, Hunger was significantly higher in Pacific ($p < 0.001$) and the apparent-fat profile ($p = 0.034$) than NZE women and women with normal-fat profile, respectively. Adverse tendencies of Habitual Disinhibition, and External Hunger were more prominent in Pacific and the apparent-fat profile than NZE women and normal-fat profile, respectively (all $p < 0.05$). External Hunger was more prominent in the hidden-fat profile than normal-fat profile ($p = 0.001$). When accounting for age and ethnicity the most significant predictors of BMI and BF % were Restraint ($p = 0.007$ and $p = 0.005$ respectively), Disinhibition (both $p < 0.001$), Habitual Disinhibition (both $p < 0.001$) and Emotional Disinhibition (both $p < 0.001$). Non-ideal behaviour combinations (Low Restraint High Disinhibition and High Hunger High Disinhibition) generally corresponded to significantly higher body composition markers and dietary intake ($p < 0.05$). Pacific women were three times more likely to have High Hunger High Disinhibition than NZE women ($p = 0.004$). Low Restraint High Disinhibition and High Hunger High Disinhibition increased by 12% and 11%, respectively from the normal-fat profile to hidden-fat profile (both $p < 0.001$).

**Conclusions:** The TFEQ eating behaviour categories, sub-categories and sub-groups can significantly vary between ethnicities and body composition groups. Tailored interventions to promote Restraint
(particularly Flexible Restraint) and counteract Disinhibition (particularly Habitual Disinhibition and Emotional Disinhibition), Hunger (particularly External Hunger), Low Restraint High Disinhibition and High Hunger High Disinhibition could enhance eating behaviour and dietary intake and help optimise weight management in young New Zealand women.

Key words: Eating behaviour, body composition profiles, New Zealand women
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List of Abbreviations

ADP Air displacement plethysmography
AEBQ Adult Eating Behaviour Questionnaire
AT Adipose tissue
BCP  Body composition profile
BD  Body density
BF  Body fat
BF %  Body fat percentage
BIA  Bioelectrical impedance analysis
BMD  Bone mineral density
BMI  Body mass index
BV  Body volume
CT  Computerised tomography
DEBQ  Dutch Eating Behaviour Questionnaire
DXA  Dual x-ray absorptiometry
EAT  Eating Attitude Test
EDI  Eating Disorder Inventory
EXPLORE  Examining Predictors Linking Obesity Related Elements
FFM  Fat-free mass
FFQ  Food Frequency Questionnaire
FPS  Food Pleasure Scale
G  Gram
HC  Hip circumference
HDL-C  High density lipoprotein cholesterol
IES  Intuitive Eating Scale
IL-6  Inflammatory marker 6
KG  Kilogram
LBM  Lean body mass
LDL-C  Low density lipoprotein cholesterol
M  Metre
MEQ  Mindful Eating Questionnaire
Mrem  Millirem
MRI  Magnetic resonance imagine
N  Number
NZ  New Zealand
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>NZE</td>
<td>New Zealand European</td>
</tr>
<tr>
<td>NZWFFQ</td>
<td>New Zealand Women’s Food Frequency Questionnaire</td>
</tr>
<tr>
<td>OGTT</td>
<td>Oral glucose tolerance test</td>
</tr>
<tr>
<td>PET</td>
<td>Positron emission tomography</td>
</tr>
<tr>
<td>PSS</td>
<td>Perceived Stress Scale</td>
</tr>
<tr>
<td>rEI</td>
<td>Reported energy intake</td>
</tr>
<tr>
<td>RMR</td>
<td>Resting metabolic rate</td>
</tr>
<tr>
<td>SAT</td>
<td>Sub-cutaneous adipose tissue</td>
</tr>
<tr>
<td>SEIC</td>
<td>Satter Eating Competency Inventory</td>
</tr>
<tr>
<td>SREBQ</td>
<td>Self-Regulation Eating Behaviour Questionnaire</td>
</tr>
<tr>
<td>STAI</td>
<td>State Trait Anxiety Inventory</td>
</tr>
<tr>
<td>TAC</td>
<td>Tissue time activity curves</td>
</tr>
<tr>
<td>TBW</td>
<td>Total body water</td>
</tr>
<tr>
<td>TEE</td>
<td>Total energy expenditure</td>
</tr>
<tr>
<td>TEF</td>
<td>Thermic effect of food</td>
</tr>
<tr>
<td>TFEQ</td>
<td>Three Factor Eating Questionnaire</td>
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<tr>
<td>VAS</td>
<td>Visual Analogue Scale</td>
</tr>
<tr>
<td>WC</td>
<td>Waist circumference</td>
</tr>
<tr>
<td>WHR</td>
<td>Waist to hip ratio</td>
</tr>
<tr>
<td>WREQ</td>
<td>Weight Related Eating Questionnaire</td>
</tr>
<tr>
<td>WTHR</td>
<td>Waist to height ratio</td>
</tr>
<tr>
<td>YFAS</td>
<td>Yale Food Addiction Scale</td>
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