Assessing the real world effectiveness of the Healthy Eating Activity and Lifestyle (HEAL^TM) program

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Abstract

Issue addressed: Community-based lifestyle modification programs can be a valuable strategy to reduce risk factors for chronic disease. However, few government-funded programs report their results in the peer-reviewed literature. Our aim was to report on the effectiveness of the Healthy Eating Activity and Lifestyle (HEAL™) program, a program funded under the Australian government's Healthy Communities Initiative.

Methods: Participants (*n* = 2827) were recruited to the program from a broad range of backgrounds and each week completed an hour of group-based physical activity followed by an hour of lifestyle education for 8 weeks. Physical activity, sitting time, fruit and vegetable consumption, anthropometric measures, blood pressure and functional capacity data were gathered at baseline and post-program.

Results: HEAL™ participation resulted in significant acute improvements in frequency and volume of physical activity, reductions in daily sitting time and increases in fruit and vegetable consumption. HEAL™ participation led to reductions in total body mass, body mass index, waist circumference and blood pressure and to improvements in functional capacity ($P < 0.001$).

Conclusions: Based on these findings and the coordinated approach to program delivery, the HEAL™ program warrants consideration as a behaviour change strategy in primary health care networks, local government or community settings.

So what? These findings should inform future policy development around implementation of lifestyle modification programs; they strengthen the case for support and promotion of lifestyle modification programs to improve public health, lessening the financial and personal burden of chronic conditions.

Introduction

Research evidence points to the efficacy of lifestyle modification programs in the prevention and treatment of conditions such as obesity, diabetes and cardiovascular disease. Key features of efficacious programs have been reported to include delivery by highly trained staff, inclusion of behaviour change education and goal-setting techniques and targeting multiple physical activity and nutritional goals simultaneously.[1–4] Baker *et al.*[1] noted that the challenge was to translate efficacious programs into effective programs implemented in a real world setting. Compared with other approaches, multi-component group-based interventions built on proven theoretical frameworks have been reported to be more effective in increasing physical activity.[3] However, it has been reported that few government-funded programs disseminate their results and experiences through the peer-reviewed literature limiting what might be learnt from these programs.[5]

In this paper we attempt, in part, to redress this by reporting results from the Healthy Eating Activity and Lifestyle (HEAL™) program, a group-based lifestyle modification program. HEAL™ was a National Program Grant (NPG) recipient under the Australian government's Healthy Communities Initiative (HCI) which supported local governments to deliver evidence-based community physical activity and healthy eating programs.[6] Application to become one of the six NPG recipients was a competitive process requiring applicants to demonstrate significant evidential support for their programs. This was to ensure that local governments had a selection of evidence-based programs they could implement with confidence, helping to overcome reported difficulties in local government accessing, and using, research evidence in health promotion.[7] NPG funding was used to expand HEAL™ resources, train and support facilitators Australia-wide and to gather evaluation data. Data reported in this paper comes from HEAL™ programs completed during the HCI

period (1 July 2010 to 31 May 2013) and shows the short-term effects of program participation on participant behaviour change and on participant health indicators.

Methodology

Participants

The aim of the HCI was to provide access to physical activity and healthy eating programs for disadvantaged Australians, particularly those out of the paid workforce. Target groups were identified within local government applications for HCI funding and councils recruited participants through a combination of media advertising, online advertising, brochures and posters placed in community venues and by canvassing local health services and general practitioners. A Healthy Communities Coordinator was employed in each council area that received HCI funding to oversee implementation. HEAL™ programs were delivered to participants from a range of low socioeconomic backgrounds including retirees, Aboriginal people, refugees, migrants, young mothers and people living with a mental or physical disability. Participants completed an individual pre-program screening and assessment. Informed consent was obtained before proceeding with screening and assessment. The Adult Pre-Exercise Screening System (APSS)[8] was used to risk stratify participants; those who answered yes to one or more questions in stage one of the APSS were asked to seek a referral from their doctor or an appropriately qualified allied health practitioner before starting the program.

