

LIFESTYLE MODIFICATIONS OF PATIENTS WITH CORONARY HEART DISEASE ON FOLLOW UP IN PUBLIC PRIMARY CARE CENTRES IN SINGAPORE: ASSESSMENT OF PERCEPTION AND BEHAVIOUR

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ABSTRACT

Introduction: Healthier lifestyles in terms of dietary change with reduced saturated fat consumption, appropriate intensity of cardiovascular exercises and smoking cessation, reduce premature death, the need for coronary interventions and improve quality of life for patients with existing coronary heart disease (CHD). The aim of this article was to highlight the lifestyle modifications and related issues of CHD patients managed at public polyclinics in Singapore.

Methods: The first segment of the study used focus group discussions to collect qualitative data on lifestyle modifications adopted by patients who had coronary bypass, or angioplasty or were treated conservatively for CHD and are currently managed in primary care. A subsequent questionnaire survey of a larger source population determined the dimensions of the themes derived by the earlier qualitative study.

Results: Triangulation of both studies showed that CHD patients had attempted to adopt healthier lifestyles by dietary modifications, exercised more often and had a higher smoking cessation rate. However a segment of the study population faced difficulties in changing their behaviour, being influenced by family and environmental factors, co-morbidities, personal attitudes and a lack of understanding of the benefits of lifestyle change. Up to 61% of CHD patients continued to consume food rich in saturated fat and up to 60% of them continued less healthy dietary habits, 30% did not exercise at all and 7.6% continued smoking.

Conclusion: CHD patients were proactive in modifying their lifestyles but they were affected by their physical, psychosocial and environmental factors.

Key words: Coronary heart disease, primary care, lifestyle, diet, exercise, smoking

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INTRODUCTION

Coronary heart disease (CHD) is the second major cause of mortality in Singapore, with rising prevalence from 18.2% in 2005 to an estimated 19.8% in 2007.¹ It is the third major cause of hospitalization in Singapore, which constituted 3.7% of hospital admissions in 2005 and 2007.¹

Patients who survive the initial coronary event have five to seven times the event rate of patients with similar risk factors but without overt CHD.² Improvements in diet, physical activity and other lifestyle measures can decrease absolute cardiovascular risk such as premature death, reduce the need for interventional procedures and improve quality of life of patients with existing CHD.³

In Singapore, patients with CHD are often discharged to primary care from cardiologists in tertiary institutions, once their conditions are stabilised after the acute cardiac events. These patients can select their sites of medical review based on their preference, either at the public polyclinics or the private general practitioner clinics.

However, detailed patients' information pertaining to their treatment in primary care is lacking, which leads to a gap in the understanding of their dietary pattern and lifestyle adaptations in the community. In addition to food prepared at home, 49.9% of Singaporeans patronised hawker centres 6 times a week or more, according to the National Nutrition Survey in 2004 (NNS 2004).⁴

Local national health agency such as Health Promotion Board had also introduced posters and healthier choice symbols (HCS) decals during national Healthy Lifestyle Campaigns, which started in 1999 and 2000. These serve as visual reminders to the public to take up regular exercises, make healthier food choices and to encourage them to opt for less salt and oil when they order their food at various community eating outlets such as hawker centres.⁴

Nevertheless, little is known if such messages reach the CHD patients. There is thus a need to determine the measures undertaken by these patients to modify their risk factors and to understand their barriers toward adopting healthier lifestyles.

As a result, the authors carried out two inter-related studies of CHD patients who are currently managed at local public polyclinics. A qualitative study (CAD study) which aimed to explore the health issues of CHD patients was executed and completed, followed by a cross-sectional quantitative study (HEALTH study). The objectives of the latter were to substantiate and complement the earlier qualitative data based on the same source population. This paper focused on lifestyle modifications such as changes to diet, exercise and smoking habit of the study population.

METHODS

Part 1: CAD (Coronary Artery Disease) study

A study using focus group discussions (FGD) to gather qualitative data was executed between September 2005 and March 2007.^{6,7} The participants were adult patients with known CHD for at least one year, whose diagnosis was based on polyclinic medical records and referral from cardiologists. They included CHD patients treated with the following modalities: percutaneous, transluminal coronary angioplasty (PTCA), coronary arterial bypass grafting (CABG) or non-invasive pharmacological treatment. Those who could speak English were invited by the investigators to join in the focus group discussions. Purposive selection of such patients from a variety of demographic profile, (including three participants on follow up by private general practitioner clinics and two managed at specialist clinics) was executed to ensure multivariate construct of the study population.

