

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.

# **Nutritional status of older Māori hospitalised due to infection**

---

Master of Science in Human Nutrition and  
Dietetics

at

Massey University, Albany, New Zealand

**Fiona Baggett**  
**2013**

## Acknowledgements

I would like to acknowledge some of the people who made this research possible. There are many other people not mentioned here but contributed to this thesis and to those I am also grateful for your help and support.

Firstly to the participants without their consent this would not have been written as well as the LiLACs team who collected all the data and did all the ground work to make this topic possible.

To my supervisor, Dr Carol Wham for her wisdom, expertise, positive encouragement and tireless patients. Thanks to Ruth Teh for her guidance with statistics and managed to make statistics interesting. To Professor Ngaire Kerse and Mere Kepa for their support and encouragement.

Last I would like to acknowledge my family. Trina my sister, my daughter Olyvia and niece Kiriana-Maia, who encouraged me to stick at it when I wanted to give up and had faith in me. To my mum and dad who if they were here today would be proud of me too. Arohanui.

# Abstract

## Background

Life expectancy amongst Māori is increasing and more Māori are expected to live into advanced age (80+ years). Māori have higher rates of morbidity and health disparities compared to non-Māori. Māori diets are seen to have high fat intakes and marginal intakes of zinc and selenium. Deficiencies in these minerals may have negative effects on immune status. Nutrition is a modifiable factor that may help to reduce the risk of infection. This study aims to look at the nutrient intake of Māori in advanced age (80+ years) and to investigate differences in energy and nutrient intakes of those hospitalised due to infection and not hospitalised.

## Methods

There were 200 Māori participants in this study aged 80-90 years. Detailed nutritional information was collected using the 24 hour multiple-pass recall method on two separate days. FOODfiles was used to analyse nutrient intake. Selected International Classification of Disease (ICD) codes for infections were paired with National Health Index (NHI) numbers to identify participants who had been hospitalised over a two year period. Face to face interviews were conducted in the LiLACs NZ to obtain demographic, social and health information.

## Results

Participants had a higher percentage of energy from fat intake (38%) compared to the NHMRC recommendations for adults (25-35%). Participants intakes were below the NHMRC recommendations for adults for calcium (47% vs 50%) and selenium (29% vs 37%) respectively. Only men had intakes below the NHMRC recommendations for zinc (28%) and vitamin E (24%).

A total of 18% of participants were hospitalised due to infection. The main type of infection was infection of the lower respiratory tract.

Participants who had been hospitalised were more likely to have smoked ( $p=0.013$ ), been diagnosed with diabetes ( $p=0.05$ ) and have chronic lung disease ( $p>0.001$ ) and cardiovascular disease ( $p=0.003$ ). They also had a higher consumption of total fat (78.3g vs 64g) ( $p=0.05$ ) and monounsaturated fat (28g vs 21g) ( $p=0.04$ ). Those who had not been hospitalised versus those hospitalised had a higher percent of energy from protein (17% vs 15%) ( $p=0.009$ ).

## **Conclusions**

The nutritional intake of the older Māori participants was similar to New Zealanders aged 71 years and over reported in the National Nutrition Survey 2008/9. Participants tended to have inadequate intakes of calcium, selenium and vitamin E. Zinc intakes were inadequate only in men. Participants who had been hospitalised had a lower percentage of energy from protein compared to those not hospitalised. Protein may have a protective effect on the nutritional health of older Māori and this may reduce hospitalisation due to infection in this age group.

