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**NUTRITION AND PHYSICAL ACTIVITY FOR PRE-SCHOOLERS: EARLY CHILDHOOD  
EDUCATION TEACHERS' KNOWLEDGE AND PERSPECTIVES**

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

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## ABSTRACT

**Background** Caregivers' knowledge of the links between nutrition, diet and physical activity is increasingly being recognised as important for children's health and body size. Evidence is limited for early childhood education (ECE) teachers' knowledge about nutrition and physical activity for pre-schoolers, especially in New Zealand. Identifying knowledge gaps amongst teachers may direct professional development, health promotion and obesity prevention strategies in childcare settings.

**Aims** The primary aim was to measure early childhood education (ECE) teachers' nutrition knowledge for pre-schoolers (2-5-year-olds); and their perspectives towards nutrition and physical activity. In order to achieve this, a secondary aim was to design an ECE teacher nutrition knowledge questionnaire that satisfies psychometric criteria of validity and reliability.

**Methods** Questionnaire items were generated based on New Zealand Ministry of Health nutrition guidelines for pre-schoolers, a literature search and expert advice. Nutrition (n=40) and non-nutrition (n=51) university students completed the questionnaire once; 35 of the nutrition students completed the questionnaire twice.

Psychometric tests for construct and test-retest reliability were conducted. The cross-sectional online validated questionnaire of New Zealand ECE teachers' nutrition knowledge for pre-schoolers was then used to measure ECE teachers' nutrition knowledge for pre-schoolers. Knowledge was scored and measured against the Ministry of Health *Food and Nutrition Guidelines for Healthy Children and Young People (Aged 2-18 years): A background paper* (2015c). Teachers' perspectives towards nutrition and physical activity for pre-schoolers were assessed using Likert scales within the questionnaire. Analysis included descriptive statistics, correlation and linear regression.

**Results** The questionnaire achieved an acceptable level of content and construct validity and test-retest reliability. ECE teachers (n=386) from New Zealand childcare centres

completed the validated questionnaire. Teachers' knowledge of nutrition was lacking; overall score was  $22.56 \pm 2.83$  (mean  $\pm$  SD), or 61% correct. Age, qualification level, employment role and years of experience did not predict overall nutrition knowledge scores. Teachers' increased years of experience significantly predicted an increase in knowing that New Zealand nutrition and physical activity guidelines existed ( $B=0.02$  [95% CI, 0.00-0.03],  $r^2=0.13$ ,  $P=0.033$ ). Teachers' increased agreement in feeling they were confident talking about nutrition to parents significantly predicted an increase in overall nutrition knowledge scores, ( $B=0.34$  [95% CI, 0.06-0.63],  $r^2=0.15$ ,  $P=0.019$ ). The belief that ECE teachers play a vital role in promoting pre-schoolers' healthy eating and physical activity was widespread. Teachers generally held positive perspectives towards feeding practices and perceived themselves to understand key physical activity concepts. Common barriers for ECE teachers' nutrition and physical activity knowledge included a lack of staff training, confidence and resources.

**Conclusion** The questionnaire achieved an acceptable level of construct validity and test-retest reliability and is suitable to measure ECE teachers' nutrition knowledge for pre-schoolers (2-5-year-olds) in New Zealand. ECE teachers may lack nutrition knowledge for pre-schoolers in New Zealand, particularly with regards to basic nutrition recommendations (servings, food/beverage choices and portion sizes).

Keywords: childhood obesity, childcare, kindergarten, day care, pre-school, nutrition environment, psychometric validation, nutrition literacy

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## TABLE OF CONTENTS

ABSTRACT .....	II
ACKNOWLEDGEMENTS .....	IV
TABLE OF CONTENTS .....	III
LIST OF TABLES .....	X
LIST OF FIGURES .....	XIII
LIST OF ABBREVIATIONS AND SYMBOLS .....	1
CHAPTER 1: INTRODUCTION .....	1
1.1 Summary and Justification for Research .....	3
1.2 Purpose of the Study .....	4
1.3 Aims and Objectives .....	5
1.4 Thesis Structure .....	5
1.5 Contributions of Researchers.....	6
CHAPTER 2: LITERATURE REVIEW.....	7
2.1 Introduction.....	7
2.2 Childhood Obesity .....	8
2.2.1 Obesity rates in pre-schoolers.....	8
2.2.2 Childhood obesity aetiology .....	8
2.2.3 Health consequences of childhood obesity.....	9

