

Addressing risk factors of overweight and obesity among adolescents in out-of-home care: the Healthy Eating and Active Living (HEAL) study

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Rates of overweight and obesity increase significantly whilst children and young people are in out-of-home care. This paper provides the protocol for a study, funded by the Australian Research Council (2012–2014), being conducted to evaluate the effectiveness of a Healthy Eating and Active Living intervention programme for adolescents who live in out-of-home residential care. This randomised trial will be conducted with 118 adolescents aged 13–17 years of age in out-of-home residential care and the residential staff who look after them. Adolescents' eating habits, physical activity levels, psychological well-being, body dissatisfaction and weight status will be assessed at baseline, immediately post the programme (which runs for 6 months), and again 12 months post baseline. Similar measures will be obtained from residential carers (across the same time points). If effective, this programme could be implemented as usual care to modify levels of obesity amongst these vulnerable young people.

Keywords: young people; out-of-home residential care; obesity; eating habits; physical activity

Introduction

Obesity is a major public health concern in Australia and globally (Withrow & Alter, 2011) and it is important to intervene to address obesity levels before adulthood (Lobstein, Baur, & Uauy, 2004). Current estimates indicate that childhood overweight is a serious problem in Australia, with over one-third (35%) of young people aged 12–24 years considered to be overweight (23.3%) or obese (11.3%) (Australian Institute of Health and Welfare [AIHW], 2011). This is concerning given both the short-term and long-term consequences of being overweight or obese at this age, including increased risk of developing serious health problems (diabetes, hypertension and other cardiovascular diseases) and increased risk of premature death in adulthood (de la Eva, Baur, Donaghue, & Waters, 2002; Garnett et al., 2005; Lobstein et al., 2004). We know also from our extensive research in the area of body image that the mental health issues most prevalent among adolescents in out-of-home care (OOHC) – namely elevated depressive symptoms, anxiety, and stress and lower levels of self-esteem – are highly correlated with body dissatisfaction across the lifespan and that body dissatisfaction is also associated with overweight and obesity (Clark, Skouteris, Wertheim, Paxton, & Milgrom, 2009;

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Fuller-Tyszkiewicz & Mussap, 2009; McCabe & Ricciardelli, 2009; Mellor, Fuller-Tyszkiewicz, McCabe, & Ricciardelli, 2010; Ricciardelli & McCabe, 2004; Skouteris, Carr, Wertheim, Paxton, & Duncombe, 2005).

Although the weight status of young people in Australia has been the focus of research in recent years, the risk of overweight and obesity for children placed in OOHC has been largely ignored (Skouteris et al., 2011). Presently, there are around 32,000 Australian children living in OOHC (AIHW, 2012). Children and young people in OOHC experience poorer health than their counterparts in the general community, including lower levels of immunisation and attainment of educational objectives, and higher levels of mental health issues, behavioural disorders, risky health behaviours, illnesses and accidents (Carbone, Sawyer, Searle, & Robinson, 2007; Department of Families, Housing, Community Services and Indigenous Affairs, 2010; Fernandez, 2009; Nathanson & Tzioumi, 2007; Wise & Egger, 2007). Although research has been limited, more recent findings suggest a growing prevalence of obesity and associated health risks for young people in OOHC (Skouteris et al., 2011).

Our systematic review (Skouteris et al., 2011) examined the literature on nutrition and weight-related issues for children in OOHC over the last decade and revealed that, worldwide, only six studies have examined these concerns: three Australian studies (Nathanson & Tzioumi, 2007; Tarren-Sweeney, 2006; Osborn, 2006), and three international studies (Hadfield & Preece, 2008; Schneider et al., 2009; Steele & Buchi, 2008). International studies provide a clear indication that rates of overweight and obesity increase significantly whilst children and young people are in care (Skouteris et al., 2011). The review also revealed a lack of strategies or interventions designed specifically to combat overweight and obesity in children in OOHC. In addition to our review, a recent study by Falkiner et al., 2010 examined OOHC case manager perceptions of healthy eating and exercise as well as assessing support structures and resources. It was found that few staff members had adequate knowledge or training in physical activity or healthy eating, and few organisations had policies or resources and programmes in place to support healthy eating or physical activity among their young people who are living in OOHC.

