

# Participant perceptions of a community-based lifestyle intervention: the CHIP

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## Introduction

Cardiovascular disease (CVD), with its underlying atherosclerotic processes, is the most common cause of death in Australia (responsible for about 50,000 deaths in 2008) with 3.5 million people reporting having the condition in 2007-08.<sup>1</sup> CVD is also the most common cause of death in the US<sup>2</sup> and a major cause of preventable morbidity and mortality in other developed countries.<sup>3</sup> Major risk factors include high serum levels of low density lipoproteins (LDL cholesterol), low levels of high density lipoproteins (HDL cholesterol), high blood pressure, smoking, diabetes, excess weight, sedentary living, and increasing age.<sup>4</sup> Modelling suggests that even a 10% reduction in LDL cholesterol at a community level could save around 3,000 lives annually<sup>5</sup> among an Australia population of fewer than 23 million.<sup>6</sup> Reducing serum cholesterol and controlling other risk factors generally requires sustained dietary modification and increased exercise, both of which are challenging to initiate and maintain.<sup>7,8</sup>

The Coronary Health Improvement Project (CHIP) is a community-based educational initiative for improving cardiovascular fitness and other health indicators associated with lifestyle-related disorders. CHIP promotional material targets "heart disease, stroke, hypertension, diabetes, overweight, certain adult cancers, diverticular

disease, constipation, gall bladder disease, heartburn, arthritis, gout and impotence".<sup>9</sup> Prevention and arrest of disease by modifying factors via this program<sup>10</sup> is intended for "generally healthy, yet at-risk, adults"<sup>11</sup> using interactive instruction. More than 50,000 people, 95% from the US, have participated in the CHIP since 1988.<sup>12</sup>

People enrolling in the CHIP can attend a free one-hour information session orienting them to the goals and objectives of the program and sign up for the initial (baseline) Heart Screen testing. When registered, participants receive pre- and post-program Heart Screens in which medications are reviewed, and fasting lipids, blood sugar, lifestyle, body mass index and blood pressure are assessed. Content is delivered via 16 one-hour video lectures and 16 one-hour group seminars over 4 to 8 weeks. Topics include risk factors, dietary factors, regular exercise in preventing and arresting disease<sup>13</sup> and "limitations of high-tech medical approaches in dealing with lifestyle related diseases"<sup>13</sup> whereby the CHIP advocates behavioural change to prevent coronary artery disease by reversing lifestyle-related risk factors, in preference to pharmaceutical or surgical procedures. Cognitive-behavioural aspects of change include the importance of "adaptability", "forgiveness" and "self-worth" in achieving and maintaining optimal health.<sup>13</sup> The final classes have mental health components, venturing beyond biomedical topics. In Australia, which

## Abstract

**Issue addressed:** The Coronary Health Improvement Project (CHIP) is a community-based educational initiative designed to improve cardiovascular fitness and other health indicators associated with common, lifestyle-related health disorders in developed societies. Evaluations of the CHIP since the late 1990s, though yielding positive statistical results for change in participant physical health indicators, have not included qualitative assessments of the CHIP experience from the perspectives of CHIP participants.

**Methods:** Data were obtained using a mixed methods survey design via a questionnaire completed by 79 respondents (71% female) who had participated in Australian CHIP programs. Responses were analysed using descriptive statistics and thematic analysis.

**Results:** Participants commonly undertook the CHIP to fulfil their lifestyle and health aspirations and to target specific health conditions. Improved diet, enhanced exercise and weight loss were the most commonly reported benefits. Participation in the CHIP involves a process of conviction (involving risks and motivation), connection (involving support and reinforcement), challenge (involving control and struggle) and change (involving more and less).

**Conclusion:** This study offers a model of a change process generated from the perspectives of participants of the CHIP in Australia. Not all participants found CHIP lifestyle recommendations straightforward to adopt, as some encountered resistance from within themselves or from family and friends.

**Key words:** cardiovascular diseases, lifestyle-induced illness, health behaviour, community health education; health promotion.

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## So what?