<b>2.3 Nutrition for Pre-schoolers (2-5-year-olds)</b> .....	<b>10</b>
2.3.1 Definitions .....	10
2.3.2 Energy and key nutrients for growth and development .....	11
2.3.3 Nutritional Intakes of New Zealand pre-schoolers .....	12
2.3.4 Nutrition recommendations and feeding practices for pre-schoolers .....	12
2.3.3.1 Recommended servings per day .....	13
2.3.3.2 Serving versus portions.....	13
2.3.3.3 Eating variety .....	14
2.3.3.4 Eating frequency .....	14
2.3.3.5 Food and beverage choices.....	15
2.3.3.6 Other feeding practices .....	16
<b>2.4 Nutrition in Early Childhood Education (ECE)</b> .....	<b>17</b>
2.4.1 Food and nutrition environments in ECE centres .....	17
2.4.2 Te Whāriki – Early childhood curriculum.....	18
2.4.3 The Healthy Heart Award programme .....	19
2.4.4 ECE teachers’ nutrition knowledge for pre-schoolers.....	19
2.4.5 Barriers for ECE teachers’ nutrition and physical activity knowledge .....	20
2.4.5.1 Educational background .....	20
2.4.5.2 Perceived responsibilities .....	21
2.4.5.3 Confounding nutrition messages.....	21
2.4.5.4 Other potential barriers.....	21

2.4.6 The impact of ECE teachers’ nutrition knowledge .....	22
2.4.6.1 Improved nutrition knowledge or behaviours in children .....	22
2.4.6.2 Improved health behaviours in teachers .....	22
2.4.6.3 Improved BMI in children .....	23
2.4.6.4 Improved nutrition environments in childcare .....	23
2.4.6.5 Improved rates of teaching nutrition in class.....	24
<b>2.5 Physical Activity for Pre-schoolers (2-5-year-olds) .....</b>	<b>25</b>
2.5.1 Definitions .....	25
2.5.2 Physical activity for growth and development .....	26
2.5.3 Physical activity recommendations for pre-schoolers .....	27
2.5.4 Physical activity in ECE centres.....	28
2.5.5 ECE teachers’ physical activity knowledge and perspectives for pre-schoolers .....	29
<b>2.6 Nutrition and Physical Activity Knowledge Questionnaires .....</b>	<b>32</b>
2.6.1 Content validity .....	32
2.6.2 Construct validity.....	32
2.6.3 Reliability.....	33
2.6.4 Current questionnaires .....	33
<b>2.7 Summary .....</b>	<b>37</b>
<b>CHAPTER 3: EARLY CHILDHOOD EDUCATION TEACHERS’ NUTRITION KNOWLEDGE FOR 2-5-YEAR-OLD CHILDREN IN CHILDCARE: A NARRATIVE REVIEW .....</b>	<b>38</b>
<b>3.1 Abstract.....</b>	<b>38</b>



<b>3.2 Introduction.....</b>	<b>39</b>
3.2.1 Objectives.....	40
<b>3.3 Methods .....</b>	<b>40</b>
3.3.1 Search procedure.....	41
3.3.2 Inclusion and exclusion criteria .....	41
<b>3.4 Results .....</b>	<b>43</b>
3.4.1 Summarising the articles .....	43
3.4.2 Outcome findings.....	43
3.4.2.1 ECE teachers’ nutrition knowledge.....	43
3.4.2.2 ECE teachers’ nutrition-related attitudes and beliefs.....	45
3.4.2.3 ECE teachers’ nutrition-related behaviours and feeding practices .....	47
3.4.2.4 ECE teachers’ background and nutrition knowledge/attitudes/practices .....	48
<b>3.5 Discussion.....</b>	<b>56</b>
<b>3.6 Conclusions.....</b>	<b>61</b>
<b>CHAPTER 4: DEVELOPMENT OF A PSYCHOMETRICALLY VALID AND RELIABLE EARLY CHILDHOOD EDUCATION TEACHERS’ NUTRITION KNOWLEDGE QUESTIONNAIRE ..</b>	<b>62</b>
<b>4.1 Abstract.....</b>	<b>62</b>
<b>4.2 Introduction.....</b>	<b>63</b>
<b>4.3 Methods .....</b>	<b>64</b>
4.3.1 Study design .....	64
4.3.2 Questionnaire design .....	66