As a direct response to the growing prevalence of obesity and associated health risks for young people in OOHC, Berry Street – the largest independent child and welfare organisation in Victoria, Australia – developed the Healthy Eating and Active Living (HEAL) programme. The HEAL programme was designed to address this need for a healthy lifestyle programme in residential care units, as well as a secondary obesity prevention initiative. HEAL is a 12-month (6 months intensively and 6 months maintenance), multi-component healthy lifestyle programme that is offered free to young people residing in residential care and the staff who care for them, irrespective of weight. The programme aims to provide the young people in out-of home residential care units with information and practical opportunities to make positive choices and behaviour changes in relation to their own eating and physical activity habits. HEAL also provides the staff who care for them with the professional development, resources and support needed to facilitate these behaviour changes among the young people in order to foster their psychological health and well-being and healthy weight management; it recognises the importance of positive role-modelling and its impact on young people.

The overall aim of this study is to conduct a randomised trial to measure the effectiveness of the HEAL programme across two major community service organisations that provide OOHC to disadvantaged adolescents in the State of Victoria, Australia – Berry Street and The Salvation Army Westcare. It is hypothesised that the intervention

HEAL group adolescents, in comparison with the wait-list group, at the completion of the 6-month intervention programme will: demonstrate greater consumption of fruit and vegetables, and a decrease in consumption of high-fat, high-sugar cordials, soft-drinks and juices and non-essential, energy-dense snack foods; increase the number of days per week they are physically active for at least 60 minutes per day; demonstrate improved knowledge regarding key aspects of healthy eating, physical activity and sedentary behaviours relevant to the prevention of obesity and improving health and well-being generally; and exhibit lower levels of depressive, anxiety, and stress symptoms, lower body dissatisfaction, and greater self-esteem and quality of life. At 12 months post intervention these significant differences between the intervention and control group adolescents will be sustained, and the intervention group adolescents will also exhibit lower body mass index (BMI)-for-age z -scores.

It is further hypothesised that the intervention HEAL group residential carers, in comparison with the wait-list control group, at the completion of the 6-month intervention programme and at 12 months post intervention will: decrease the frequency with which they offer high-fat, high-sugar cordials, soft-drinks and juices and non-essential, energy-dense snack foods to their child; increase the frequency with which they offer vegetables and fruit, water and milk (rather than cordials, soft drinks and juices) to the adolescents at meal times; demonstrate improved knowledge regarding key aspects of healthy eating, physical activity and sedentary behaviours relevant to the prevention of obesity and improving health and well-being in young people generally; report being more encouraging, and rate more highly the importance of, their residents eating well and being physically active; increase the frequency with which they model healthy behaviours around diet and physical activity; and provide greater opportunities for the young people in their care to engage in physical activity.

Methods

Design

The randomised trial design and time-line for the intervention and wait-list control groups is shown in [Figure 1](#). Baseline assessment of study variables will occur at recruitment. Follow-up assessments will take place at the end of the 6-month programme and again at the end of the 6-month maintenance programme. This project was approved by the Deakin University Human Research Ethics Committee on 23 February 2012 (DUHREC 2012-017).

Participants

The participants will be 118 adolescents aged 13–17 years of age in out-of-home residential care across Berry Street's four Regions in Victoria, Australia (Hume, Gippsland, Northern & Western Metropolitan, and South Eastern Metropolitan) and The Salvation Army's Northern and Western Metropolitan Region, Victoria, Australia, and the residential staff who care for them. Young people and staff will be eligible to take part if they can provide informed consent. Short-term/emergency care residents will not be included in the study; these young people represent 5% of all residents in OOHC.

Recruitment strategies

Young people and staff will be recruited through the residential unit in which they live or work. Unit managers will be briefed on what participation in the research involves (for both young people and staff) and provided with HEAL recruitment instruction booklets.