Program

The HEAL™ program is an eight-week, group-based lifestyle modification program designed for people with, or at risk of developing, chronic conditions such as obesity, diabetes and cardiovascular disease. HEAL™ was developed by a team of exercise physiologists, dietitians and chronic disease specialists at South Western Sydney Medicare Local (SWSML) and has been operating in their local health district for 12 years. In partnership with Exercise and Sports Science Australia, SWSML were successful in securing HCI funding to expand the program nationwide; this funding was used to administer the program, produce resources and to train and support facilitators in those local government areas that opted to run HEAL™ as one of their HCI interventions. Program implementation and achievement of project milestones were monitored by the Department of Health and Ageing. Quantitative and qualitative reports were submitted to the department every six months during the HCI period.

Program development

The development of the HEAL™ program education content was based on the 'Transtheoretical Model and Stages of Change' described by Prochaska *et al.*[9] The constructs from this model that guided program development were:

(1) consciousness raising: finding and learning new facts, ideas, and tips that support healthy behaviour change

(2) environmental re-evaluation: realising the negative impact of unhealthy behaviour or positive impact of healthy behaviour on one's proximal social or physical environment

(3) self re-evaluation: realising that behaviour change is an important part of one's identity as a person

(4) self-liberation: making a firm commitment to change

(5) helping relationships: making use of social support for healthy behaviour change

(6) counterconditioning: substitution of healthier alternative behaviours and cognitions for the unhealthy behaviours

(7) contingency management: develop contracts, overt and covert reinforcements and incentives to maintain change.

Table 1 shows the HEAL™ education session content and associated constructs. Combining exercise and education in every session was based on evidence for the effectiveness of combined lifestyle education and physical activity sessions in preventing chronic condition development or progression.[10,11]

Program delivery

Each week participants completed an hour of supervised group exercise followed by an hour of lifestyle education. The exercise content was adapted to suit the needs and interests of the participant group with the main stipulation being that activities not exceed a moderate intensity. Examples of activities undertaken include: aerobic circuit classes, weights sessions, supervised walks, traditional dance, outdoor gym sessions, aqua aerobics, modified boxing classes and line dancing. In some cases the exercise sessions were conducted by an exercise physiologist and the education sessions by a dietitian but in the majority of cases the education and exercise were conducted by the same facilitator due to workforce limitations or cost considerations. Barring illness the entire eight weeks was facilitated by the same person or teaching combination.

The program was delivered in a wide variety of locations across 67 local government areas including: community halls, exercise studios, meeting rooms, Aboriginal health centres, refugee accommodation centres and, in one instance, in the local pub. Location selection was the responsibility of the supporting council or local facilitator. Participants were deemed to have completed the program if they had attended at least six of the eight sessions.

Each participant received a manual containing the education slides and support materials, group discussion points, home-based activities and a home exercise program. In response to suggestions from HEAL™ facilitators, an abridged version of the participant manual was developed for people with low English literacy and for those from non-English speaking backgrounds. An Aboriginal and Torres Strait Islander version of the manual and promotional resources were also produced, as was an A3 flip chart version for use during yarning sessions and cook-ups.

Facilitators

HEAL™ was facilitated by university-trained allied health professionals, predominantly exercise physiologists and dietitians. HEAL™ facilitator training included instruction in pre-exercise

