Factors associated with non-attendance at a secondary prevention clinic for cardiac patients

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Received 29 January 2003; received in revised form 15 April 2003; accepted 8 May 2003

Abstract

Background: A randomised controlled trial was undertaken to test the effectiveness of a secondary prevention clinic. Secondary prevention programs can improve prognosis after an acute cardiac illness. It is therefore important to encourage high participation rates.

Aim: The present study was a post-hoc analysis to identify factors associated with patients’ non-attendance at the clinic.

Methods: We compared the baseline socio-demographic and clinical characteristics of 83 (73.5% male) non-attending patients and a random sample of 96 (85.4% male) attending patients. Self-reported data were gathered during interviews conducted on an average of 30 months after hospital admission to investigate long-term outcomes of the clinic.

Results: Using logistic regression analysis, we found that non-attendance was significantly and independently associated with being female, being under 60 years of age, having no history of high cholesterol and having no angina prior to the event. In bivariate analyses, non-attendance was also associated with being born overseas and not having private health insurance.

Conclusions: Likely non-attending patients should be identified early and more effective strategies should be devised to facilitate their participation in secondary prevention programs.

Keywords: Secondary prevention; Cardiovascular disease; Hospital clinic; Predictors; Non-participation

1. Introduction

Modification of risk factors can reduce mortality and morbidity in patients with coronary heart disease [1–5]. In addition to the ongoing management of patients by medical practitioners, other approaches are available to promote the secondary prevention of cardiovascular disease (CVD). These include group cardiac rehabilitation programs [1,2], special hospital clinics for monitoring and long-term management of risk factors [3,4,6], follow-up by primary care nurses [7] and regular telephone contact by a nurse or other health professional to encourage modification of patients’ risk factors [8–11].

Group comprehensive cardiac rehabilitation programs including exercise, education and support not only facilitate physical and psychological recovery [1,2,12]; they also help patients to initiate lifestyle changes and thus provide an opportunity for secondary prevention. In Australia, these programs are usually co-ordinated by nurses and run for six–eight weeks [1,13]. Elsewhere, they continue for 13 weeks or longer [2]. In some countries, attendance at outpatient hospital clinics for cardiac patients can continue for several months or years [3,4].

Despite the reported benefits of cardiac rehabilitation programs, participation rates are disappointingly low [14,15]. Numerous studies have investigated factors associated with poor uptake of these programs. Non-attendance is consistently associated with being female and being older [16–20]. With few exceptions [21], studies also show that patients who have undergone coronary artery bypass graft surgery (CABGS) are more likely to attend than those who have had an acute myocardial infarction (AMI) or percutaneous coronary intervention (PCI) [16,20,22]. Smokers are reportedly more likely to discontinue before completing the program [23,24]. Randomised controlled trials of cardiac rehabilitation programs have demonstrated higher mor-
tality and morbidity among patients allocated to usual care rather than the intervention groups [4,25].

Most reported studies of participation patterns concern attendance at cardiac rehabilitation programs rather than longer term secondary prevention programs. While some investigations have examined barriers to participation in clinical trials [26], few studies have documented and compared the characteristics of participants and non-participants. There is some evidence that the profiles of non-participants in secondary prevention programs might be similar to those of patients who do not attend cardiac rehabilitation programs. For example, a secondary prevention trial of post AMI patients reported that non-consenters were significantly older, were more likely to be female and to be receiving social security benefits [27]. There is also some evidence that smokers are less likely to attend follow-up clinics [28].

Participation in secondary prevention interventions might be increased if family members are invited to participate as a family unit [29]. With this in mind, a randomised controlled trial, entitled the Family Atherosclerosis Risk Intervention Study (FARIS), was undertaken to investigate whether risk factor profiles of patients who had had an AMI or undergone CABGS or PCI would be improved following their attendance at a special hospital-based clinic where their risk factors were monitored. The trial also aimed to determine whether the inclusion of spouses and other family members increased attendance and promoted positive lifestyle change among both patients and relatives. By offering the clinic three months after the acute event, it was anticipated that barriers which might have precluded attendance at an earlier cardiac rehabilitation program of exercise and education might be removed and a high participation rate achieved.