Qualitative data were generated from five FGDs. Investigators took turns to facilitate the FGDs based on semi-structured topic guide developed after mutual deliberations by the investigators. The third investigator took charge of the FGD administration such as note taking, voice recordings and transcript auditing. All sessions were audio-taped for subsequent transcription by independent transcribers. The investigators carried out debrief after each FGD. Any new concepts and ideas were noted and included in the topic guide for discussion in the subsequent FGD. The study was terminated after saturation of ideas after five FGDs.

The investigators used the software package NVivo7 (QSR International Pty Ltd, Australia) to code the verbatim transcripts and organised them into emergent themes.

Based on findings generated by qualitative content analysis of the CAD study, themes considered to be important were included in the design of the questionnaire to be used in part two of the study.

Part 2: HEALTH (Heart patients' Expectation of care, Awareness of disease, Lifestyle modifications, Targets of treatment and Health-seeking behaviour) study

This cross-sectional survey was a collaborative study between SingHealth Polyclinics and Ngee Ann Polytechnic School of Nursing. The investigators deliberated and designed the HEALTH study questionnaire based on preliminary qualitative data from the CAD study. The surveys were carried out by the polytechnic student nurses in the nine SingHealth Polyclinics from June 07 to September 07. These interviewers received briefings from the investigators to clarify implementation issues and to standardise the execution of the survey. They were supervised by their polytechnic tutors.

The participants satisfied the same inclusion and exclusion criteria of the CAD study. The questionnaire comprised thirty questions pertaining to CHD patients' expectation of care, awareness of disease, lifestyle modifications, targets of treatment

and their health-seeking behaviours. The questionnaire content was derived from issues raised during the CAD study to ensure internal validity. As there is no precedent study, no external validation was done as the study was targeted as a pilot study.

As there are three major ethnic groups in the local population with different dietary patterns, the exact dietary content differs between the subgroups in the study population. Thus, the investigators selected five basic food types as surrogate indicators of intake of food of high cholesterol content.

Participants were also asked about their behaviour at hawker centres and food courts in view of the local eating habits. Patrons at these eating sites can choose their preferred type of food, where options for healthier food are often available. They could also restrict their salt and oil intake by asking the hawkers to add less oil and salt to their food or use less dips and sauces.

In the exercise segment, the investigators assessed participants' exercise frequency and duration. The questionnaire was either self-administered or facilitated by the polytechnic interviewers. For smoking, the investigators classified the participants into current active smokers defined by smoking at least 1 cigarette per day in the past 6 months, ex-smokers (who had quit for at least 6 months) and non-smokers.

Categorical variables were tabulated and analysed using Stata-10 software (StataCorp LP, USA).

All investigators participated in the deliberation of the results in both segments of the study. Both studies were approved by SingHealth Polyclinics institution review board.

RESULTS

Qualitative and quantitative data pertaining to CHD patients' lifestyle medications were presented sequentially in this article. The demographic profile of 44 participants in the CAD study is shown in Table I and that of 303 participants of the HEALTH study is depicted in Table II.

Majority of participants were managed in public polyclinics. For the HEALTH study, 61.3% of the subjects had CHD for more than five years (Table II).

Theme 1: Attempts and environmental barriers towards dietary modifications

Participants reported switching over to healthier diet after their heart condition was diagnosed, although it was difficult to verify the extent of their change to such diet in the FGDs. They mentioned the difficulties, which they faced in terms of meals and food choices.