## Table of Contents

<b>Acknowledgements</b> .....	<b>i</b>
<b>Abstract</b> .....	<b>ii</b>
<b>List of tables</b> .....	<b>vi</b>
<b>List of figures</b> .....	<b>vii</b>
<b>Glossary</b> .....	<b>viii</b>
<b>1. Introduction</b> .....	<b>1</b>
<b>2. Literature Review</b> .....	<b>3</b>
<b>2.1 Kai (food) perspectives</b> .....	<b>3</b>
2.1.1 Pre-colonial eating practices. ....	3
2.1.2 Post- Colonial eating practices .....	4
2.1.3 Contemporary eating practises.....	5
2.1.4 Nutrient intakes of Māori from National Nutrition Surveys.....	5
2.1.5 Regional studies on nutrient intakes of older Māori .....	7
2.1.6 Food Security and Māori .....	8
<b>2.2 Māori and Health</b> .....	<b>9</b>
2.2.1 Life Expectancy .....	9
2.2.2.Lifestyle and successful aging .....	10
2.2.3 Māori and Body Mass Index classifications .....	11
2.2.4 Health conditions affecting Māori .....	12
2.2.5 Health disparities amongst Māori .....	12
2.2.6 Māori models of health. ....	14
<b>2.3 Hospitalisations</b> .....	<b>14</b>
2.3.1 Hospitalisation from infection in New Zealand.....	14
<b>2.4 Types of infections</b> .....	<b>16</b>
2.4.1 Respiratory infections .....	16
2.4.2 Skin infections and cellulitis.....	17
2.4.2 Enteric infections .....	18
<b>2.5 Nutrients and relationship to infections</b> .....	<b>18</b>
2.5.1 Total energy and infections.....	18
<b>2.6 Macronutrient relationship to infection</b> .....	<b>19</b>
2.6.1 Protein.....	19
2.6.2 Fats.....	21
<b>2.7 Micronutrients and infection</b> .....	<b>21</b>
2.7.1 Vitamin E.....	22
2.7.2 Vitamin C.....	23
2.7.3 Vitamin A .....	23
2.7.4 Zinc .....	24
2.7.5 Selenium .....	24

2.7.6 Iron.....	25
<b>2.8 Summary.....</b>	<b>26</b>
<b>3. Aims and objectives .....</b>	<b>27</b>
<b>4. Methods.....</b>	<b>28</b>
<b>4.1 Te Puāwaitanga o Nga Tapuwae Kia Ora -LiLACS NZ.....</b>	<b>28</b>
<b>4.2 Participants and recruitment.....</b>	<b>29</b>
<b>4.3 Collection process of data.....</b>	<b>29</b>
4.3.1 Categories selected from LiLAC NZ questionnaire .....	30
4.3.2 Demographic Information.....	31
4.3.3 Health Measures .....	31
4.3.4 Anthropometric measures .....	32
<b>4.4 Hospital data.....</b>	<b>32</b>
4.4.1 Hospital admissions .....	32
4.4.2 Classifications of infections on hospital admission .....	33
<b>4.5. Infection codes .....</b>	<b>33</b>
<b>4.6. Dietary Assessment - Two 24 hour Multi pass dietary recall .....</b>	<b>34</b>
4.6.1 Nutrients investigated .....	35
<b>4.7 Statistical analysis .....</b>	<b>37</b>
<b>5. Results .....</b>	<b>39</b>
<b>5.1 Demographic, lifestyle and health characteristics .....</b>	<b>39</b>
5.1.1 Demographics .....	39
5.1.2 Lifestyle characteristics .....	40
<b>5.2 Health characteristics .....</b>	<b>41</b>
<b>5.3 Function and quality of Life.....</b>	<b>42</b>
<b>5.4 Dentures .....</b>	<b>43</b>
<b>5.5 Access to support services .....</b>	<b>44</b>
<b>5.6 Deprivation Index .....</b>	<b>45</b>
<b>5.7 Financial Security .....</b>	<b>45</b>
<b>5.8 Weight and Body mass index .....</b>	<b>46</b>
<b>5.9 Infection by type and number of hospital admissions. ....</b>	<b>47</b>
<b>5.10 Nutrient intake from 24 hour MPR .....</b>	<b>48</b>
5.10.1 Energy and Macronutrients.....	48
5.10.2 Micronutrients.....	49
5.10.3 Macronutrient percentage from energy.....	49
5.10.4 Comparison to Nutrition Reference Values .....	50
<b>5.11 Nutrient intakes by hospitalised versus not hospitalised participants.....</b>	<b>51</b>
5.11.1 Energy and Macronutrients.....	51
5.11.2 Micronutrients.....	51
5.11.3 Macronutrient percentage from energy.....	52
5.11.4 Nutrient intakes for hospitalised versus not hospitalised by gender. ....	53

