

**Family management of overweight in
5-9 year old children:
results from a multi-site randomised controlled trial**

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Thesis summary

Childhood overweight is a leading global public health issue. **Chapter One** of this thesis is a three part literature review of the evidence concerning the issue of childhood overweight and its management. Section One of the literature review describes this issue in terms of Australian and international prevalence rates and trends, health outcomes and aetiology. Sections Two and Three of the literature review examine the evidence to guide effective management of childhood overweight and analyse the thoroughness by which this evidence has been determined and translated into practice recommendations.

The assumed cornerstones of child weight management are dietary change, increased physical activity, decreased sedentary behaviour, family support and behaviour modification. Recently, the role of parenting skills in the management of childhood overweight has been identified as a promising area of research. This thesis study examined the effect of the addition of parenting skills training to a parent-led, family-focussed healthy lifestyle intervention for the management of overweight in 5-9 year old children (The Parenting, Eating and Activity for Child Health (PEACH) Study). The methodology of the intervention is presented in **Chapter Two**.

Families of overweight 5-9 year old children across two sites (three cohorts per site) were randomized to either a healthy lifestyle group program (HL) or a healthy lifestyle plus parenting group program (HL+P). Parents in both groups received eight 1.5hour group education sessions covering topics on child/family nutrition, physical activity and positive body image. Parents in the HL+P group were offered a four week parenting skills training program prior to this. All information was directed to parents and they were responsible for initiating and maintaining healthy lifestyle changes with their families. The intervention was delivered over a six month period and group differences were examined at this time point (intervention effect) and six months following with no further program contact (maintenance effect). The sample size (n=169) was calculated to demonstrate an estimated reduction in BMI z-

score of 30% in the HL+P group and 10% in the HL group over 12 months, allowing for a drop out rate of one third (power=80%, significance=95%). Intention to treat analysis was conducted using ANCOVA.

The effectiveness of the intervention was measured against a comprehensive evaluation plan consisting of:

- primary outcome indicators (body mass index (BMI) z-score and waist circumference (WC) z-score) (**Chapter Three**),
- secondary outcome indicators (health-related quality of life (HRQoL), body size dissatisfaction and height z-score) (**Chapter Three**),
- impact evaluation indicators (children's lifestyle behaviours and parent's parenting practices) (**Chapter Four**),
- process evaluation indicators (participant attendance and satisfaction and maintenance of program integrity across sites) (**Chapter Four**) and
- qualitative evaluation of the factors external to the intervention that supported or inhibited families to achieve their healthy lifestyle goals (**Chapter Five**).

Analysis of the primary outcomes (**Chapter Three**) found a significant group difference at the six month time point for BMI z-score (HL: -8%, HL+P: -13%, $p=0.005$), but not WC z-score (HL: -9%, HL+P: -11%, $p=0.39$). There were no group differences at the 12 month time point (six months following intervention end and with no further program contact). Application of the IOTF definition for childhood overweight and obesity to the full study sample found that 39 (23%) and 130 (77%) children were classified as overweight and obese respectively at baseline. By the six month time point ($n=135$), six (4%) children fell within the healthy weight range and 38% were classified as overweight and 58% as obese. At 12 months ($n=123$), 4% of children remained in the healthy weight range, 35% as overweight and 61% as obese. Children's psychosocial health and linear growth were sustained during the intervention and maintenance periods.

There were no between-group difference observed for any of the children's lifestyle behaviours (dietary and activity behaviours) or parents' parenting practices. However, the group as a whole exhibited significant improvements from baseline for scores of diet quality at the six month time point that were maintained during the following six month non-contact period ($p < 0.001$ for 0-6mth and 0-12mth) (**Chapter Four**). Small screen usage significantly decreased for the full sample from 0-6 months and 0-12months ($p < 0.001$ for both), however time spent being physically active did not change. Parents in both groups reported improvements in aspects of parenting over both time periods.

Evaluation of process indicators showed that the intervention was well attended and accepted by families (**Chapter Four**). Seventy three percent (123) of subjects were retained to the 12 month time point and 44% (75) attended at least 75% of scheduled program sessions. Of the 131 parents who responded to a program satisfaction questionnaire, ninety four percent reported receiving the help they desired and 99% would recommend the program to others. The integrity of intervention sessions was upheld across sites providing reassurance that the program protocol was adhered to and demonstrating a good degree of generalisability.