Participation in secondary prevention interventions is important because non-adherence to treatment regimens has been consistently associated with poorer outcomes, including higher recurrence rates of illness, more readmissions to hospital and higher death rates [30–32]. Profiles of patients who do not participate need to be more clearly defined so that future recruitment can be targeted more specifically. To this end, the present study aimed to identify the key socio-demographic and clinical characteristics associated with non-attendance at the FARIS clinic.

2. Methods

2.1. The FARIS study population

A consecutive series of 894 patients (18–70 years of age) admitted with an acute cardiac illness to a university public teaching hospital were eligible for the FARIS study. There were 163 patients who were excluded due to distance (49%), death (21%), physical incapacity (14%), language (5%) and other factors (10%). The remaining 731 patients were invited by the project’s nurse co-ordinator, on behalf of the hospital’s director of cardiac services, to attend the FARIS clinic three months after their event (AMI, CABGS, PCI) and were randomly allocated to either intervention or usual care control groups. Verbal invitations in hospital were followed up by letters a week later. Arrangements were confirmed shortly before the patients and their relatives were due to attend. In addition to the invitation to attend the FARIS clinic, all patients had been automatically referred to a group cardiac rehabilitation program conducted during early convalescence.

Recruitment to the trial continued for 30 months. While 103 (14.1%) eligible patients did not attend the clinic, 628 (85.9%) did attend. Of these, 87.3% were accompanied by at least one first degree relative. There was a mean of 3.15 (S.D. = 1.80) attending relatives per attending patient (range 1–10 per patient). In total, 1723 relatives attended.

Together with their first degree relatives, patients were assessed at entry to the clinic three months after their acute event. Baseline socio-demographic and medical data were obtained and risk factors measured, including blood pressure, cholesterol, smoking, weight, body mass index (BMI) and family history of CVD. All participants were invited to attend one week later to obtain their results and to receive individualised advice about their risk factor profiles. The clinic, staffed by physicians, nurses and a dietitian, was open both during the day and evening and there was no charge for attendance. Patients in the intervention groups subsequently received more intensive support, whereas those in the control group received usual care from their general practitioners and cardiologists. All patients and family members were contacted to attend for further screening and review after 12 months. Details of the study design and the risk factor profiles of patients and relatives are reported elsewhere [29]. The study was approved by the Austin Hospital Human Research Ethics Committee. The investigation conforms with the principles outlined in the Declaration of Helsinki.

2.2. The present study sample

Both non-attending and attending patients were identified from the clinic records at the commencement of the follow-up study. Non-participants were defined as the 103 patients who did not attend the clinic for entry assessment three months after their cardiac event, despite having been invited and randomly allocated to either intervention or usual care control groups. For comparison purposes, a random sample (n = 96) of the 628 attending patients (equal numbers of intervention and control group participants) was obtained for interview. The FARIS study records and the hospital records were
checked to confirm current addresses. Invitations to participate in the study were initially made by letters and followed up by telephone calls. If patients could not be located despite an extensive search, their doctors were approached to obtain further information regarding the patients’ whereabouts.

Of the 103 non-attenders, three had died before contact was made and four were too ill to participate. Of the remaining 96 non-attending patients, 10 could not be located and three refused interview. Follow-up data were provided by 83 non-attending patients, representing an 86% response rate. Data were collected between 16 and 45 months following the patients’ cardiac event. The mean follow-up period was 30.8 ± 10.1 months for non-attending patients and 30.2 ± 8.3 months for attending patients. All patients gave written consent to participate in the study.

2.3. Interview data

Most data were collected by personal interview conducted by researchers independent of the FARIS clinic team. A proportion (22%) of non-attenders were interviewed by telephone. In a few cases, shorter interviews were conducted at the request of participants. The interview schedule contained both structured and open-ended questions, investigating socio-demographic characteristics, CVD risk factors and medical history at the time of the event. The clinical data were based upon self-report, using questions based upon items taken from past national surveys of CVD risk factors [33]. Baseline socio-demographic and clinical characteristics were confirmed during follow-up interviews.

2.4. Variables

Independent variables were dichotomised (apart from diagnosis), based upon clinically meaningful cut-points, as follows:

1. Socio-demographic characteristics, including age (< 60/≥ 60 years), marital status (married or defacto/other), country of birth (Australia/elsewhere), language spoken at home (English/other), years of schooling (≥ 11/< 11 years), work status (in workforce/not in workforce), occupation (non-manual/manual) [34] and private health insurance (yes/no).