FGD2 (Malay patient): *"I have this problem of high cholesterol. Prior to my heart condition, I used to eat a lot of Beef Rendang (stewed beef), Soup Kambing (Mutton soup), prawns...very high in cholesterol. Didn't realise at that time ... all these are fatty food. Only when I have this heart problem, I stopped."*

Table I: Demographic profile of participants in CAD Study

FGD* (n)	Gender		Age (years)		Race				Highest educational Level attained		Site of follow-up	
	Male	Female	< 60	>60	Chinese	Malay	Indian	Others	Secondary or below	JC/Diploma/Tertiary	Polyclinic	GP/ Specialist
1 (8)	6	2	5	3	7	0	1	0	6	2	8	0
2 (6)	5	1	2	4	3	1	1	1	4	2	6	0
3 (7)	6	1	4	3	4	1	2	0	7	0	6	1
4 (11)	10	1	5	6	7	0	2	2	8	3	8	3
5 (12)	10	2	7	5	7	1	3	1	10	2	11	1
Total (44)	37	7	23	21	28	3	9	4	35	9	39	5

*FGD: Focus Group Discussion (n: number of participants in the respective FGD)

Participants admitted that they would still consume less healthy food periodically, as a matter of habitual behaviour, which they regarded as difficult to change. Some believed that their medication would protect them against the deleterious effects of unhealthy food.

FGD4 (Chinese patient): *"For me, I don't take too oily food, I don't take deep fried food. All these I don't take. Mostly steamed ... Roti prata (type of Indian fried pancake), all these I don't take, but once a while, Nasi Bryani (type of Malay rice usually with curry chicken, beef or mutton, cooked with coconut and rich in fat)."*

FGD3 (Chinese patient): *"It's very hard to follow strictly what the doctor had advised (on dietary control), The habit is very difficult to change."*

FGD1 (Indian patient): *"I believe that the medication is to safeguard you. Sometimes, I pamper myself in eating, but I know I got some medicine to back up. I think that's balance."*

Some participants had to share food that was prepared by other family members, which might not be appropriate for a CHD patient. For others whose family did not cook their meals at home, they had to eat out at food courts and hawker centres, where they perceived the food to be less healthy.

FGD3 (Chinese patient): *"The family cannot just cook for us."*

FGD3 (Chinese patient): *"Here, there, hawkers and food court ... (we take) too much of "outside" food."*

Table III (HEALTH Study) showed that 56.1% to 61.1% of participants continued to consume red meat, seafood and food items rich in saturated fat such as butter, fast food and egg yolk either "some of the time or most time".

Table IV (HEALTH Study) showed the dietary habits of the participants in their daily lives. 52.5% of them did not proactively ask the hawkers to reduce the salt in their preparation of their food. 41.6% of participants continued to use dips and sauces in their meals frequently. 60.1% of them did not use or used little pan salt (higher potassium content compared with table salt) in their own cooking.

Table II: Demographic profile of 303 participants in HEALTH Study

Age (years)	No of patients (%)
41-60	79 (26.1)
61-70	87 (28.7)
71-80	137 (45.2)
Gender	
Male	182 (60.1)
Female	121 (39.9)
Ethnic groups	
Chinese	223 (73.6)
Malay	43 (14.2)
Indian	31 (10.2)
Others	6 (2.0)
Education	
Primary/Secondary	275 (90.8)
Junior college/diploma/tertiary	28 (9.2)
Duration of coronary heart disease (years)	
< 1	16 (5.3)
1-5	101 (33.3)
>5	186 (61.4)

Theme 2: Understanding and physical hurdles towards exercise activities

Many participants reported taking up exercises, although they varied in the types, duration and intensity of their exercises. Some claimed to incorporate exercises as part of their daily routine activities. There was a general lack of understanding of the appropriate form of exercise for cardiovascular health and the types of exercise, which the participants undertook, were directed by their views and perceptions, rather than specific exercise prescription by healthcare professionals.

FGD1 (Chinese patient): *"I keep myself busy, I jog, I exercise, I stick to my normal routine."*

FGD3 (Chinese patient): *"I cycle to run errands. It's a way to exercise."*

It appeared that some participants faced barriers towards exercise, including work-related fatigue and misperception about the benefits of exercise. Others were affected by their co-morbidities such as joint diseases or their ambivalent attitude.

