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**AN INVESTIGATION OF FRUIT AND VEGETABLE INTAKES IN
WHANGAREI SCHOOLCHILDREN.**

**DO 5+ A DAY EDUCATIONAL RESOURCES MAKE A
DIFFERENCE?**

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**A thesis submitted to fulfill the requirements for the degree of Master of
Science (Nutritional Science), Massey University, 2004.**



ABSTRACT

Fruits and vegetables contain a multitude of nutritive and non-nutritive substances that are beneficial for good health. The Ministry of Health (MOH) recommends consumption of at least five servings of fruits and vegetables daily. This is to enhance wellbeing and to maximise the potential protection against the chronic diseases with which low intakes of these specific foods are associated (MOH, 2003a). The 2002 National Children's Nutrition Survey (CNS02), however, reported that large numbers of New Zealand's young people are eating less than these recommendations (MOH, 2003b). Effective strategies to increase fruit and vegetable intakes in this population group are required.

Numerous school-based programmes specifically designed to increase the intake of fruit and vegetables have been implemented in America and the United Kingdom with mixed results (Perry et al, 1998; Reynolds et al, 2000; DOH, 2002; Edmunds & Jones, 2003). In New Zealand, the national 5+ A Day campaign encourages people to consume the targeted amounts of fruits and vegetables every day and has been introduced into numerous child early learning centres and primary schools throughout the country (United Fresh, 2003). Evaluation of this programme is necessary to determine its effectiveness, to identify areas for improvement, and to provide current updates, which may aid the development of health education policies.

The present study aimed to determine what, if any, difference the 5+ A Day resource material provided to primary schools makes on the dietary intakes and nutritional knowledge of children who are exposed to these resources (intervention) compared to those who are not (control). Children were recruited from five Whangarei primary schools (2 controls, 3 interventions). Data on dietary intake, nutritional knowledge and physical activity were collected from children using a food frequency questionnaire (FFQ) and a knowledge/physical activity questionnaire (CNKQ). Parents or guardians of the children

also completed a questionnaire similar to the CNKQ, which included questions about shopping and barriers to increasing fruit and vegetable intakes.

The findings of this study show that Whangarei children are consuming fruit and vegetables above MOH recommendations. Intakes of fruits and vegetables and nutrition knowledge do not differ significantly between control and intervention groups. Children who did receive the specific 5+ A Day resources, however, are more aware of a connection between food and certain health conditions i.e. general health, heart disease and cancer. The 5+ A Day message is well recognised by both children and parents regardless of whether or not the school was registered to receive 5 + A Day resources. It is likely that the widespread promotion of the programme via various channels of communication has contributed to enhanced awareness and reported intakes of fruit and vegetables. Additionally, the intensity to which health and nutrition activities are delivered in school, the degree to which environmental changes are made to increase the availability of fruit and vegetables, and the involvement of parents and the wider community are issues that may influence whether or not children increase their intake of these foods.

ACKNOWLEDGEMENTS

Acknowledgements go to the management staff, teachers, children and parents from the Whangarei schools involved in this research: Hurupaki Primary, Kamo Primary, Whau Valley Primary, Onerahi Primary, and St Francis Xavier Primary; and to those from Matarau Primary school who were involved in pilot testing of the questionnaire.

Acknowledgements go also to my family for their patience and support, Dr Pauline Ashfield-Watt for her input and encouragement, Elizabeth Stewart for her help with questionnaire design, and to United Fresh New Zealand Inc. for their financial support.

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ETHICS AND CONFIDENTIALITY

Ethical approval for this study was obtained in May 2003 from the Massey University Human Ethics Committee.

LIST OF ABBREVIATIONS

ATBC	Alpha-Tocopherol Beta-Carotene Cancer Prevention Study
BMD	Bone mineral density
BMI	Body mass index
CARET	Beta Carotene & Retinol Efficacy Trial
CNKQ	Child nutrition knowledge questionnaire
CHD	Coronary heart disease
CNS02	The National New Zealand Children's Nutrition Survey 2002
CTL	Control
CVD	Cardiovascular disease
DILQ	Day in the Life of Questionnaire
DOH	Department of Health (British)
EX	Children who exercised regularly outside of school
FAO	Food & Agriculture Organisation of the United Nations
FEV ₁	Forced expiratory volume in one second
FEV ₂₅₋₇₅	Forced expiratory flow between 25% and 75% of forced vital capacity
FFQ	Food frequency questionnaire
FVC	Forced vital capacity
INT	Intervention
Hey	Homocysteine
HPFS	Health Professionals Follow-up Study
MI	Myocardial Infarction
MOH	Ministry of Health
NHANES I	National Health and Nutrition Examination Survey I
NEX	Children who did not exercise regularly outside of school
NHS	Nurses Health Survey
NW	Non-overweight/normal weight children

OO	Overweight/obese children
OR	Odds Ratio
PNKQ	Parent nutrition knowledge questionnaire
PE	Parent/guardian of a child from a school registered to receive 5+ A Day resources
PNE	Parent/guardian of a child from a school not registered to receive 5+ A Day resources
RR	Relative Risk
WHO	World Health Organisation