Community-based education addressing lifestyle disease risk factors are likely to benefit from including social and psychological components to course and health promotion material.

is the setting of the current research, CHIP programs are conducted by trained volunteer facilitators authorised to use the same lectures (on DVD), format and schedule as those presented by the project's founder, Dr Hans Diehl, in the US.<sup>14</sup> A study by Rankin *et al.*<sup>15</sup> showed that among a free-living population, CHIP can achieve significant reductions in selected chronic disease risk factors, even when the intervention is facilitated by volunteers.

Alumni reunions, which offer activities such as food tasting and invited guest speakers to reinforce lifestyle changes, are held monthly following completion of the program.

Several evaluations of the CHIP have been conducted. In the US, Diehl<sup>16</sup> found significant improvements in blood lipids, blood pressure, weight, pulse rate and diabetes. An analysis by Englert *et al.*<sup>10</sup> at four weeks from baseline found unprecedented improvements in serum cholesterol and triglycerides, blood glucose, blood pressure and weight, especially among participants at highest risk. These findings were further supported in a combined analysis of five CHIP courses.<sup>17</sup> A randomised clinical trial by Merrill *et al.*<sup>11</sup> showed significant improvements in weight, physical activity, eating habits, sleep and other stress indicators at six weeks and six months after participation. In a larger study, Merrill *et al.*<sup>18</sup> found significant improvements in sleep and stress disorders at four weeks. Merrill *et al.*<sup>19</sup> showed that behavioural changes can persist for 18 months, although with some decay compared with six weeks after baseline measures. Other US evaluations include Aldana *et al.*<sup>20-23</sup> The CHIP is listed among many other community-based prevention programs of proven effectiveness.<sup>24</sup>

Outcome measures from research into the CHIP are predominately biomedical. However, physiological and biometric measures do not inform educators about the process of behavioural change. Experiential reports from CHIP participants have not yet been considered in the scholarly literature. The current study redresses this absence of published accounts. Accounts of CHIP participants' subjective experiences of the CHIP, their motivations for enrolling, any rewards and challenges they experienced, and their appraisal of the CHIP have the potential generally to inform community education programs that promote healthy lifestyles, this being a principal aim of the current research. Of further interest is whether accounts of CHIP graduates' experience match prominent theories about health behaviour and behavioural change, such as the Health Belief Model (HBM),<sup>25,26</sup> the Transtheoretical Model of Behavior Change,<sup>27,28</sup> the Theory of Planned Behavior,<sup>29</sup> and approaches to behaviour change including Health Coaching<sup>30</sup> and Motivational Interviewing.<sup>31</sup>

According to the HBM, health behaviour is influenced by the subjective value of the outcome and the expectation that the outcome will occur if the person acts to bring it about.<sup>26</sup> The Transtheoretical Model involves change over time, beginning with precontemplation, when change is not considered for the foreseeable future; then contemplation, when change is anticipated but the decision is caught between risks and benefits; followed by preparation for action in the immediate future; then action that is occurring or has occurred; a subsequent period of maintenance, which can be prolonged, to prevent relapse; and termination, when relapse is no longer contemplated. At the outset of a CHIP program, CHIP recruits are likely to be at the action stage, whereas graduates who have adopted CHIP principles as a lifestyle will be at the

maintenance stage. Of the 10 transtheoretical processes for guiding people through change,<sup>28</sup> the CHIP would appear most to employ consciousness-raising and self-liberation (the belief that one can change), and counter-conditioning (substituting healthy behaviours).

The Theory of Planned Behavior<sup>29</sup> describes volitional action, such as lifestyle change, as the result of intentions which are, in turn, an outcome of attitudes towards the behaviour, the subjective norm for the behaviour, and perceived volitional control. In other words, people will do something if they intend to do it. They intend to do it if they are favourably disposed towards the behaviour, the behaviour receives general approval and the person considers the action feasible, as not all goals (such as weight loss) are under complete volitional control.<sup>32</sup> The conclusion is that effective behavioural interventions will target the individual's evaluation of the behaviour, social pressure towards the behaviour, and ability to accomplish the behaviour.<sup>33</sup>

The demonstration by Sullivan *et al.*<sup>34</sup> of how perceived benefits, susceptibility, self-efficacy, barriers and the subjective norm influence intention to control stroke-risk via weight-loss and exercise, showed how lifestyle education should target health beliefs and the psychological processes that bring about or inhibit behaviour change. If these principles generalise, they will apply to the CHIP and any other lifestyle improvement program.