4.3.3 Participants.....	67
4.3.4 Statistical analysis.....	68
<b>4.4 Results.....</b>	<b>68</b>
4.4.1 Participants.....	68
4.4.2 Content validity.....	68
4.4.3 Construct validity.....	68
4.4.4 Test-retest reliability.....	69
<b>4.5 Discussion.....</b>	<b>70</b>
4.5.1 Limitations.....	71
<b>4.6 Conclusion.....</b>	<b>71</b>
 <b>CHAPTER 5: NUTRITION AND PHYSICAL ACTIVITY FOR PRE-SCHOOLERS: KNOWLEDGE AND PERSPECTIVES AMONGST EARLY CHILDHOOD EDUCATION TEACHERS.....</b>	 <b>72</b>
<b>5.1 Abstract.....</b>	<b>72</b>
<b>5.2 Introduction.....</b>	<b>73</b>
<b>5.3 Methods.....</b>	<b>75</b>
5.3.1 Participants.....	75
5.3.2 Recruitment.....	75
5.3.3 Questionnaire.....	75
5.3.4 Statistical analysis.....	76
<b>5.4 Results.....</b>	<b>77</b>
5.4.1 Participants.....	77

5.4.2 Overall nutrition knowledge.....	80
5.4.3 Servings.....	80
5.4.4 Food choices.....	80
5.4.5 Portions.....	81
5.4.6 Resources.....	81
5.4.7 Perspectives.....	82
5.4.8 Barriers for teachers' knowledge.....	82
5.4.9 Additional comments.....	83
<b>5.5 Discussion.....</b>	<b>88</b>
5.5.1 Overall nutrition knowledge scores.....	88
5.5.2 Servings.....	88
5.5.3 Food choices.....	89
5.5.4 Portions.....	90
5.5.5 Resources.....	91
5.5.6 Determinants of ECE teachers' nutrition knowledge.....	91
5.5.7 Perspectives and barriers.....	92
5.5.8 Limitations and strengths.....	94
<b>5.6 Conclusions.....</b>	<b>94</b>
<b>CHAPTER 6: CONCLUSIONS.....</b>	<b>96</b>
<b>6.1 Overview and Achievement of Study Aims and Objectives.....</b>	<b>96</b>
<b>6.2 Findings and Concluding Remarks.....</b>	<b>96</b>

<b>6.3 Research Contribution .....</b>	<b>97</b>
<b>6.4 Strengths and Limitations .....</b>	<b>97</b>
6.4.1 Choice of aims and objectives .....	98
6.4.2 Measuring tool: Knowledge questionnaire .....	98
6.4.3 Recruitment and data collection .....	99
6.4.4 Sample size.....	99
6.4.5 Statistical analysis.....	99
<b>6.5 Directions for Future Research .....</b>	<b>100</b>
<b>6.6 Final Recommendations .....</b>	<b>100</b>
<b>REFERENCES .....</b>	<b>103</b>
<b>APPENDICES .....</b>	<b>123</b>
<b>Appendix A: Additional background and study protocol.....</b>	<b>123</b>
<b>Appendix B: Supplementary results.....</b>	<b>129</b>
<b>Appendix C: Questionnaire and materials .....</b>	<b>166</b>

## LIST OF TABLES

Table 1.1. Contributions of researchers .....	6
Table 2.1. Psychometric validation of existing ECE teachers' nutrition and/or physical activity knowledge questionnaires .....	35
Table 3.1. Study characteristics .....	49
Table 4.1. Mann-Whitney test comparing nutrition knowledge scores between nutrition and non-nutrition students (n=91) .....	69
Table 4.2. Median-split table (n=91) .....	69
Table 4.3. Test-retest reliability using Pearson's product-moment correlation (n=35; nutrition students only) .....	70
Table 5.1. Participant characteristics (n=386) .....	79
Table 5.2. Mean $\pm$ SD nutrition knowledge scores by participant variables .....	84
Table 5.3. Responses of ECE teachers in New Zealand on nutrition knowledge items (n=386) .....	85
Table 5.4. Analysis of variance (ANOVA) and correlation analysis of ECE teachers' nutrition knowledge scores and age, qualification, employment role and years of experience (n=386) .....	86
Table 5.5. ECE teachers' nutrition and physical activity-related perspectives (7-point Likert scale) .....	87

Table B. 1. Number and percentage of items correct by participants (n=386).....	129
Table B. 2. Responses for servings sub-category items (n=386) .....	130
Table B. 3. Responses for food choices (n=386) .....	130
Table B. 4. ECE teachers’ responses for “How many snacks should a pre-schooler have per day?” (n=386).....	133
Table B. 5. Linear regression analysis for nutrition knowledge scores and qualification level, current role, age and years of experience (n=377).....	133
Table B. 6. Nutrition and physical activity perspectives (7-point Likert scale; strongly disagree=1 to strongly agree=7) .....	135
Table B. 7. Analysis of variance (ANOVA) and correlation analysis of ECE teachers’ nutrition and physical activity perspectives and age, qualification, employment role and years of experience .....	137
Table B. 8. Linear regression analysis of nutrition and physical activity perspectives and qualification level, current role, age and years of experience .....	144
Table B. 9. Pearson’s correlation analysis of ECE teachers’ nutrition knowledge perspectives and overall nutrition knowledge scores .....	151
Table B. 10. Linear regression analysis of nutrition and physical activity perspectives and overall nutrition knowledge scores.....	153
Table B. 11. Sources that ECE teachers report using to find information about nutrition and physical activity.....	155
Table B. 12. ECE teachers’ perceived barriers for nutrition and physical activity in ECE .....	156
Table B. 13. Themes and evidence examples identified in ECE teachers’ additional comments about nutrition for pre-schoolers .....	158