2. Clinical characteristics, including diagnosis (AMI, CABGS, PCI), risk factor history at the time of the event, namely high blood pressure (yes/no), high cholesterol (yes/no), obesity based on body mass index (BMI ≥ 30/BMI ≤ 30 kg/m²), diabetes (yes/no), smoking (current smoker/former or non-smoker), positive family history of CVD (yes/no) and angina (yes/no).

2.5. Statistical analyses

Differences between non-attenders and attenders, and between men and women, were assessed using the chi square statistic. The significance level was set at \( P < 0.05 \). Where gender differences were identified, attendance patterns were assessed separately for males and females. Significant variables were entered into a logistic regression analysis to predict non-attendance.

3. Results

3.1. Characteristics of the study population

Of the 179 patients interviewed, all were Caucasian, most were male (80%) and most were married (84%). Mean age was 59.3 ± 8.8 years (range, 34–73). Men were more likely than women to be in the workforce (42 vs. 6%, \( P < 0.001 \)) and to have smoked at the time of their event (56 vs. 30%, \( P = 0.009 \)), whereas women were more likely than men to have had a history of high cholesterol prior to their event (80 vs. 62%, \( P = 0.049 \)).

In order to identify any biases resulting from the long follow-up period, patients interviewed within 30 months and those interviewed more than 30 months after admission were compared. There were no differences in baseline socio-demographic characteristics or self-reported risk factors, thus suggesting that there was no systematic bias due to the long follow-up period.

3.2. Characteristics of non-attenders and attenders

Characteristics of non-attenders and attenders are shown in Table 1.

Compared with attenders, non-attenders were younger and were more likely to be female, born outside Australia, and not covered by private health insurance. Non-attenders were less likely than attenders to have reported a history of high cholesterol and/or angina before their event. Despite the gender difference in cholesterol levels, the difference between non-attenders and attenders in cholesterol levels was evident for males (50 vs. 71%, \( P = 0.011 \)) and approached significance for females (71 vs. 93%, \( P = 0.130 \)).

3.3. Factors associated with non-attendance

Variables significant at \( P < 0.05 \) in \( \chi^2 \) analyses were entered into a logistic regression analysis, yielding the following result: being female, being aged under 60 years, not having a history of high cholesterol, and not having a history of angina were significantly and independently associated with non-attendance. (Table 2). Each of these four factors independently increased the likelihood of non-attendance by 2–3 times.
Table 1
Baseline characteristics of non-attenders and of random sample of attenders

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Non-attenders</th>
<th>Attenders</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N=83*</td>
<td>N=96*</td>
<td></td>
</tr>
<tr>
<td>n (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Socio-demographic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>61 (73.5)</td>
<td>82 (85.4)</td>
<td>0.047</td>
</tr>
<tr>
<td>Aged &lt; 60 years</td>
<td>44 (53.0)</td>
<td>35 (36.5)</td>
<td>0.026</td>
</tr>
<tr>
<td>Married</td>
<td>67 (82.7)</td>
<td>82 (85.4)</td>
<td>ns</td>
</tr>
<tr>
<td>Australian born</td>
<td>37 (48.1)</td>
<td>62 (64.6)</td>
<td>0.029</td>
</tr>
<tr>
<td>English spoken at home</td>
<td>53 (69.7)</td>
<td>74 (77.1)</td>
<td>ns</td>
</tr>
<tr>
<td>≥ 11 years schooling</td>
<td>18 (23.4)</td>
<td>26 (27.1)</td>
<td>ns</td>
</tr>
<tr>
<td>In workforce</td>
<td>31 (37.3)</td>
<td>30 (31.6)</td>
<td>ns</td>
</tr>
<tr>
<td>Non-manual occupation</td>
<td>25 (32.5)</td>
<td>41 (43.2)</td>
<td>ns</td>
</tr>
<tr>
<td>Private health insurance</td>
<td>27 (37.0)</td>
<td>50 (52.6)</td>
<td>0.044</td>
</tr>
<tr>
<td>Clinical Diagnosis</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AMI</td>
<td>40 (48.2)</td>
<td>56 (58.3)</td>
<td></td>
</tr>
<tr>
<td>CABGS</td>
<td>22 (26.5)</td>
<td>17 (17.7)</td>
<td></td>
</tr>
<tr>
<td>PCI</td>
<td>21 (25.3)</td>
<td>23 (24.0)</td>
<td>ns</td>
</tr>
<tr>
<td>History of high blood pressure</td>
<td>43 (56.6)</td>
<td>46 (47.9)</td>
<td>ns</td>
</tr>
<tr>
<td>History of high cholesterol</td>
<td>43 (55.8)</td>
<td>71 (74.0)</td>
<td>0.012</td>
</tr>
<tr>
<td>Obesity</td>
<td>20 (30.8)</td>
<td>17 (22.1)</td>
<td>ns</td>
</tr>
<tr>
<td>Diabetes</td>
<td>15 (19.7)</td>
<td>14 (14.6)</td>
<td>ns</td>
</tr>
<tr>
<td>Current smoking</td>
<td>38 (48.1)</td>
<td>51 (53.1)</td>
<td>ns</td>
</tr>
<tr>
<td>Positive family history of CVD</td>
<td>50 (67.6)</td>
<td>68 (71.6)</td>
<td>ns</td>
</tr>
<tr>
<td>History of angina</td>
<td>49 (63.6)</td>
<td>76 (79.2)</td>
<td>0.023</td>
</tr>
</tbody>
</table>