Table 1.   HEAL^{TM} education session content

Session title	Session topics	Intervention components	Link to processes of change
Your Health and Your Choices	• Causes of weight gain • Health risks • Healthy choices	• Identify modifiable and non-modifiable causes of weight gain and disease risk • Choice and lifestyle game	• Environmental re-evaluation • Self-re-evaluation
Physical Activity	• Impact of technology • Why is it good for us? • Types of activity • Australian guidelines	• Discussion on modes of physical activity, guidelines and the benefits of being physically active • Participant makes a physical activity contract	• Consciousness raising • Environmental re-evaluation • Self-liberation
What is Healthy Eating?	• The Australian guide to healthy eating • Energy balance • Carbohydrates and protein • Alcohol	• Presentation on portion sizes, serves and the healthy plate model • Group discussion on energy balance • Presentation on nutrients in the diet	• Consciousness raising • Self-re-evaluation
Fat In Your Diet	• Types of fat • Amount of fat in food • Low fat cooking methods	• Identification of the types and amount of fat in a variety of foods • Discussion of alternate cooking methods	• Consciousness raising • Environmental re-evaluation • Counterconditioning
Eating Out and Meal Planning	• Eating out • Healthier meal choices	• Presentation and discussion on healthier eating when away from home and modifying recipes to be lower in fat	• Consciousness raising • Environmental re-evaluation • Counterconditioning
Label Reading	• Practical session in label reading • Supermarket tour (if included)	• Practical session on learning to read labels and interpreting the information to make healthier choices	• Consciousness raising
Planning for a Healthy Lifestyle	• Making changes • Staying on track • Maintaining changes	• Discussion on goal setting and SMART goals • Identifying barriers to achieving goals • Making an action plan for staying on track	• Counterconditioning • Helping relationships • Also elements of contingency management
Food Myths and Non-hungry Eating	• Exposing myths and misconceptions • Non-hungry eating	• Identify common myths around food and eating • Identify triggers to eating and develop plans to combat those triggers • Learn about eating with awareness	• Self-liberation • Counterconditioning

screening procedures and risk stratification; assessment procedures; understanding and delivering education session content; adapting and delivering the exercise session content; principles of self-managed change; active listening skills and an introduction to motivational interviewing; and program promotion, referral pathways, data entry and administrative functions. Facilitators participated in competency-based assessments and had to pass a written theory assessment before receiving certification.

Data collection

Physical activity and sitting time data were gathered by survey at individual baseline and post-program assessments. Physical activity questions were based on the Active Australia Survey[12] and included an estimation of the total weekly minutes spent: walking for more than 10 min for fun, fitness or transport; completing other physical activity (not walking) done for fun, fitness or sport; or in gardening or household chores that made participants breathe harder or 'puff'.

Daily fruit and vegetable consumption were gathered from answers to questions one (fruit) and six (vegetables) on the Fat and Fibre Barometer questionnaire[13] which asks participants to estimate their average daily serves of fruit and vegetables. Anthropometric data (height in metres, body mass (kg), body mass index (BMI) and waist circumference in cm); systolic and diastolic blood pressure;

and functional capacity measures (6-min walk test and 30-s chair rise) were also gathered by facilitators at these time points. Participants were invited to complete a satisfaction survey at the conclusion of the program. All assessment items were voluntary.

Facilitators entered quantitative participant data into individually-coded spreadsheets and sent the most up-to-date copy of their spreadsheet to the HEAL™ project team staff every six months. A custom written database application was used to import spreadsheet data, produce reports and export the complete dataset for analysis. Qualitative data were gathered via telephone interviews conducted by the national HEAL™ project team with 12 healthy communities coordinators, 21 HEAL™ facilitators and 39 HEAL™ participants. Interviewees were a purposive sample from 12 local government areas that had opted to implement the HEAL™ program. Interview questions included success of engagement with HCI target groups, program reach and effectiveness and participant characteristics.

Data Analysis

SPSS (version 11.5) was used for data analysis, baseline to post-program differences were assessed using paired sample *t*-tests. Data are presented as mean ± standard deviation. The study was approved by the Tasmanian Human Research Ethics Committee (H0013949).

Results

Program delivery

To 31 May 2013, 310 HEAL™ facilitators had been trained to deliver the program; these were predominantly exercise physiologists (47%) and dietitians (16%) but also included registered nurses (11%), physiotherapists (5%) and Aboriginal health workers (5%). Facilitators had been trained to deliver the program in 67 of the 92 HCI local government areas. To this date, 297 HEAL™ programs had commenced.

Participants

To 31 May 2013, 2827 participants had started in a HEAL™ program: of these 56% reported having a health care card. The government used the health care card as an indication of the participants' socioeconomic status in order to monitor whether the HCI target group was being reached. To this date, 61% of participants had completed the program and returned for post-program testing. Females constituted 78% of HEAL™ attendees ($n = 2213$) with an average age of 58 ± 14 years; males ($n = 614$) had an average age of 60 ± 15 years. There were significant improvements in all outcome variables ($P < 0.001$) for participants completing the program (see Table 2). These included increases in level and frequency of physical activity; reductions in daily sitting time; increases in daily serves of fruit and vegetables consumed; reductions in body mass, BMI, waist circumference and blood pressure; and improvements in measures of functional capacity. At baseline, 60% of participants were not meeting recommended physical activity levels (210 min per week) while at post-program testing this had dropped to 45%.