Table B. 14. Themes and evidence examples identified in ECE teachers' additional comments about physical activity for pre-schoolers ..... 162

Table B. 15. Sample characteristics for ECE questionnaire validation study (n=91) ..... 164

## LIST OF FIGURES

Figure 2.1. Search strategy .....	7
Figure 3.1. Search terms, and inclusion and exclusion criteria .....	42
Figure 4.1. Questionnaire validation for ECE teachers’ nutrition knowledge study protocol flow diagram .....	65
Figure 5.1. Participant flow diagram .....	78
Figure A. 1. ECE teachers’ nutrition knowledge and related perspectives for pre- schoolers’ study protocol flow diagram .....	125
Figure C. 1. ECE teachers’ nutrition and physical activity questionnaire (sample). .....	188
Figure C. 2. ECE teachers’ nutrition and physical activity study webpage (homepage) .....	189
Figure C. 3. ECE teachers’ nutrition and physical activity study webpage (about researchers) .....	190
Figure C. 4. ECE teachers’ nutrition and physical activity study webpage (participant information) .....	191
Figure C. 5. ECE teachers’ nutrition and physical activity study webpage (update page) .....	192
Figure C. 6. ECE teachers’ nutrition and physical activity study webpage (contact page) .....	193
Figure C. 7. ECE teachers’ nutrition and physical activity study press release (Massey University).....	194
Figure C. 8. ECE teachers’ nutrition and physical activity study feature on RadioLive (03/08/17).....	195



Figure C. 9. The North Shore Times article for the ECE teachers’ nutrition and physical activity study (10/07/17). ..... 196

Figure C. 10. Invitation for participants via facebookLive post; Livenoticeboard.co.nz; the Mike Hosking Breakfast show..... 197

## LIST OF ABBREVIATIONS AND SYMBOLS

Table I. List of abbreviations and symbols

<b>Abbreviation or symbol</b>	<b>Definition</b>
%	Percentage
<	Less than
=	Equal to
>	Greater than
±	Plus-minus
≤	Equal to or Less than
≥	Equal to or Greater than
ANOVA	Analysis of variance
AUS	Australia
BMI	Body mass index
CACFP	Child and Adult Care Food Program
CDC	Centers for Disease Control and Prevention
CI	Confidence Interval (i.e. Upper and Lower Bounds)
cont.	Continued
d	Cohen's effect size index
df	Degrees of freedom
Dr	Doctor
e.g.	Example
ECE	Early childhood education
et al.	and others
F	F-ratio
HHA	Healthy Heart Award
IBM	International Business Machines Corporation
kg	Kilogram
MEDLINE	Medical Literature Analysis and Retrieval System Online

MeSH	Medical Subject Headings
METs	Metabolic equivalents
mg	Milligram
MoH	Ministry of Health
MS	Mean squares
MSc	Master of Science
MVPA	Moderate-vigorous intensity physical activity
N	Population size
n	Sample size
NAP SACC	Nutrition and Physical Activity Self-Assessment for Child Care
NK	Nutrition knowledge
NSW	New South Wales
NZ	New Zealand
OECD	Organisation for Economic Co-operation and Development
PAHA	Physical Activity Health Alliance
PAK	Physical activity knowledge
PubMed	Public/Publisher MEDLINE
P-value	The probability of rejecting the null hypothesis when it is true
r	Pearson's product-moment correlation coefficient
r <sup>2</sup>	Coefficient of determination (r-squared)
RCT	Randomised control trial
RDA	Recommended daily allowance
RDI	Recommended daily intake
r <sub>s</sub>	Spearman's correlation coefficient
SD	Standard deviation
SPANS	Schools Physical Activity and Nutrition Survey
SPSS	Statistical Package for the Social Sciences
U	Mann-Whitney U (Wilcoxon) statistic
UK	United Kingdom
US or USA	United States of America

USDA	United States Department of Agriculture
VPA	Vigorous intensity physical activity
WHO	World Health Organization
y	Years
z	Standard score
zBMI	Body mass index-for-age z-score (or standard deviation score)
$\beta$	Greek Beta (the probability of a Type II error)