This project seeks to evaluate the existing CHIP program from the perspectives of Australian CHIP participants, and to examine whether concepts from theories and approaches to behaviour change are reflected in participants' accounts of the CHIP experience.

## Method

A descriptive, exploratory, retrospective, non-experimental self-report survey design was employed with a convenience sample of CHIP graduates in Australia.

## Participants

Eligibility criteria were that participants had graduated from at least one CHIP in Australia. The sampling method was respondent self-selection from the population of graduates who had earlier offered their contact details to CHIP organisers for CHIP-related purposes such as alumni reunions.

## Measures

The lack of known precedent for this project required an original questionnaire to be developed. A set of closed questions covered demographics such as age and gender, and the year and state in which the CHIP was attended. Open response questions covered participants' decision to attend; their experiences of the CHIP; their successes and struggles in achieving the lifestyle changes promoted; how the CHIP has affected their views on diet and exercise; what was most helpful about the CHIP; their advice to someone considering attendance; and suggested improvements to the program. The questionnaire received repeated peer review, including review from a university research approval committee independent of the research team.

The project complied with laws and principles relevant to ethical research, including anonymity, informed consent and voluntary

participation. Approval to conduct the project was received from the researchers' university's human research ethics committee.

### Data collection

The questionnaire was developed for distribution both as a printed version and as an interactive PDF form. The PDF form was sent either as an attachment to each participant's e-mail address for completion and submission to the principal researcher's university e-mail address. The printed version was distributed, completed by participants, collected at alumni meetings by CHIP organisers then forwarded to the researchers. A total of 79 questionnaires were returned, representing a 55% response rate.

### Analysis

Descriptive summary statistics reveal the demographic profile of the sample. The raw data from participants' responses to the open-ended questions were examined. Thematic analysis<sup>35</sup> was used to group the verbatim data into broad categories under which concepts and patterned responses were coded and organised. Provisional themes and sub-themes were further examined for fit between the aim of the study and the findings. From these themes a conceptual model reflecting participants' experience of the CHIP was generated and verified by co-investigators.

## Results

### Sample description

The sample was predominately female (n=56, 71%). Mean age was 59.2 years (SD=11.6, Mdn=60.0, range=24-81 years). Male and female respondents were equivalent in mean age,  $t(31.0)=0.04$ ,  $p=1.0$ . Of the 79 respondents, 67 had graduated from CHIP programs in 2009 or 2010; the other 10 during 2004-08. Two respondents did not report their year of graduation. Most (55) had attended programs in Queensland, 17 in New South Wales, six in Victoria and one in South Australia. The predominance of Queensland respondents may partly reflect the stronger presence of the CHIP in that state. Of the 75 respondents who reported the number of CHIP programs they had completed, most (72) had completed one program, two had completed two programs, and one had completed three programs. This information was intended to capture difference in participants' experiences, even though CHIP programs are standardised.

### Response summaries

Table 1 categorises the reasons why respondents chose to participate in the CHIP program. Most common were basic lifestyle and health aspirations and specific health conditions that the CHIP targets. Improved diet, enhanced exercise and weight loss were the most commonly reported positive achievements (Table 2). Social pressure emerged where adaptive lifestyle change clashed with others' habits and expectations (Tables 3 and 4). From the 74 participants answering the question about how they would advise someone interested in attending the CHIP, most were laudatory (55%), with examples such as "do it", "try it" or similar; and "start the program with an open mind" (19%). Another common response was "It will take commitment" (24%).

