FAMILY-FOCUSED MANAGEMENT
OF OVERWEIGHT IN
PRE-PUBERTAL CHILDREN –
A RANDOMISED CONTROLLED TRIAL

The Healthy Eating and Lifestyle through Positive Parenting (HELPP) study

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Thesis Summary

Over a quarter of children and two thirds of adults in Australia are overweight, with these estimates reflecting global trends. The literature review in Chapter 1 highlights that treatment of childhood overweight is an important part of the public health approach required to address the obesity epidemic. Energy moderation, behaviour modification and family support are the cornerstones of treatment of childhood overweight. However the evidence to guide best practice is limited, with a call being made for well designed studies to inform age-appropriate effective, long term child weight management. Studies are needed in a range of populations and to assess a range of health outcomes. This thesis tested the hypothesis that, pre-pubertal children whose parents participate in a parent-led, family-focused child weight management intervention comprising parent skills training and intensive lifestyle education will have adiposity, metabolic profiles and indicators of physical and psychosocial functioning after 12 months that are a) improved compared to children wait listed for intervention and b) no different to children whose parents participate in parenting skills training alone (without intensive lifestyle education).

Methods of the randomised controlled trial undertaken with 111 overweight, pre-pubertal 6-9 year olds to test this hypothesis are detailed in Chapter 2. Parents were defined as the agents of change, responsible for attending intervention sessions and implementing family-focused lifestyle change to support child weight management. Two interventions, both utilising parenting skills training, but differing in the presence or absence of intensive lifestyle education were compared to a group waitlisted for intervention with a brief pamphlet. Program effectiveness was defined in terms of adiposity together with broader health and evaluation outcomes.
Chapter 3 describes the study population, their flow through the study, the primary outcome BMI z score and waist circumference z score. With parenting plus intensive lifestyle education there was a 10% reduction in BMI z score over 12 months. However this was not statistically different to the 5% reduction observed with parenting alone or intervention waitlisting. There was a significant reduction in waist circumference between baseline and 12 months with parenting alone and parenting plus lifestyle education, but not waitlisting. There was a group, time and gender interaction, with boys receiving intervention having greater reductions in adiposity. In determining intervention effectiveness, growth, metabolic profile and psychosocial outcomes are presented in Chapter 4. While there were limited improvements in metabolic profile and body dissatisfaction, significant improvements were observed in parent-perceived HR-QOL relating to psychosocial and family functioning. Improvements were confined to the intervention groups, parenting plus lifestyle education more than parenting alone. Chapter 5 presents the study process and impact evaluation. Parents were satisfied with the program and reported that it provided the type of help they wanted. Personal, rather than program factors such as work and family commitments limited intervention attendance to 60%. Child health behaviours and parental weight status show positive change in all groups, but favour intervention. Chapter 6 highlights key findings, study strengths/limitations and areas for further research. In conclusion, a parent-led family-focused intervention utilising parenting skills training and healthy family lifestyle is a promising intervention for young overweight children.
**Declaration**

'I certify that this thesis does not incorporate without acknowledgment 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.'

Rebecca K Golley

December 2005

The conception and design of the RCT reported in the thesis was undertaken before I commenced my PhD candidature, as part of a funding proposal for a multi-site RCT. Partial funding was secured from the Australian Health Management Group Assistance to Health and Medical Research Fund which enabled the RCT to be undertaken in Adelaide only as a PhD project. I adapted the study design to delivery at one site, developed the nutrition component of the study interventions, adapted the parenting component of the study interventions, assisted with obtaining ethical approval, developed study protocols and procedures, recruited subjects, coordinated subject eligibility screening, delivered the study interventions (apart from physical activity component) and co-ordinated outcome measurements by a blinded assessor. In consultation with my supervisors and a statistician I developed the study analysis plan and I performed the data entry and analysis. I designed and performed the secondary analysis of the National Nutrition Survey data and developed the evidence-based food-based recommendations underpinning the study interventions (chapter 2, appendix 6). I designed and performed the baseline analysis for the purposes of Metabolic Syndrome definition comparison (chapter 2, appendix 6). I took a leadership role in the preparation of all manuscripts arising from the study. The thesis study (HELPP) also formed the pilot work for a successful National Heath and Medical Research Council grant for a multi-site study (PEACH) undertaken in Sydney and Adelaide from 2003.'
Acknowledgements

Assoc Prof Lynne Daniels and Dr Anthea Magarey conceived the original study idea, and I thank them for the opportunity to undertake my thesis in this challenging area. I have appreciated the faith, independence and colleagueship you both have extended me, blended perfectly with endless expertise and nurturing guidance. This unique blend of supervision qualities has facilitated my growth in research, dietetic and academic life. Special thanks to Professor Louise Baur, Assoc Prof Kate Steinbeck and Dr Nicola Spurrier for their support, advice and colleagueship during my candidature.