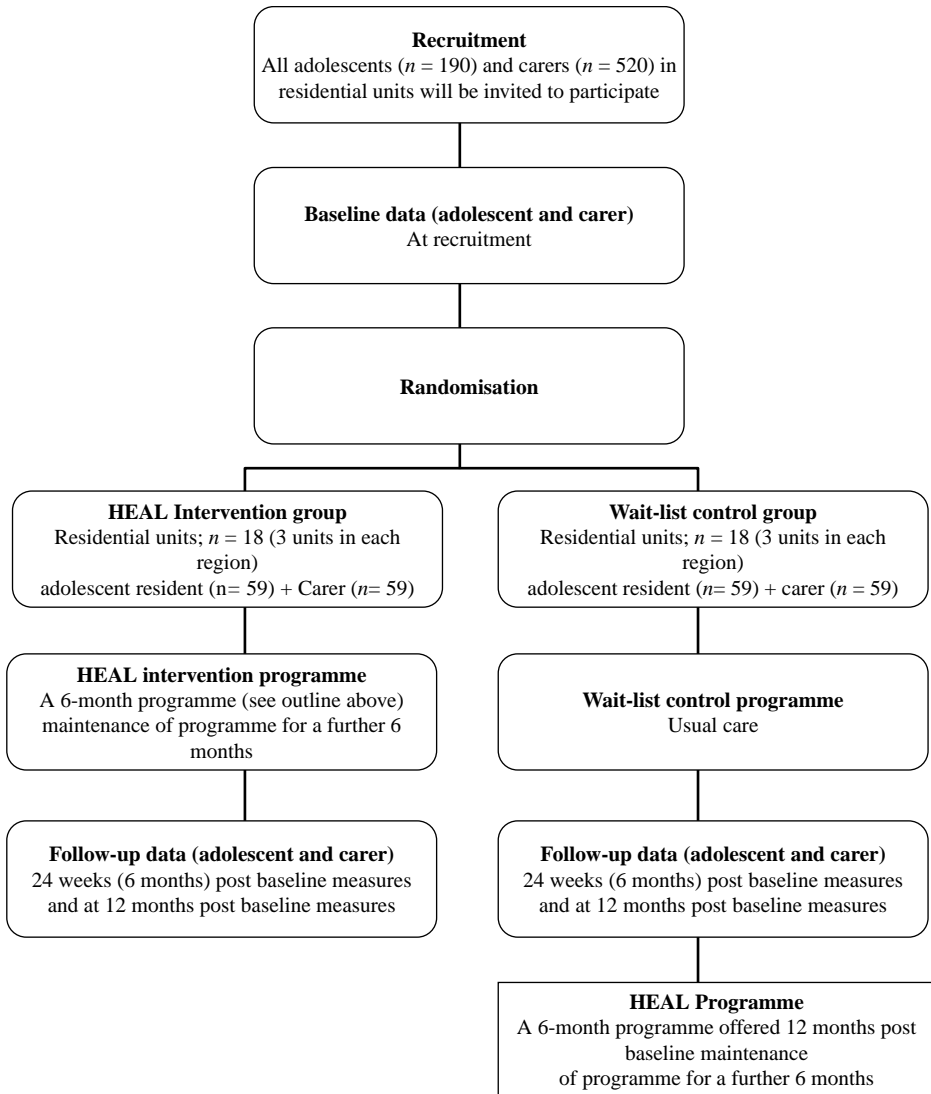


Figure 1. Study design.

Procedure

The intervention

An overview of the structure of the HEAL programme follows:

- (1) Month one: the HEAL coordinator will visit each unit to discuss one-on-one with each young person their lifestyle habits, including eating and physical activity habits. Residential staff professional development (PD) sessions will be run across all units to ensure that all carers of young people know about the aims of the HEAL programme and their role in the programme.
- (2) Month two: the HEAL coordinator will meet with each young person one-on-one to develop an individual health plan that focuses on fostering a healthy lifestyle, in

relation to eating and physical activity habits; health goals are set by the young person. The HEAL coordinator then meets with staff from each unit to present an overview of each young person's health plans and goals. The HEAL coordinator will also discuss with the residential staff how they can assist young people to meet their goals, and how residential staff can foster a healthy eating culture within the unit, especially in relation to positive role-modelling, encouragement, and instrumental behaviours (e.g. providing opportunities for physical activity, etc.).