**Table 1: Reasons for joining the CHIP (n=78).**

	n	Percentage
Good health or healthy lifestyle	30	38
Weight	29	37
Cholesterol or lipids	25	32
Hypertension	12	15
Other physical condition	11	14
Cardiovascular disorder or family history	9	12
Diabetes or elevated blood sugar	9	12
Accompany or support relative	9	12
Media or advertising	8	10
Personal referral, friend or colleague	8	10
Improve fitness	6	8
Stress or mental health	6	8

**Table 2: Successful lifestyle change via the CHIP (n=78).**

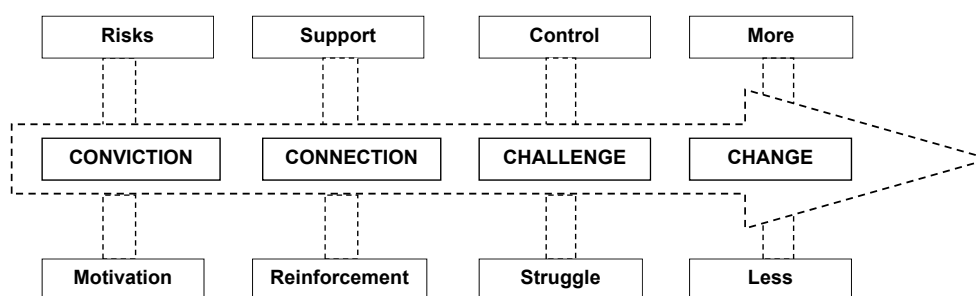
	n	Percentage
Better diet	44	56
More exercise	21	27
Weight loss	19	24
Health knowledge	11	14
Improved well-being	11	14
CHIP easy to adopt	8	10
Blood pressure reduction	7	9
Cholesterol reduction	7	9
Drinking more water	4	5
Was already following CHIP principles	3	4
Glucose reduction	2	3
Other lifestyle improvements	14	18
Other general positive remark	10	13

**Table 3: Struggles in making lifestyle changes: via the CHIP (n=76).**

	n	Percentage
Diet	43	57
Time	19	25
Exercise	17	22
Few or no struggles	14	18
Other people	7	9
Caffeine	5	7
Drinking enough water	5	7
Weight	3	4
Reading labels when shopping	2	3
Flatulence or bloating	2	3
Other struggles	7	9

**Table 4: How CHIP participation affected family and friends (n=66).**

	n	Percentage
Supportive response from others	28	42
Opposition or significant difficulty	10	15
Mixed reaction from family or friends	11	17
Indifference or mild response	7	11
Not an issue (e.g. no family) or no change	15	23

**Figure 1: The CHIP process model of change.**

Of the 58 respondents (73% of the total 79) to a question seeking suggested improvements to the CHIP, 35 (60%) offered constructive advice such as the need for an Australian edition of the DVD to better reflect local tastes, recipe weights and measures; the structure of the program (e.g. fewer nights per week with longer sessions to instil better habits; an afternoon program for retirees rather than evenings), and improved formats for information (e.g. handouts bound and provided at the beginning of the course). There was general approval of the program without suggestions (41% of 58 respondents) and some critical comments (21% of 58 respondents), e.g. the American bias of the DVD, excessive length or intensity of some information, the high commitment of time and meeting schedules, and privacy when talking about individuals' screening results. Of the 58 respondents, 21% reported that no improvements were necessary.

### The CHIP process model of change

Figure 1 illustrates a model of change process generated from participants' reported experiences of the CHIP. Themes (and sub-themes) that constitute the model consist of conviction (involving risks and motivation), connection (involving support and reinforcement), challenge (involving control and struggle) and change (involving more and less).

#### Conviction

Participants held a conviction or firm belief that change needed to be made to their lifestyle, including factors such as diet and exercise. Reducing cardiovascular risk factors such as high cholesterol, hypertension, excess weight, diabetes, osteoporosis, angina, heart disease, shortness of breath, excessive stress and lack of fitness (as per Table 1) was the motivation for participating in the CHIP.

*"I [was] sick of doctors telling me I was a walking time bomb."  
(Female, 58 years)*

*"I had high blood pressure for 30+ years. Suddenly my cholesterol and blood pressures went up and I had always thought I was living a healthy lifestyle – not overweight and I exercised. . . . I joined [CHIP] hoping it would help turn my life around."  
(Female, 65 years)*

*"My cholesterol was very high and I wasn't happy with my health."  
(Male, 67 years)*

*"High triglyceride levels on last blood test prompted health interest."  
(Male, 65 years)*

*"There is nothing to lose (except weight) and everything to gain in additional stamina and vitality."  
(Female, 54 years)*

#### Connection

CHIP participants valued their connection with like-minded others, offering support and reinforcement. Practical, informational and emotional support was gained from presenters and group members. Encouragement from spouses and family members, where this was forthcoming, played a role in participants' adherence to the program. Participants' knowledge, beliefs, principles, philosophy and views about healthy living and eating were reinforced while gaining knowledge.

