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Exploring body composition and metabolic health amongst NZ European, Pacific
Island and Māori women participating in the women's EXPLORE study

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2017

A thesis completed as part of the requirements for
Master of Science in Nutrition and Dietetics
at Massey University, Albany Campus
Auckland, New Zealand

Abstract

Background: In New Zealand, 31.6% of adults are obese. Significant

ethnic health inequalities exist; Pacific Islanders and Māori have the highest rates.

Objectives: To investigate the body composition and metabolic health profiles of healthy NZ European, Pacific and Māori women participating in the women's EXPLORE study.

Methods/Design: Cross sectional design investigating 233 European, 91 Pacific and 84 Māori women. Different body mass index (BMI) and body fat % (BF%) defined body composition profiles were analysed for anthropometric measurements, body fat location, and metabolic biomarkers.

Results: Obese (BF%) Māori women had higher android fat mass than obese (BF%) Europeans (2.53kg vs 2.23kg) with no difference in waist circumference (WC). Non-obese (BMI) Māori had higher WC than non-obese (BMI) NZ Europeans (78cm vs 73.5cm) with android fat differences. Regardless of body composition grouping, no ethnic differences were found for BF%. Obese Pacific women had higher HOMA-IR (5.12-5.45) and insulin (24.28-23.28mU/L) than obese Europeans (2.10-2.61 and 10.07-11.24mU/L respectively), as did obese Māori (3.64-4.35 and 16.76-19.41mU/L respectively). Body composition measures with highest sensitivity across all biomarkers assessed were BF% ≥ 30 for Europeans, both BF% ≥ 30 and BMI ≥ 25 for Pacific, and BMI ≥ 25 for Māori.

Conclusion: Māori and Pacific women had significantly higher glucose metabolism markers than NZ Europeans despite no differences in BF%. When comparing Māori to NZ Europeans, a higher WC was not always related to a higher android fat mass or vice versa, suggesting that WC may not be an accurate representation of abdominal fat for Māori. In spite of ethnic differences, BF% ≥ 30 and BMI ≥ 25 appear most sensitive to detect high biomarkers compared to abdominal measurements.

Acknowledgements

First and foremost, I would like to thank Massey University, and Rozanne Kruger in particular, for the opportunity to be a part of the EXPLORE study to complete my thesis. I would also like to thank Rozanne and Marilize Richter for their ongoing advice, guidance and support throughout this process, especially during the difficult times. Although it has been a challenging journey, I have learned so much from each of them and for this I will always be grateful.

I would also like to thank all of those who were involved with the recruitment, screening, data collection, and data handling for this study.

Finally I would like to thank my family, friends, and Justin for supporting and encouraging me, reminding me to take study breaks, and helping me through the highs and lows along the way.

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Abbreviations

AG android gynoid

ASMM appendicular skeletal muscle mass

ATM adipose tissue macrophage

BF body fat

BIA bioelectrical impedance analysis

BMD bone mineral density

BMI body mass index

BP blood pressure

Chol/HDL cholesterol to high density lipoprotein ratio

CRP c-reactive protein

CVD cardiovascular disease

DXA dual-energy x-ray absorptiometry

FFA free fatty acids

FM fat mass

FFM fat free mass

HbA1c glycated haemoglobin

HC hip circumference

HDL high density lipoprotein

HH high BMI, high body fat %

HOMA-IR homeostasis model of insulin resistance

IFG impaired fasting glucose

IGT impaired glucose tolerance

IL interleukin

IR insulin resistance

LBM lean body mass

LDL low density lipoprotein

MCP- 1 monocyte chemotactic protein 1

MHO metabolically healthy obese

NH normal BMI, high body fat %

NN normal BMI, normal body fat %

NWO normal weight obesity

NZE New Zealand European

OGTT oral glucose tolerance test

VLDL very low density lipoprotein

SAT subcutaneous adipose tissue

Se sensitivity

Sp specificity

SNS sympathetic nervous system

TC total cholesterol

T2D Type II diabetes

TG triglycerides

TLR-4 Toll like receptor 4

TNF- α tumor necrosis factor

VAT visceral adipose tissue

WC waist circumference

WHO world health organisation

WtHR waist to height ratio

WHR waist to hip ratio