- (3) Months three to six: the HEAL coordinator will work closely with the young people and residential staff (visiting no less than once per fortnight) to ensure the goals of each young person are being met; and if not, ways to revise the health goals to keep the young people on track. Further PD for staff and educational sessions for young people will be offered throughout this four-month period, including healthy cooking classes, and inter-unit challenges to keep the young people motivated, such as the 'Race Around the World Challenge', Masterchef competitions, 'Train the Carers Week', sports challenges, and so forth. In addition, eight HEAL themes will be run each fortnight. [Table 1](#) outlines the fortnightly themes; each unit will receive posters and handouts on these fortnightly themes.

The wait-list control group

Young people and staff in this group will receive their usual care and will be assessed (same measures as the intervention group) at baseline and follow-up (6 and 12 months post baseline). The wait-list control group will be offered the intervention at 12 months post baseline assessment (see [Figure 1](#)).

Measures

At recruitment, young people and staff will be asked to complete an informed consent form confirming their participation in the study. Each of the following measures will be administered at baseline, at the end of the 6-month intensive intervention and the end of the 6-month maintenance programme.

Primary outcome – young people

Daily dietary intake. The food questions from the brief Children's Eating and Physical Activity Questionnaire [EPAQ] (Bennett, de Silva-Sanigorski, Nichols, Bell, & Swinburn, 2009) will be used. The EPAQ is designed to assess the intake of energy-dense foods and sugar-sweetened beverages. Reliability has been found to be adequate and has been validated for use with young children and adolescents (Bennett et al., 2009).

Secondary outcomes

Physical activity. The questions from the EPAQ related to physical activity and the two-item Adolescent Physical Activity Measure (Prochaska, Sallis, & Long, 2001), developed as a screening tool for adolescents in primary care settings, will be used to measure both sedentary and physical activity levels. Both measures have demonstrated reliability and validity (Bennett et al., 2009; Prochaska et al., 2001).

General distress and psychopathology. The Depression Anxiety and Stress Scale 21-item (Lovibond & Lovibond, 1995) will measure psychological health.

Table 1. The 8 HEAL themes.

| Weeks | Theme title | Discussion topic(s) | Intervention content |
|---------|-----------------------------------|---|--|
| 1 and 2 | Developing Healthy Habits & Sleep | Lifestyle issues related to food and physical activity and understanding the impact of sleep on their health and well-being | <p>Reflect on food and exercise choices</p> <p>Consider why people develop unhealthy practices</p> <p>Understand barriers that prevent us from making healthier choices</p> <p>Understand that change is a process</p> <p>Be encouraged to start developing healthy habits</p> <p>Reflect on the quantity and quality of sleep they experience</p> <p>Understand how quality sleep benefits well-being</p> <p>Understand the impact of poor sleep on making healthier choices</p> <p>Identify techniques for enjoying better sleep</p> |
| 3 and 4 | Drinking Water & Reducing Sugar | <p>Drinking more water is a simple and achievable lifestyle change</p> <p>The impact of excess sugar in the diet</p> | <p>Reflect on their choice of beverages</p> <p>Understand the benefits of being well hydrated</p> <p>Develop strategies to increase their water intake</p> <p>Reflect on the quantities of sugar they consume in drinks and food</p> <p>Understand the impact of excess sugar on their energy levels</p> <p>Understand the impact of excess sugar on weight control</p> <p>Be encouraged to identify ways of enjoying healthier levels of sugar</p> |
| 5 and 6 | FOODcents | Healthy grocery shopping on a budget | <p>FOODcents is an education programme developed by the Western Australian government that helps people to achieve a healthy diet and to save money on their groceries. Please see: http://www.foodcentsprogram.com.au/</p> |
| 7 and 8 | Wellbeing | Achievable lifestyle changes that can improve the way you feel | <p>Reflect on their lifestyles</p> <p>Understand lifestyle factors that impact our health and the way we feel</p> |