*"Even though I have had experience with 16 years of veganism 20 years ago... I have found this four weeks of high-fibre diet is helping me lose weight."  
(Female, 60 years)*

*"We were already following some of the lifestyle principles presented."  
(Male, 67 years)*

*"Good group encouragement."  
(Male, 53 years)*

*"I have really benefitted by the group support, the information presented, and by doing the workbook the information stayed with me."  
(Female, 47 years)*

*"The information became a revelation. Absolutely loved all the information. . . . I was already exercising most days, drinking 3 litres of water daily, always eaten fresh fruit and vegies. Have not missed the meat/dairy/eggs, etc."  
(Female, 52 years)*

#### Challenge

Participants were challenged by aspects of the CHIP. They struggled to break maladaptive lifestyle patterns. Control was needed to adopt new healthier patterns.

*"The first two weeks are the hardest."  
(Female, 69 years)*

*"The first three weeks are hardest."  
(Female, 60 years)*

*"Spasmodic describes the efforts. Difficult to cook for others not into the changes."  
(Female, 51 years)*

*"Found the program challenging in terms of having to completely change diet – new ways of cooking."  
(Female, 59 years)*

*"Very challenging for me to follow the diet strictly."  
(Female, 70 years)*

*"Some bad habits are extremely hard to break."  
(Male, 24 years)*

Participants struggled to maintain initial gains; to relinquish caffeine; to maintain a diet different from that of their spouse or family members; to eat at restaurants that did not cater to the CHIP dietary regimen; to adapt exercise regimes to suit bad knees and feet, when using a walking aid, or when experiencing joint pain; to reduce or give

up dairy products; to increase water intake; to adopt a restrictive or "boring" diet of fruits, vegetables, nuts, grains; or dealing with caffeine withdrawal symptoms, such as headaches. Ten participants (15%) reported opposition from family or friends to the lifestyle changes.

*"Has created difficulties with spouse." (Male, 53 years)*

*"My husband likes his stuff swimming in oil; therefore we have separate meals as this adversely affects me." (Female, 68 years)*

*"Most friends don't like it and family as well." (Female, 73 years)*

*"They are not interested – my sons think it is 'just one of Mum's hobbies'. My husband is very supportive." (Female, 70 years)*

Nearly one-fifth of respondents experienced no struggle in adopting the prescribed lifestyle (Table 3).

## Change

Successful CHIP participation brings change in lifestyle behaviour. Change involves 'more' (additions to previous lifestyle) and 'less' (sacrifice or abstention from usual lifestyle).

*"Replaced all food from beginning – started afresh – no meat, no dairy (my favourite foods) and no tea/coffee (quite addicted)." (Female, 63 years)*

*"I began to use more complex carbohydrates, less sugar, salt and fat." (Female, 76)*

*"Walking more than 10,000 steps a day." (Female, 51 years)*

*"More legumes, whole grain rice, oats. Less fat, salt, less sugar." (Female, 49 years)*

*"Weight loss; change in diet; increased exercise." (Male, 67 years)*

Sacrifices included drinking less alcohol, and eating less meat, sugar, salt and fat, fewer desserts, sweets, eggs and dairy products, and smaller quantities of food. For some (38%), the goal was to weigh less. Further to the concept of "less", participants sought or managed to take fewer medications (blood pressure), and to reduce cholesterol level and other risk factors.

*"Don't even want to go back to my old habits." (Female, 65 years)*

*"Not tempted to use sugar." (Female, 65 years)*

*"I am not missing eating meat, chicken, etc." (Female, 65 years)*

*"I'm now totally aware of what I put in my mouth and will continue to do so in future. No turning back the clock to feel unwell." (Female, 65 years)*

*"My shopping habits have changed. I move directly to the produce section and miss out all the junk foods and sweets aisle at my local supermarket." (Female, 40 years)*

Maintenance of change was harder for some than for others.