For those who completed the participant satisfaction survey ($n = 568$), 98% reported that participation had increased: their awareness of the risks of physical inactivity and unhealthy eating choices; their knowledge of healthy physical activity and eating; and their skills with regard to setting goals and planning for a healthy lifestyle. Additionally 97% reported that they intended to change their lifestyle by maintaining healthy physical activity and eating practices.

Table 2.   Baseline and post-program outcome measure averages with *t-test p* values

Outcome measure	n	Baseline	Post-program	t-test p value
Physical activity (min/wk)	1728	248 ± 306	301 ± 313	<0.001
Physical activity (days/wk)	1256	3.9 ± 2.3	4.8 ± 1.9	<0.001
Sitting time (hours/day)	1220	5.2 ± 3.4	4.5 ± 3.2	<0.001
Vegetables (serves/day)	1304	2.4 ± 1.4	3.0 ± 1.4	<0.001
Fruit (serves/day)	1307	1.7 ± 0.9	1.9 ± 0.8	<0.001
Body mass (kg)	1492	87.5 ± 20.7	86.5 ± 20.5	<0.001
BMI (kg/m^2)	1463	32.5 ± 6.9	32.0 ± 6.8	<0.001
Female Waist (cm)	1155	101.8 ± 16.2	99.2 ± 16.2	<0.001
Male Waist (cm)	350	112.8 ± 15.3	110.8 ± 16.6	<0.001
Systolic BP (mmHg)	1406	134 ± 18	131 ± 17	<0.001
Diastolic BP (mmHg)	1406	80 ± 12	77 ± 11	<0.001
6-min walk (m)	1357	444 ± 148	493 ± 160	<0.001
30-s chair rise (n)	1371	12.9 ± 3.9	15.2 ± 4.8	<0.001

Discussion

The HEAL™ program aims to assist people with, or at high risk of developing, chronic conditions to achieve positive lifestyle changes. Participants are encouraged to become more physically active, to decrease their sitting time, increase their fruit and vegetable consumption and to follow a low-fat, high-fibre diet. The program achieves this through group-based moderate intensity physical activity sessions combined with lifestyle education sessions.

Behaviour change

Improvements in post-program outcome variables suggest that the program was successful in achieving its aims. HEAL™ participants were found to have significantly increased the quantity and frequency of their weekly physical activity and reduced their average daily sitting time. This is important because low levels of physical activity and prolonged sitting time have been shown to be independent risk factors for all-cause mortality.[14–16]

HEAL™ participants also achieved significant increases in fruit and vegetable consumption. Results from the 1995 Australian National Nutrition Survey and 2011–2012 Australian National Health Survey indicated that while 50% of people surveyed were eating two or more serves of fruit a day, only 20%–30% were eating four or more serves of vegetables.[17,18] By comparison, post-program 75% of HEAL™ participants reported eating two or more serves of fruit a day (an increase of 63% from baseline) and 31% reported eating four or more serves of vegetables a day (an increase of 17% from baseline). These increases in fruit and vegetable consumption by HEAL™ participants were noteworthy as education content on fruit and vegetable serving size and recommended intakes constituted just a small part of week 3 content and yet this information had been retained and acted upon. Additionally, in interviews conducted for the six-monthly qualitative evaluations, HEAL™ facilitators reported that, in general, participants began the program with low health and nutrition literacy levels. It appears then that what was new nutritional information to these participants about fruit and vegetable consumption was understood and incorporated into participants' lives.

Improvements in fruit and vegetable consumption also need to be viewed in the context of associated health benefits which include reductions in the risk of coronary heart disease (CHD),[19] stroke[20] and diabetes[21] and, because of their relatively low-energy density and high-fibre content, weight loss.[22]

Anthropometry

Improvements in HEAL™ participants' physical activity and eating behaviours led to reductions in waist circumference, body mass and BMI. Research has highlighted that decreases in these measures are associated with improved health outcomes. For example, greater waist circumference has been associated with an increased risk of cardiovascular disease and all-cause mortality risk[23] highlighting the importance of the significant reductions achieved by HEAL™ participants. Uusitupa *et al.*[24] reported that insulin sensitivity was

markedly improved by weight loss, while Anderson and Knoz[25] reported that for every kilogram of weight loss in their study participants there were associated favourable changes in blood biochemistry, blood pressure and blood glucose levels. Mertens and Van Gaal[26] suggested that even modest weight loss had the potential to normalise blood pressure.