FGD3 (Malay patient): *"Lack of exercise, well, nature of my*

FGD3 (Chinese patient): *"I think exercise does not actually*

Table III: Food selection amongst CHD patients (HEALTH Study)

Food selection	Most time/sometimes % (n)	Little of the time % (n)	None of the time % (n)
Red meat	61.1 (185)	28.7 (87)	10.2 (31)
Seafood (eg prawn, squid)	56.1 (170)	32.3 (98)	11.6 (35)
Butter	61.1 (185)	20.4 (62)	18.5 (56)
Fast-food	58.4 (177)	16.8 (51)	24.8 (75)
Egg yolk	62.1 (188)	25.7 (78)	12.2 (37)

Table IV: Dietary behaviour of CHD patients (HEALTH Study)

Dietary Behaviour % (n)	Most time/sometimes % (n)	Little of the time % (n)	None of the time % (n)
I inform the hawker to use less salt when eating out	36.0 (109)	11.5 (35)	52.5 (159)
I use dips and sauces during meals	41.6 (126)	29.7 (90)	28.7 (87)
I use pan salt in my cooking	39.9 (121)	22.8 (69)	37.3 (113)

prevent you from getting heart disease. It will only increase your immunity but that doesn't mean that it will prevent you from getting heart disease."

FGD3 (patient of other ethnic group): "I have Charcot's foot so I cannot walk for long, I cannot do anything, just sit at home and do simple exercise. Either I walk for two bus stops or simple hand exercise. I got so many problems!"

FGD2 (Malay patient): "I used to walk, but...give up. I've given up for many months already." "What happened?" "I think (it's) laziness. I think I should continue."

In the HEALTH study, 30.4% of participants did not exercise at all. 51.5% of them claimed that they exercised regularly and 18.1% did so intermittently (Figure 1).

Figure 1 also showed that 36.6% of participants exercised for less than 30 minutes and 33% of them did so for half an hour and beyond.

Theme 3: Smoking: Personal attitude and doctor's influence

Majority of participants declared that they quit smoking after the onset of CHD, as a result of their desire to achieve good health. They managed to do so with difficulty but seemed to be more successful after prompting by their doctor.

FGD1 (Indian patient): "It's your own desire. When I was told that I had a heart attack, I still smoke my cigarette. To be frank, one year after my "balloon", then I completely quit my cigarette. I don't have clean air, so I decided to stop my cigarettes. When I stop my cigarettes I have clean air, I can go running, I can now go swimming and be normal."

FGD1 (Chinese patient): "When I was first diagnosed as having heart problems, (my) job was very stressful. You smoke! You're a time bomb, going to die, very fast, especially if you smoke. He (the doctor

at Heart Centre) asked me one question only: "can you stop smoking?" Actually I tried stop smoking by myself previously: two packs "non-filtered", that were quite heavy. I said "yes I can." [snapped fingers] I just stopped. That's it."

Few participants continued to smoke, as they adopted a fatalistic attitude or they perceived that cigarettes were not harmful to their heart condition.

FGD4 (Chinese patient): "Smoking has nothing to do with the arteries of the heart."

FGD5 (Chinese patient): "Smoking also die, not smoking also die. That is my view."

The HEALTH survey showed that 7.6% of participants were still currently smoking despite their CHD. All the current smokers were males. 14.2% were ex-smokers.

DISCUSSION

The results suggest that while attempts are made to changes in dietary habits and regular exercise by CHD patients, poor adherence is common. The qualitative study provided an insight into the complex psychosocial hurdles that these patients faced in order to make change and to maintain the changes.

Gulanick M et al⁸ reported in a qualitative study that patients with PTCA were making some of their necessary lifestyle changes. However, some became frustrated trying to enact lifestyle change and certain patients even compromised on medical recommendations. This concurred with what the CHD patients reported in the CAD study.

Despite scientific evidence for intensive risk factor management as key prevention of recurrent CHD⁹, only a minority of such patients are achieving the desirable levels for risk

factors modification. Consequently, CHD remains as one of the prime causes of mortality and hospitalization in Singapore.¹

The results of the HEALTH study showed that more than half of participants continued with their less healthy diet. It is comparable with other studies which reported that only one-third of patients adhered to dietary regimens at one year.¹⁰

The NNS 2004 showed a significant increase in the proportion of Singaporeans who exceeded the recommended intake of fat in the diet, with 42.7% of Singaporeans in 2004, compared with 24.9% in 1998.⁴ Although the average fat intake is within recommended range, the type of fat consumed was relatively high in saturated fat. Eight in ten Singaporeans exceeded the recommendation for saturated fat.