Table 1. (*Continued*)

| Weeks | Theme title | Discussion topic(s) | Intervention content |
|-----------|-------------------------------------|---|---|
| 9 and 10 | Reading Food Labels & Portion Sizes | How to read food labels and appropriate portion sizes for adolescents | <p>Develop strategies to increase their opportunities to feel better</p> <p>Boost staff's knowledge of food labels, particularly how to read and understand the information provided on different food labels</p> <p>Understand what is meant by the term 'portion'</p> <p>Reflect on their current portions sizes</p> <p>Become more mindful of portion size</p> |
| 11 and 12 | 2+3 Today & Reducing Fat | Benefits of including fruit and vegetables in the diet and different types of fat available in our diet | <p>Reflect on how many serves of fruit and vegetables they are enjoying each day</p> <p>Understand the benefits of eating a balanced diet</p> <p>Learn about 'serving sizes'</p> <p>Identify techniques for enjoying at least two serves of fruit and at least three serves of vegetables each day</p> <p>Reflect on the amount of fat in their current dietary choices</p> <p>Understand the different types of dietary fat</p> <p>Be encouraged and feel motivated to reduce saturated and trans fats in their diet</p> |
| 13 and 14 | Fighting Fit | The benefits of being physically active | <p>Reflect on the amount of physical activity they do on a daily basis</p> <p>Understand the benefits of keeping active</p> <p>Feel motivated to increase their levels of physical activity</p> |
| 15 and 16 | Positive Body Image | Simple and achievable ways to help young residents develop better body image | <p>Reflect on how they see and feel about themselves</p> <p>Understand what it means to have positive body image</p> <p>Develop strategies to practice enjoying positive body image</p> |

Body dissatisfaction. A five-item version of the Body Dissatisfaction subscale of the Body Change Inventory (Ricciardelli & McCabe, 2002) will be used; this is a well-validated measure of body image disturbances in male and female adolescents.

Quality of life. The Personal Wellbeing Index – School Child Version (Lau, Cummins, & McPherson, 2005) is a brief, eight-item measure of well-being that has excellent psychometric properties.

Self-esteem. Young people will be asked to complete the Rosenberg Self-Esteem Scale (Rosenberg, 1965). This is a 10-item scale and the most widely used reliable and valid measure of self-esteem.

Nutrition and physical activity knowledge. Young people's knowledge of child nutrition will be assessed with the valid and reliable subscales of the Nutrition Knowledge Questionnaire (Parmenter & Wardle, 1999) and young people's knowledge of child physical activity will be assessed by revising the questions from the brief Active Australia Survey (AIHW, 2003) to be relevant to adolescent guidelines, not adult guidelines.

Body mass index. The height and weight of the young people will be measured with a stadiometer and standardised digital scales, respectively. Height and weight measures will then be converted to a BMI (kg/m^2) for each participant. BMI will be standardised for age and gender using BMI-for-age z-scores and change will be assessed using the BMI z-score slope following World Health Organization recommendations for adolescents (de Onis & Lobstein, 2010).

Residential carer measures

An audit of pantry/fridge contents and meals cooked across a one-week period (all meals cooked and offered to young people have to be documented by residential staff on a daily basis) will be used to evaluate the first two hypotheses. Knowledge of child nutrition and physical activity will be assessed using the same measures administered to the young people.

Carer modelling of physical and sedentary activities. The Active Australia Survey (AIHW, 2003) – a validated questionnaire that measures physical activity behaviour in adults – will be used to measure carer engagement in physical and sedentary activities (duration and nature).

Carer encouragement and importance. Carers will also be asked to rate on a five-point Likert scale ('very much' to 'not at all') how encouraging they feel they are of, and how important it is to them that, their young people (are) participating in physical activities, eating fruits and vegetables, reading books, and watching television.

The following measures will also be administered to carers at baseline and 6 and 12 months post baseline to allow us to determine whether individual differences in carer characteristics influence the efficacy of the HEAL programme (see Analyses section below).

Carer well-being. We will measure carer's psychological health by administering the Depression Anxiety and Stress Scale 21-item (Lovibond & Lovibond, 1995).

Job-related aspects of carer role. Carers will be asked about their level of experience in care giving for young people (in years). The Workplace Wellbeing Index (Page, 2005) will be used to measure job satisfaction and level of support from colleagues and supervisors. Job stress will be evaluated using the Effort–Reward Imbalance Questionnaire

(Siegrist, Wege, Pühlhofer, & Wahrendorf, 2009), and the Motivation at Work Scale (Gagné et al., 2010) will be used to evaluate motivation of carers.