*"I find it very hard to eliminate dairy foods." (Female, 63 years)*

*"I miss the real cup of tea still as I used to drink about 17-19 cups a day!" (Female, 69 years)*

*"Eat healthy most of the time, occasional lapses." (Female, 71 years)*

The CHIP model labels certain interactional stages in the process of change. For instance, the challenge to do less (eating fewer dairy products) or to do more (exercise) is likely to be moderated by a person's preference for certain foods, and a normally sedentary person's resolve to increase physical activity.

## Discussion

Most research about the CHIP concentrates on changes in biomedical risk factors to cardiovascular and other lifestyle-related disorders. The current research examines graduates' subjective responses to the CHIP. Participants reported mostly positive experiences; they appraised the program favourably and would recommend it. Not all found CHIP lifestyle recommendations straightforward to adopt, as some encountered resistance from themselves or from family and friends, while others reported practical difficulties.

A model of change applicable to participants' experiences of Australian CHIP has been generated (Figure 1). Aspects of this model resemble long-standing models and approaches to behaviour change described in the introduction. In keeping with the HBM,<sup>25</sup> graduates were motivated by the perceived value of prospective outcomes and reported their personal susceptibility, severity of their health risks, benefits from participation and barriers to change. They demonstrated a 'readiness to change' aligned with the principles of Health Coaching and, in particular, the struggle involved at the 'decision line' towards lifestyle behaviour change.<sup>30</sup> Corresponding with the Transtheoretical Model of Behavior Change,<sup>28</sup> participants appeared to operate in the action or maintenance stage of behaviour change, with a small percentage in the termination phase. As anticipated, self-liberation, consciousness raising and counter-conditioning are evident. In terms of the Planned Behavior Theory,<sup>29</sup> graduates commonly reported how the subjective norm influenced their decisions, either in joining the program from others' recommendation, or in the resistance or approval received from family and friends. Adaptive lifestyle change often involves nonconformity, resulting in social pressure. Aspects of volitional control wherein the person feels either capable or challenged by change were also evident. Support and reinforcement, integral to effecting behaviour change, are aligned with the collaborative aspect of Motivational Interviewing.<sup>31</sup>

In addition, the process of change reported by graduates reflects the bio-psycho-social (BPS) model proposed by Engel,<sup>36</sup> for example, participants' conviction to reduce cardiovascular risk factors, the internal struggle in doing so, and the influence of family and friends. Moreover, Engel's position that "modern" medical practice must include social and psychological factors<sup>36</sup> affirms the CHIP model.

## Implications

The current research illustrates how behavioural interventions to eliminate physiological risk factors must address the psychological processes underlying lifestyle change to show why a program may or may not be successful. The findings also illuminate the motivations, perceived difficulties and challenges for participants, enabling health educators to better understand the pressures on people attempting lifestyle changes. In turn, they can assist people in managing the losses (some pleasures must be relinquished), the temptations to revert to former habits, and how to negotiate other people's scepticism or hostility towards new and healthier habits, and thus improve their program delivery. The Australian Government's *Swap It, Don't Stop It* online and mass media public health promotion campaign<sup>37</sup> is a clever approach to reducing the sense of sacrifice

that may inhibit people from taking action to safeguard their long-term health.

The data are from a small convenience sample of volunteers whose views may not represent those of all CHIP participants. People who withdrew without completing the program were not included. The self-selection method of sampling may be biased towards those with a positive experience of the CHIP. Self-report data are conventionally considered unreliable, although subjective perceptions were sought for their especial value.

A longitudinal (mixed method) study would allow examination of lifestyle changes, sustainability and long term benefits, and evaluation of the CHIP process model of change generated from this study.

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## Declared interest

Professor Esther Chang is President of the Lifestyle Medicine Institute, Australia (Inc.) which conducts the CHIP in Australia. Jean Ward is an officer of the CHIP in Australia. Dr Hans Diehl is founder of the CHIP.

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