Major sources of saturated fat in the Singaporeans' diet included eggs, coconut milk or cream used in local dishes, high-saturated fat cooking oil used for frying noodles and vegetables, and non-dairy creamers used in beverages. These ingredients contribute 44.6% of saturated fat intake.⁴ It is even more critical for the CHD patients to cut drastically the amount of saturated fat in their diet but the results showed that a subset of CHD patients has yet to change their fat intake.

A qualitative study by Mohan S et al reported knowledge of the beneficial effects of a healthy diet did not deter CHD patients from continuing unhealthy dietary habits.¹¹

Henkin et al found that six months after the end of a 12-week intensive dietary education programme to reduce serum cholesterol, many patients who initially responded to cholesterol lowering diets, later reverted to higher cholesterol levels.¹²

More than half of this study population did not inform the hawkers for healthier preparation of their selected food and more than 40% of them did not change their habit of using dips and sauces. Nonetheless, these visual reminders are non-specific and are not targeted specifically at CHD patients.

Another qualitative study by Farooqi et al reported a range of attitudes and different levels of knowledge of lifestyle risk factors for CHD amongst South Indians in Leicester, England.¹³ Lack of information and cultural barriers hampered lifestyle change.

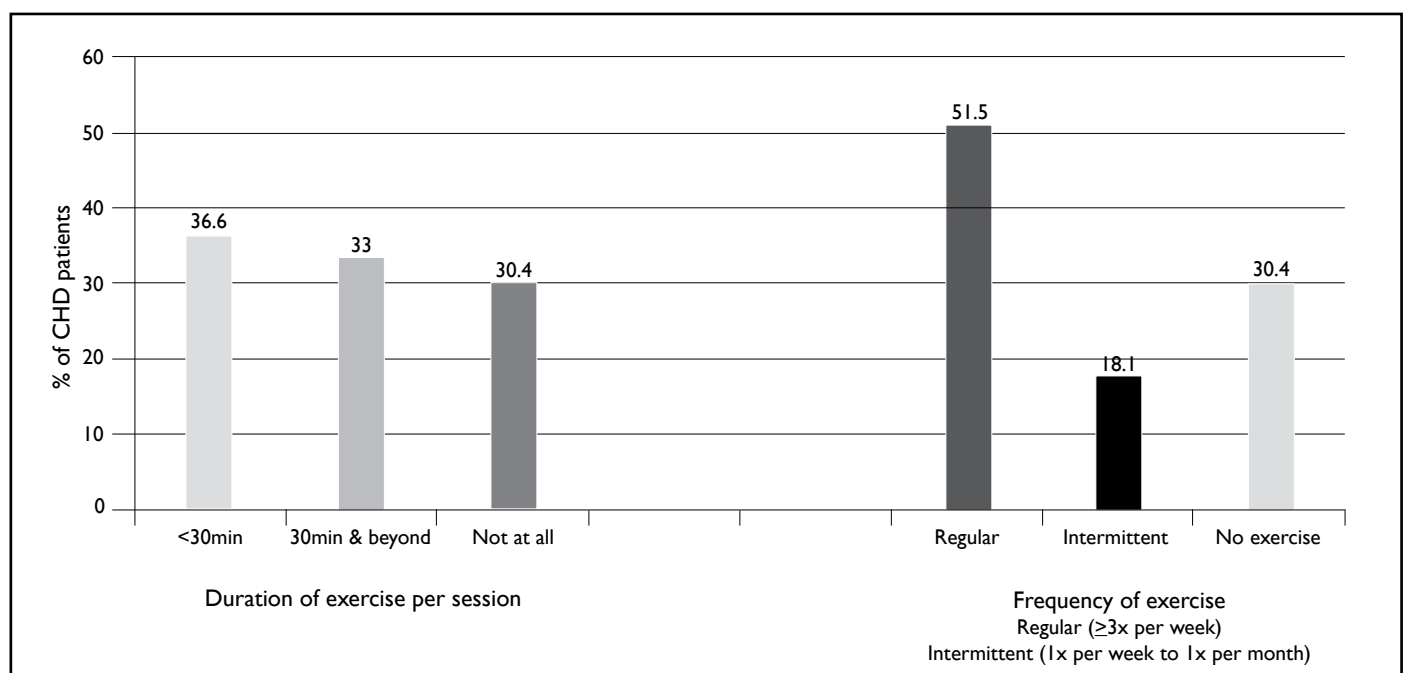
This study showed various ethnic groups in the study population were susceptible to failure to adopt lifestyle change but further study is required to identify any particularly vulnerable ethnic groups due to inadequate number of participants in the HEALTH study for multivariate statistical analysis.