The thematic analysis of interviews conducted with parents at the 12month time point identified more references to barriers than facilitators of healthy lifestyle goal achievement (433 vs 375) (**Chapter Five**). This chapter highlights the contextual nature of family-based interventions and weight management strategies and the need to consider these during program planning and delivery.

Chapter Six concludes the thesis by summarising its results and highlighting how they have contributed to the evidence base. Study strengths and limitations are described and implications of the findings on practice and future research are presented.

Research output arising from this thesis

Peer-reviewed Journal Articles

Warren JM, Golley RK, Collins, CE, Okley AD, Jones RA, Morgan PJ, **Perry RA**, Baur LA, Steele JR, Magarey AM. Randomised controlled trials in overweight children: practicalities and realities. *International Journal of Paediatric Obesity*. 2007; 2: 73-85.

Golley RK, **Perry RA**, Magarey AM and Daniels LA. A family-focussed child weight management program incorporating parenting skills training with healthy lifestyle information to support behaviour modification. *Nutrition & Dietetics*. 2007; 64: 145-150.

Magarey A, Gehling R, **Haigh R** and Daniels L. 2004. Letters to the editor. Key elements for the nutrition component of child overweight management interventions in five- to nine-year-old children. *Nutrition & Dietetics*, 61,183-4.

Published Abstracts

Perry R, Man K, Wilson G, Daniels L, Magarey A. Nutrient intakes of 5-8 month old infants: different methods of calculating breast milk intake and comparison with intakes of formula fed infants (oral). Dietitians Association of Australia 25th National Conference, Hobart. *Nutrition and Dietetics* 2007; 64(S1): S32.

Daniels L, **Perry R**, Magarey A, Baur L, Steinbeck K, Hills A. PEACH RCT: a family-focused weight management program for 5-9 year olds – impact on maintenance of reduction in adiposity 6 months post intervention (poster). European Congress on Obesity, Budapest. *International Journal of Obesity* 2007; 31(S1): S145.

Perry R, Magarey A, Daniels L. Quality of life of 5-9 year olds enrolled in PEACH: a family focused child weight management program (poster). International Congress on Obesity, Sydney. *Obesity Reviews* 2006; 7(S2): 324.

Magarey A, **Perry R**, Baur LA, Daniels L, Steinbeck KS, Hills AP. Effectiveness of the PEACH RCT a Family Focussed Weight Management Program for 5 to 9-year-olds: 6 Month Outcomes (poster). International Congress on Obesity, Sydney. *Obesity Reviews* 2006; 7(S2): 114.

Magarey A, Wilson G, **Perry R**, Daniels L. Lifestyle Changes at 6 months of Subjects Enrolled in the PEACH RCT a Family Focussed Weight Management Program for 5 to 9-year olds (poster). International Congress on Obesity, Sydney. *Obesity Reviews* 2006; 7(S2): 325.

Perry R, Magarey A and Daniels L. Quality of life of 5-9 year olds enrolled in PEACH: a family focussed child weight management program (oral). European Childhood Obesity Group Workshop, Poland. *International Journal of Obesity* 2006; 30(S2): S41.

Perry R, Golley R, Magarey A and Daniels L. Application of parenting skills to a healthy family lifestyle program for overweight children: a case study of a novel approach for dietitians and parents (poster). Dietitians Association of Australia 24th National Conference, Sydney. *Nutrition and Dietetics* 2006; 63(S1): A37.

Other Conference Presentations

Haigh R and Magarey A. Parental perceptions of the health risk of childhood overweight and barriers to management (oral). *Australasian Society for the Study of Obesity Scientific Meeting*, Adelaide, October 2005.

Haigh R, Golley R, Magarey A and Daniels L. 2005. Program description and evaluation plan of PEACH: beyond kilograms and centimetres (oral). *National Health Outcomes Conference*, Canberra, August 2005.

Declaration

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 due reference is made in the text.