Functional capacity

Increases in physical activity also led to improved functional capacity, as measured by the 6-min walk test and 30-s chair rise test. Improved functional capacity bestows a multitude of benefits including increased ability to participate in activities of daily living and a lower fall risk for older adults.[27] It has been suggested that lower functional capacity is more strongly associated with all-cause mortality than low levels of physical activity.[28]

Strengths

A feature of this project was program delivery to a broad range of participant groups by allied health professionals rather than clinical researchers. This strengthens the case for the generalisability of the results to a wider community context, as opposed to an intervention delivered in a clinical research context. Based on the Transtheoretical Model, the HEAL™ program provided participants with knowledge and skills to support behaviour change; used group support and group discussion to normalise healthy behaviours; and incorporated goal setting and elements of motivational interviewing to support participants on their journey of change. Participant feedback indicated that they felt they had increased their awareness of the benefits of behaviour change and had improved their knowledge and skills to implement changes in behaviour. Participants also reported that they felt confident to maintain these changes in the longer term. The positive improvements in participant health variables, observed after a relatively short time period (8 weeks), argues for the program's effectiveness. HEAL™ participants increased their physical activity levels and functional capacity post-program and simultaneously increased their fruit and vegetable consumption, a finding which has been less clear from other multi-component group-based interventions.[1,10]

Limitations

Limitations to consider when interpreting the results of the current study include the lack of a control group which would have allowed comparison of the effectiveness of HEAL™ with another intervention or usual care. However, the authors note that other government-funded, community-based, prevention programs have also lacked provision of a control group[29,30] and no control group was budgeted for under the terms of the HCI funding agreement for HEAL™. Nonetheless, studies which have incorporated control groups receiving either no intervention or usual care have found that a lifestyle modification intervention results in significantly better outcomes in terms of physical activity, weight loss and progression of type II diabetes.[1,31,32] As an example and point of comparison, participants in a 24-week intensive lifestyle modification program

achieved 5.6 kg in weight loss as opposed to 0.1 kg weight loss observed in the placebo control group.[32]

Retention to post-program testing was 61% which, while lower than rates considered robust for clinical trials (85%),[33] is favourable when compared with reported retention in health-related exercise programs (50%)[34] and other lifestyle modification programs such as the Lighten Up program (53%).[30] Nonetheless, the significant improvements in participant health outcomes were meaningful especially in light of the fact that the majority of participants were drawn from traditionally hard-to-reach, socially and economically disadvantaged groups.

An additional limitation is that 78% of HEAL™ participants were female, meaning that men were under represented in the sample group. Similar bias has been reported in other community-based interventions such as the Lighten Up program, where 85% of participants were female.[30] This reflects what we know from the literature that: 'men are less likely to engage in behaviours that are linked with health and longevity'[35]. However, we also know from interviews with HEAL™ participants that the knowledge and skills gained in healthy eating, low-fat cooking and engaging in physical activity were put into action in a family context. There is also literature to support the observation that females monitor and attempt to control the health behaviours of their spouses.[36] The ability to quantify the effect this may have had on male partners of HEAL™ participants is beyond the scope of this paper but would be an interesting area of future study.

Conclusion

In summary, the HEAL™ program, a group-based lifestyle modification program incorporating behaviour change strategies, and combining education and exercise, has been shown to improve the health behaviours and health outcome measures of participants who completed the program. The strengths of the HEAL™ program are the systematic, coordinated manner of delivery and evaluation. Based on these strengths, and where funding is available, the HEAL™ program warrants close consideration as a behaviour change strategy in primary health care networks, local government or community settings. Achieving sustainability would be highly beneficial in improving public health and lessening the financial and personal burden of chronic conditions.

Competing interests

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