The results suggested that family, environment and the local community eating pattern influenced patients' diet. Measures to modify CHD patient's dietary behaviour should target at changing their personal attitude, perception of food (especially those pertaining to their racial origin) and educating other family members to support their dietary changes.

51.5% of participants reported carrying out regular exercises, double that of the general population (25% reported in the National Health Survey in 2004).¹⁴ However, a third of the participants did not take part in any form of exercise due to various reasons: long working hours, fatigue, co-morbidities such as orthopaedic conditions, laziness are issues quoted by participants in the CAD study. There is a need to review if this subset of CHD patients could participate in any simple forms of home based exercises with further studies. While kinetic exercise is generally the desirable form of cardiovascular exercise, exercise prescription should be tailored to each individual CHD patient's physical health.

Another possibility could be that exercise prescriptions tend to be non specific and were self-directed, catering mostly to patient's own views and perceptions, which might not yield any benefits and could even be risky. Most CHD patients were not routinely screened of their specific physical needs after their myocardial infarction, even upon discharge from

Figure 1: (HEALTH study) Exercise Status of CHD patients (%)



the hospitals to primary care. There is thus an urgent need to equip the family physicians with the relevant skills in exercise prescription appropriate to patients' physique and to address the lack of coordinated cardiac rehabilitation programme amongst the public and private healthcare institutions in managing post-infarction patients.

This study showed that 7.6% of CHD patients self reported as active smokers, which is lower than 12.6% that was reported in the general population in 2004.¹⁴ Patient, who has recently developed a clinical illness, is very motivated to change. Interventions during this opportunistic period can be very effective based on several studies.¹⁵ The provision of smoking cessation advice is associated with a 50% long-term (more than one year) smoking cessation rate in patients who have been hospitalized with a coronary event.¹⁶ If family physicians co-manage the CHD patients during this window period, it would be a good opportunity to clarify wrong perception and address their ambivalence as highlighted in the CAD study.

However, recurrence of smoking among ex-smokers has been shown to be as high as 40-50%, six to twelve months after an acute cardiac event.¹⁷ It is important for family physician to continue the surveillance of their CHD patients for any relapse of the smoking habit.

Physician-based primary-care interventions had shown to produce cessation rates of 10% to 20%, a threefold to fivefold increase over the one-year maintained cessation rate of 4% seen in the general population.¹⁸ Hence, smoking quit rate could improve if family physicians routinely explore the CHD smoker patients' readiness to quit the habit as part of their clinic visit. This would need devotion of dedicated resource and work process in both public and private primary care clinics to enable the healthcare team to manage the multiple risk factors for such patients. In an environment of cost consciousness and managed care to reduce the burden of disease for CHD, the strategy is to accord more recognition to the role of family physician in the primary and secondary prevention of CHD.

Conclusion: Majority of CHD patients recognised the need for healthier lifestyles and most had embarked on these changes but personal, psychosocial and environmental factors often hampered their efforts.

Limitation: While this study employed triangulation approach towards combining both qualitative and quantitative data, the subjects recruited were mainly CHD patients managed in public polyclinics and caution should be exercised in generalising the results to all CHD patients in Singapore. English speaking patients were recruited in the qualitative CAD study due to transcription constraints, which is another limitation. The relatively small number of participants in the HEALTH study and the lack of reliability appraisal of the questionnaire implementation constituted other limitations of the study, due to resource constraints during the execution of the study. Other lifestyle risk factors such as alcohol abuse and stress management should have been included in the study. Larger scale study into this complex subject is in the pipeline.

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