Many thanks to the staff of the Flinders Medical Centre (FMC) Paediatric Unit for their support and assistance with the study; Dr David Everett for supporting the study, the unit paediatricians for donating their time to screen subjects and to Kylie Bailey and Tina Owers their kindness, friendship, professionalism and making me feel welcome in the paediatric unit.

I need to make special mention of the contributions of the following groups and individuals without which HELPP could not have succeeded. Thanks to; the FMC media unit for promoting media coverage of the study; Jane Bowen, Rochelle Kuhn and Kate Wood assistance with recruitment of cohorts 3 and 4, and conducting the dietary assessment tool validation; to Dr David Lyons, Dr David Everett, Dr Nicola Spurrier, Dr Brian Coppin and Dr David Thomas for screening subjects; Michelle Howard and Kevin Duffy for enabling us to conduct the study at the Women’s Children’s Hospital (WCH); I am indebted to Dr Anthea Magarey for all the (early morning) subject measurements to maintain assessor blinding and to Heather Garreffa and Judy Beltess for their expertise in collecting paediatric blood samples; the Division of Laboratory Medicine, WCH, Adelaide and Diagnostic Laboratory, Department of Endocrinology Royal Prince Alfred Hospital, Sydney for blood analysis; Ms Sarah Garnett and Ms Margie Gruca, The Children’s Hospital at Westmead for access to their waist circumference z-score calculation program; Professor Kevin Norton and Max Martin for the development of the physical activity program and Ross Bament,
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Thank you to my colleagues and friends in the Department of Nutrition and Dietetics, Flinders University. I have felt a welcome and valued member of the department and have appreciated your support. I also need to acknowledge the friendship and support of my fellow PhD candidates, Michelle Miller, Rebecca Haigh, Jane Bowen - it was always reassuring to know I wasn’t alone.

To my friends, family and husband. Thank you for your support in this endeavour and for helping maintain a life outside a thesis. I consider the way I was raised by my family and my relationship with you Matt has played a huge role in giving me the confidence to believe I can achieve anything and the support to pursue my dreams. I hope I can repay this in the future.

Last but not least, to the 111 ‘HELPP’ families, without whom none of this could have been possible. Credit must be given for your dedication to your child’s health and willingness to try a new family-focused approach and participate in research. Many thanks for your early morning attendance to measurement sessions and children’s braveness in providing a blood sample. I wish you all the best in the years ahead.
## Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>AGHE</td>
<td>Australian Guide to Healthy Eating</td>
</tr>
<tr>
<td>BF</td>
<td>Body fat</td>
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<td>BM</td>
<td>Body mass</td>
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<tr>
<td>BMI</td>
<td>Body mass index</td>
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<tr>
<td>BT</td>
<td>Behaviour therapy (behaviour modification)</td>
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<tr>
<td>BW</td>
<td>Body weight</td>
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<td>C</td>
<td>Child</td>
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<tr>
<td>CBIS</td>
<td>Child body image scale</td>
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<td>CHQ</td>
<td>Child health questionnaire</td>
</tr>
<tr>
<td>CI</td>
<td>Confidence interval</td>
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<tr>
<td>CONSORT</td>
<td>CONsolidated Statement Of Reporting Trials</td>
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<tr>
<td>CVD</td>
<td>Cardiovascular disease</td>
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<td>EGIR</td>
<td>European Group for the Study of Insulin Resistance</td>
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<tr>
<td>FFM</td>
<td>Fat free mass</td>
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<tr>
<td>FMC</td>
<td>Flinders Medical Centre</td>
</tr>
<tr>
<td>FMS</td>
<td>Fundamental Movement skills</td>
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<tr>
<td>GI</td>
<td>Glycaemic index</td>
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<tr>
<td>HDL-C</td>
<td>High density lipoprotein cholesterol</td>
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<td>HELPP</td>
<td>Health Eating and Lifestyle through Positive Parenting</td>
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<tr>
<td>HR-QOL</td>
<td>Health related quality of life</td>
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<tr>
<td>HT</td>
<td>Hypertension</td>
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<tr>
<td>IOTF</td>
<td>International obesity task force</td>
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<tr>
<td>LCD</td>
<td>Low calorie diet</td>
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<tr>
<td>LDL-C</td>
<td>Low density lipoprotein cholesterol</td>
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<tr>
<td>LFD</td>
<td>Low fat diet</td>
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<tr>
<td>MS</td>
<td>Metabolic Syndrome</td>
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<tr>
<td>NCEP</td>
<td>National Cholesterol Education Program</td>
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<tr>
<td>NHANES</td>
<td>National Health, Nutrition and Exercise Survey</td>
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<tr>
<td>NHMRC</td>
<td>National Health and Medical Research Council</td>
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<tr>
<td>NR</td>
<td>Non-restricted</td>
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<tr>
<td>NS</td>
<td>Not statistically significant</td>
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<tr>
<td>Abbreviation</td>
<td>Full Form</td>
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<tr>
<td>OR</td>
<td>Odds ratio</td>
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<tr>
<td>P</td>
<td>Parent</td>
</tr>
<tr>
<td>P+DA</td>
<td>Parenting skills training plus intensive lifestyle education</td>
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<tr>
<td>P</td>
<td>Parenting skills training alone</td>
</tr>
<tr>
<td>PAR™</td>
<td>Planned activities routine</td>
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<tr>
<td>PS</td>
<td>Problem solving</td>
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<tr>
<td>PSMF</td>
<td>Protein sparing modified fast</td>
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<tr>
<td>PSOC</td>
<td>Parents sense of competency</td>
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<tr>
<td>R</td>
<td>Restricted</td>
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<tr>
<td>RCT</td>
<td>Randomised controlled trial</td>
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<td>S/D-BP</td>
<td>Systolic/Diastolic blood pressure</td>
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<td>SD</td>
<td>Standard deviation</td>
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<tr>
<td>SEIFA</td>
<td>Socio-Economic Index for Areas</td>
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<tr>
<td>SES</td>
<td>Socioeconomic status</td>
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<td>SPSS</td>
<td>Statistical Package for the Social Sciences</td>
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<tr>
<td>TC</td>
<td>Total cholesterol</td>
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<tr>
<td>TG</td>
<td>Triglycerides</td>
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<tr>
<td>TLD</td>
<td>Traffic light diet</td>
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<tr>
<td>Triple P®</td>
<td>Positive Parenting Program®</td>
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<tr>
<td>UK</td>
<td>United Kingdom</td>
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<tr>
<td>US</td>
<td>United States of America</td>
</tr>
<tr>
<td>VLCD</td>
<td>Very low calorie diet</td>
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<tr>
<td>WCH</td>
<td>Women’s and Children’s Hospital</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organisation</td>
</tr>
<tr>
<td>WLC</td>
<td>12 month wait listed control</td>
</tr>
<tr>
<td>%O’WT</td>
<td>Percent overweight</td>
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Table 5.7 Median (IQR) daily food group serves for children at baseline, 6 and 12 months following parent participation in the parenting plus lifestyle education (P+DA) or parenting alone (P) intervention or 12 month intervention waitlist (WLC).

