Towards obesity resistance in children: Assessing the predictors of healthy behaviours within the family environment

Gillian Hendrie

BSc (Nut & Diet)

BSc (H Movement – Hons)

Doctorate of Philosophy thesis

Discipline of Public Health, School of Medicine,

Flinders University, South Australia

CSIRO Food and Nutritional Sciences

May 2010

LIST OF TABLES

LIST OF FIGURES

SUMMARY

Understanding the determinants of behaviour in children is crucial to curb the current population obesity trends. Children's behaviour develops within the home, making it a target for obesity prevention efforts. Previous research has identified a network of parental factors that are thought to influence children's health-related behaviour including weight, health-related knowledge and behaviour, parenting styles and practices, to name but a few. This complexity makes it important to use theory or models to guide research and to determine the relative importance of factors within the home environment to improve the effectiveness of future obesity prevention interventions.

Embedded in psychological theory and nutrition education principles is the concept that knowledge is required for behaviour change. This thesis provides much-needed support for the theoretical foundation that nutrition knowledge is a determinant of dietary intake behaviour. The measurement of knowledge and the collection and interpretation of intake data are often cited as limitations to research – issues this thesis aimed to address. Modifications were made to an existing measure of nutrition knowledge, and a validation exercise conducted within a heterogeneous Australian community setting provided a valid and reliable assessment tool to measure knowledge.

Single nutrient or food group analysis omits the synergistic nature of whole diet. A key component of this thesis was the modification of the United States Department of Agriculture's Healthy Eating Index to be consistent with Australian dietary guidelines and its application to the interpretation of dietary intake. An exploratory study, using the validated knowledge tool and modified diet quality index, revealed that some of the basic nutrition guidelines, such as eat more vegetables and less fatty foods, are reaching the community, but detailed knowledge of the nutrient content of foods, diet-disease relationships and making healthier food choices is poor. Indeed, knowledge was shown to be a significant independent predictor of dietary intake and diet quality. Knowledge was shown to be a stronger predictor of overall diet quality than of any single nutrient or food group.

The second aim of this thesis was to disentangle the relative importance of family environmental factors in the context of obesity resistance in children. A 12-month longitudinal study involved 154 South Australian families with primary school-aged children, and used structural equation modelling and previous research to present a model of obesity resistance. The proposed model showed an acceptable fit (NFI=0.458; CFI=0.741; RMSEA=0.045). Parents' BMI (β=0.34*) and knowledge (β=-0.21*) had the strongest direct associations with children's obesity risk. Parents' intake and expenditure behaviours were indirectly associated with children's behaviours through the creation of the home environment. The physical activity environment was associated with children's sedentary (β=-0.44*) and activity habits (β=0.29*). The food environment was associated with fruit and vegetable intake (β=0.47*). General parenting styles (β=0.63*) and child feeding practices (β=-0.74*) were associated with the family environment. Parents' knowledge also had a direct influence on their parenting practices – parenting style (β=0.25*) and feeding practices (β=-0.50*). The proposed model provided a comprehensive insight into the potential avenues for intervention within the complex network of factors that make up the family home environment.

I certify that this thesis does not incorporate without acknowledgement any material previously submitted for a degree or diploma in any university; and that to the best of my knowledge and belief it does not contain any material previously published or written by another person except where the reference is made in the text.

Signed:  Date: May 21st, 2010

ACKNOWLEDGEMENTS

A PhD is a long journey made enjoyable by those around you. I would like to thank friends, family and work colleagues for giving me a reason to laugh along the way. Without your friendship and support this journey would have been far less fun.

This research project would not have been possible without the support of the community. I would like to thank the community groups, school principals and families who volunteered their time and were willing to provide information about their lifestyles. I would also like to thank Julie Syrette, Kylie Lange and Shay Bayly for their professional assistance in data management, statistical analysis and manuscript editing.

To my supervisors, David Cox and John Coveney, thank you for your guidance and willingness to share your expertise. The opportunity to learn and work independently was well balanced. My PhD journey has been rewarding and enjoyable largely due to your complementary approaches to supervision.

A special thank you to Greg; sharing this journey together has made it all the more special. The decision to start a PhD meant a change in lifestyle. We have plodded along together, and while this journey ends our life path continues.

Peer-reviewed publications arising from this thesis:

Hendrie, G.A., Cox, D.N., & Coveney, J. (2008). Validation of the General Nutrition Knowledge Questionnaire in an Australian community sample. Nutrition & Dietetics, 65: 72-77.

Hendrie, G.A., Coveney, J., & Cox, D. (2008). Exploring nutrition knowledge and the demographic variation in knowledge levels in an Australian community sample. Public Health Nutrition, 11(12): 1365-1371.

Hendrie, GA., Coveney, J., Cox, DN. The family activity environment as an influence on children's physical activity and screen behaviours. Journal of Science and Medicine in Sport [Under review].

The author acknowledges that copyright of published works contained within this thesis resides with the copyright holder(s) of those works.

National and international conference presentations/posters arising from this thesis include:

Public Health Advocacy Conference: *What familial practices encourage a healthy energy balance in children? Development of a conceptual model*. Adelaide 2005.

Australian Society for the Study of Obesity, 14th Annual Scientific Meeting: *What familial practices encourage a healthy energy balance in children? Building a conceptual framework.* Adelaide 2005.

10th International Congress of Obesity: *Coping with the obesogenic environment: Development of a conceptual model to explain the family factors associated with children's healthy weight status*. Sydney 2006.

10th International Congress of Obesity: *Nutrition knowledge and dietary intake: What is the relationship within an Australian population?* Sydney 2006.

30th Nutrition Society of Australia Annual Scientific Meeting: *Nutrition knowledge and dietary intake: Exploring the differences and relationships within a South Australian Community Sample.* Sydney 2006.

32nd Nutrition Society of Australia Annual Scientific Meeting: *Modification of the USDA's Healthy Eating Index for the Australian nutrition guidelines.* Adelaide 2008.

32nd Nutrition Society of Australia Annual Scientific Meeting: *Family environmental predictors of children's energy balance behaviours and weight status.* Adelaide 2008.