A funding proposal for the RCT had been developed prior to the commencement of my candidature. Following commencement, I developed protocols for implementation and modified intervention content and program materials used in the pilot study. Along with Gizelle Wilson (research assistant) I was jointly responsible for subject recruitment and retention, screening and baseline assessment at the Adelaide site. I delivered the parenting and healthy lifestyle components of the HL+P intervention arm at the Adelaide site. In order to provide blinded outcome assessment, research staff performed outcome measurements at the six- and 12-month time points.

I was responsible for the expansion of the original research protocol to include qualitative research methodology. I designed this component, secured additional grant funding to support this work and sought and gained ethics approvals for its implementation at both study sites. I trained staff in both sites to conduct the interviews.

I assisted with quantitative data entry and was responsible for all qualitative data entry. I performed all quantitative and qualitative data analysis.

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Abbreviations

ADA	American Dietetic Association
AGHE	Australian Guide to Healthy Eating
ANCOVA	Analysis of Covariance
APQ	Alabama Parenting Questionnaire
BMI	Body Mass Index
CDC	Centres for Disease Control and Prevention
CDQ	Children's Dietary Questionnaire
CHQ-PF50	Child Health Questionnaire – Parent Form 50
CONSORT	Consolidated Standards of Reporting Trials
EE	Energy Expenditure
EI	Energy Intake
GP	General Practitioner
HL	Healthy Lifestyle (arm of the PEACH intervention)
HL+P	Healthy Lifestyle+Parenting (arm of the PEACH intervention)
HRQoL	Health-Related Quality of Life
HWR	Healthy Weight Range
IOTF	International Obesity TaskForce
ITT	Intention To Treat
NHMRC	National Health and Medical Research Council
NICE	National Institute of Clinical Excellence
NIDDM	Non-Insulin Dependent Diabetes
PAR	Planned Activity Routine
PEACH	Parenting, Eating and Activity for Child Health (the thesis study)
RCT	Randomised Controlled Trial
SEIFA	Socio-Economic Indices for Areas
SES	Socio-Economic Status
SPANS	Schools Physical Activity and Nutrition Survey
TV	Television
UK	United Kingdom
US	United States
VLCD	Very Low Calorie Diet
WC	Waist Circumference

Unless otherwise stated, the term “overweight” refers to “overweight and obesity”

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Figure 4.1: Difference between time spent in physical activity and small screen usage (min/day) relative to the difference observed at baseline for PEACH children at baseline, six and 12 months

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Table 4.9: Frequency of parent attendance to the PEACH study to intervention sessions by group (HL or HL+P) for the full study sample and by site

Table 4.10: Service quality and satisfaction ratings of the PEACH study intervention from parents a) at the completion of the four week Triple P[®] training for the HL+P intervention arm full sample and by site and b) at the completion of the six month intervention for the full study sample and by group

Table 4.11: Results of quality assurance audit of four randomly selected PEACH sessions

Chapter 5: Facilitators and Barriers to the Achievement of Program Goals

Table 5.1: Results of phase two of the thematic analysis of 95 semi-structured interviews conducted with PEACH study parents at the 12 month time point listing the initial codes describing barriers and facilitators to achievement of program lifestyle goals and the number of times they were sourced (S) and referenced (R)

Table 5.2: Results of phase three of the thematic analysis of 95 semi-structured interviews conducted with PEACH study parents at the 12 month time point listing level one themes describing barriers and facilitators to PEACH families' achievement of program lifestyle goals and the initial codes that underpin them

Figure 5.1: Thematic mind map illustrating level one and level two themes describing facilitators to the achievement of program goals following the thematic analysis of 95 semi-structured interviews conducted with PEACH study parents at the 12 month time point

Figure 5.2: Thematic mind map illustrating level one and level two themes describing barriers to the achievement of program goals following the thematic analysis of 95 semi-structured interviews conducted with PEACH study parents at the 12 month time point

Table 5.3: Summary of second- and first-level facilitator themes and the number of initial codes (C) and references (R) supporting them identified through the thematic analysis of 95 semi-structured interviews conducted with PEACH study parents at the 12 month time point

Table 5.4: Summary of second- and first-level barrier themes and the number of initial codes (C) and references (R) supporting them identified through the thematic analysis of 95 semi-structured interviews conducted with PEACH study parents at the 12 month time point