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Table 5.9 Baseline parents sense of competency, satisfaction with parenting and perceived parenting efficacy for parents of study children at baseline by child gender.

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education (P+DA) or parenting alone (P) child weight management intervention or were wait listed for intervention for 12 months

Figure 1.1 The World Health Organisation multi-level public health approach to address the obesity epidemic utilising both prevention and management strategies

Figure 1.2 Prevalence of overweight in children from the United Kingdom (UK), Australia and the United States (US) between 1971-1985 and 1988-1995

Figure 1.3 Aetiological model of overweight as the interaction between genetic, physiological, behavioural and environmental factors

Figure 1.4 Dietary factors involved in the aetiology overweight

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Figure 2.1 The Australian Guide to Healthy Eating; the national food selection guide recommending volume and quality of foods within and between the five food groups, water and ‘extras’ (high energy/fat/sugar/salt) foods

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Figure 3.1 Progress of subjects through the phases of the randomised controlled trial from recruitment to analysis by group allocation to either parenting alone (P), parenting plus intensive lifestyle education (P+DA) or waitlisting for intervention for 12 months (WLC)
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Figure 3.3 Mean(SD) body mass index (BMI) z score for 6-9 year old pre-pubertal children at baseline (40 boys, 71 girls), 6 (20 boys, 37 girls) and 12 months (33 boys, 59 girls) after parents commenced a 6 month parenting plus intensive lifestyle education (P+DA) or parenting alone (P) intervention or were waitlisted for intervention for 12 months (WLC)

Figure 3.4 Mean±SD waist circumference z score for 6-9 year old pre-pubertal children at baseline (40 boys, 71 girls), 6 (20 boys, 37 girls) and 12 months (33 boys, 59 girls) after parents commenced a 6 month parenting plus intensive lifestyle education (P+DA) or parenting alone (P) intervention or were waitlisted for intervention for 12 months (WLC)

Figure 4.1 Mean±SD HDL-C for 6-9 year old pre-pubertal children at baseline and 6 and 12 months after parents participated in the parenting plus intensive lifestyle education (P+DA) or parenting alone (P) intervention or were wait listed for intervention for 12 months (WLC)

Figure 4.2 Mean±SD diastolic blood pressure for 6-9 year old pre-pubertal children at baseline, 6 and 12 months after parents participated in a parenting plus intensive lifestyle education (P+DA) or parenting alone (P) intervention or were wait listed for intervention for 12 months (WLC)

Figure 5.1 Mean±SD parent sense of competency (PSOC), satisfaction with parenting (PSOC-satisfaction) and perceived parenting efficacy (PSOC-efficacy) at baseline, 6 months and 12 months after parent participation in the parenting plus lifestyle education (P+DA) or parenting alone (P) interventions to being waitlisted for intervention for 12 months