5.11.5 Micronutrients.....	54
5.11.6 Macronutrient percentage to energy .....	54
<b>5.12 Weight and Body mass index for hospitalised versus not hospitalised .....</b>	<b>55</b>
5.12.1 Body Mass Index (BMI)classifications .....	55
<b>5.13 Logistic Regression Model .....</b>	<b>57</b>
<b>6. Discussion.....</b>	<b>58</b>
<b>6.1 Limitations.....</b>	<b>64</b>
<b>6.2 Strengths .....</b>	<b>65</b>
<b>7. Conclusion .....</b>	<b>65</b>
<b>7.1 Recommendations .....</b>	<b>66</b>
<b>8. References .....</b>	<b>67</b>
<b>9. Appendix.....</b>	<b>75</b>

## List of Tables

Table 2.1-Number of Hospitalisation from infections in Māori 80+ years for 2010/11.....	16
Table 4.1-Questionnaire categories selected from LILAC NZ.....	30
Table 4.2-Participants infection types paired to ICD-10 codes.....	34
Table 4.3-WHO classifications for Adults 18+.....	37
Table 5.1-Participant’s age and gender.....	39
Table 5.2-Lifestyle status of participants.....	39
Table 5.3-Health conditions of participants hospitalised / not hospitalised.....	41
Table 5.4-Daily activates, Quality of life of participants hospitalised versus not hospitalised..	43
Table 5.5-Participants Dentition.....	43
Table 5.6-Participants who accessed support services by hospitalised versus not hospitalised..	44
Table 5.7-Participants Self-reported financial security, by hospitalised versus not hospitalised.....	46
Table 5.8-Participants anthropometric measures by gender.....	46
Table 5.9- Frequency of hospital admissions by infection type. ....	47
Table 5.10-Median energy and macronutrient intake by gender.....	48
Table 5.11 -Median vitamin and mineral intake by gender.....	49
Table 5.12-Median % energy for macronutrient intake from the 24 hour MPR by gender.....	49
Table 5.13-Median intakes of protein and minerals compared to Nutrient Reference Values...	50
Table 5.14-Median intake of energy and macronutrient for participants who were hospitalised versus not hospitalised .....	51



Table 5.15-Median vitamin and mineral intake for participants who were hospitalised versus not hospitalised.....	51
Table 5.16-Median % energy for macronutrient intake for participants who were hospitalised versus not hospitalised.....	52
Table 5.17-Mean energy and macronutrient intake of men and women that had been hospitalised versus not hospitalised .....	53
Table 5.18-Vitamin and mineral intake of men and women that had been hospitalised versus not hospitalised.....	54
Table 5.19-Median % of contribution to energy intake of men and women that had been hospitalised versus not hospitalised.....	54
Table 5.20-Participants weight and BMI by gender for participants hospitalised versus not hospitalised.....	55
Table 5.21-Participants BMI classifications by gender and hospitalised versus not hospitalised.....	56
<b>Table 5.22-Logistic regression model adjusted for age, gender, NZ Deprivation Index, diabetes, CVD.....</b>	<b>57</b>

## List of Figures

Figure 1.1-New Zealand population 65- 85+ as a percentage of the total population: 1961 to 2021.....	1
Figure 5.1- Health comparisons between those hospitalised and not hospitalised due to infection.....	42
Figure 5.2-NZ deprivation index of participants hospitalised versus not hospitalised .....	45
Figure 5.3-Hospitalisation from infections by gender.....	47
Figure 5.4BMI classification for men hospitalised verses not hospitalised.....	56
Figure 5.5-BMI classification for women hospitalised verses not hospitalised.....	56

# Glossary

## Māori Terms

<b>Māori name</b>	<b>Translation</b>
hākari	feast
hāngi	kai cooked in an earth oven
hapū	sub-tribe
haukāinga	people of the marae
Hauora	health care providers
hui	gatherings
ika	fish
iwi	tribe
kai	food
kaimoana	seafood
kaitiaki	protectors/ guardians of the land
kuia	older women
kaumātua	older men
mana	honour/ prestige
manaakitanga	ethical principle donating the importance of caring for others
manuhiri	visitors
marae	traditional meeting place
noa	unrestricted
Pākehā	New Zealand European
piko piko	sow thistle
powhiri	Welcome ceremony
pūhā	New Zealand spinach
Rēwena	Māori bread
Tapu	sacred
Tītī	muttonbird
whānau	family, usually inclusive of extended family