Other relevant variables. Other variables will be included to ensure comprehensive assessment and will be examined as secondary, or covariate, variables. For the young people these include substance use, smoking, gender, age, and length of time in OOHC; we will also ask about gender, age, and length of employment and smoking from the carers.

Qualitative interviews

We will invite 20 adolescents and their carers from the intervention to take part in an interview to obtain qualitative data in relation to barriers to creating a healthy environment and the support or resources that they find most useful in establishing and/or maintaining healthy behaviours and attitudes around diet and physical activity for themselves. These interviews will take place 14 months post baseline, and will inform us on the strengths of the intervention and subsequent programme development.

Power, sample size, and retention

The primary outcome for this intervention is child eating habits and dietary intake. Both the expected clinical effect of the intervention and variability of the primary outcome measure are important considerations. Thus, sample size calculations were based on Australian data by the Cancer Council that provide relevant parameter estimates from a large-scale study of secondary school children throughout Australia ($n = 12,188$) (Morley et al., 2012). This report estimated that 24% of adolescents have at least the recommended four serves of vegetables per day, 41% have three or more daily serves of fruit, and 30% have four or more cups of soft drink per week. Consistent with our prior research (Skouteris, McCabe, Swinburn, & Hill, 2010), we adopted a 25% increase in healthy eating as a minimum target for this intervention. Accordingly, we aimed for the proportion of adolescents in our sample who met daily dietary requirements for fruit and vegetables to increase to 51% and 30%, respectively, and for consumption of four or more cups of soft drink per week to reduce to 24%. A prior power analyses with power of 0.95 and one-tailed significance tests ($\alpha = 0.05$) were entered into G*Power version 3.1 (Faul, Erdfelder, Buchner, & Lang, 2009) and revealed that a sample of 118 was needed to evaluate change in dietary habits using logistic regression. Consequently, allowing for attrition of 20% (attrition rate in the HEAL pilot study, which is also typical of attrition rates in large longitudinal studies with multiple time points) we need to recruit approximately 146 young people to ensure a final sample of 118; with a total sample of 190 young people and 83% of young people in the residential units agreeing to be part of the evaluation (prior to attrition), the initial recruitment sample of 146 is viable.

Analyses

Baseline data will be secured prior to treatment allocation, missing values will be scrutinised to check for non-random distribution, and primary analyses will be executed twice: once using observed data, and once using multiple imputation under multivariate normal assumptions using methods given by Schafer, so that all participants will be analysed in their allocated condition. Multivariate analyses of variance will test the between-group differences in the primary and secondary outcomes at each assessment time point and across time points for the young people and carers. Finally, the interview transcripts will be analysed using elements of phenomenology and thematic content

analysis, with which we have experience. Although we will implement a strict protocol to ensure that the treatment received is consistent for all participants in the intervention group, prior research shows that individual differences in carer characteristics can still influence the efficacy of treatment programmes (Firth-Cozens, 2001; Gilligan, 2004; Kalra et al., 2004). Accordingly, we will evaluate (using multi-level modelling) the extent to which changes in key outcomes (i.e. eating habits and dietary intake) are influenced by carer characteristics that may influence the efficacy of treatment: psychological health (depression, anxiety, and stress), carer attitudes, and job-related influences (job satisfaction, level of experience in this position, and availability of resources to help carers in their job).

Discussion

Epidemiological studies indicate childhood overweight and obesity is a serious problem in Australia (AIHW, 2012). Unfortunately, children living in OOHC are not exempt, and calls have been made recently to reverse this unhealthy trend. Developing effective prevention and intervention programmes for young people living in out-of-home residential care is an important step to overcoming rising overweight and obesity in this population. Targeting this group is especially important, given they are one of the most vulnerable and disadvantaged groups in our society. Currently, there is a paucity of strategies aimed at altering the eating and physical activity behaviours of this group (Skouteris et al., 2011). This study aims to address this urgent need to develop and test the effectiveness of the HEAL intervention programme for young people (and staff) residing in residential care. Our intervention will provide both young people and staff with information and resources to support them in the development of healthy lifestyle behaviours. If effective, this programme could modify levels of obesity and improve the psychological adjustment of these vulnerable young people. Furthermore, this study may further our knowledge regarding the effectiveness of programmes targeting physical activity and dietary behaviours amongst young people living in out-of-home residential care units.

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