Note: statistical test = χ². ns = Not significant at P < 0.5; *N ranges from 73 to 83 for non-attenders and from 91 to 96 for attenders. Data for BMI missing for 18 non-attenders and 19 attenders. Across other variables, data missing for < 10 non-attenders and < 1 attendant.
Divorced, separated, widowed, never married.
*** Defined as BMI ≥ 30 kg/m².

4. Discussion

While the FARIS secondary prevention clinic was successful in achieving a high rate of attendance, a small percentage of cardiac patients failed to attend. Non-attendance was significantly and independently associated with being female, being younger, having no history of high cholesterol, and no history of angina prior to the cardiac event. Bivariate analyses showed that patients born outside Australia and those without private health insurance were also less likely to attend. Since this study was conducted in a large public hospital with representation across a range of socio-demographic characteristics, it is likely that these findings are widely generalisable.

The finding that female gender was associated with clinic non-attendance was not unexpected, given that this factor has also been consistently shown to predict non-attendance at cardiac rehabilitation programs [15,17,21]. It is likely that the same gender barriers to participation apply in both settings. Limited access to transport [19,35], lack of spousal and/or social support [15,17,36] and women’s care giving responsibilities [18] have been identified as barriers for women in attending rehabilitation programs. These factors might have operated for women in the present study. Likewise, the presence of a co-morbid condition, such as arthritis, which is common in older women [15,35], might have discouraged some women from travelling to the clinic. Importantly, that the clinic did not include an exercise component undermines the common argument that women’s non-attendance at programs reflects their reluctance to exercise [18,19].

The present study showed poorer attendance amongst younger patients. In contrast, most studies of participation in cardiac rehabilitation programs report poorer attendance amongst older patients [16,18,19]. While such findings in part reflect lower rates of referral to cardiac rehabilitation among older patients [37], the present study was open to all patients under 70 years of age. No specific physician referral was required. Without any referral bias in the present study, younger patients showed poorer attendance than older patients.

The greater willingness of older patients to attend the clinic might, in part, be explained by the later commencement of the secondary prevention clinic three months after the acute illness. It is recognised that older cardiac patients experience more complications and have a slower recovery course than younger patients [38,39]. While they might not have felt well enough to attend a rehabilitation program offered during early convalescence, they might have been ready at this later stage to attend the clinic. Further, the clinic’s day time opening presumably optimised attendance by older non-working patients. Older patients might also have been encouraged to attend because the clinic did not include exercise, a factor shown in past studies of cardiac rehabilitation program attendance to deter some older patients. Indeed, Degoulet et al. also found that older patients showed relatively good adherence to a management clinic for hypertension which, like the FARIS clinic, did not involve exercise [28].

There are other possible explanations for the poorer attendance of younger patients. In the present sample, patients under 60 were more likely than those aged 60 or more to be in the workforce (51 vs. 16%, P < 0.001),

Table 2
Factors associated with non-attendance

<table>
<thead>
<tr>
<th></th>
<th>Adjusted odds ratio</th>
<th>Lower 95% CI</th>
<th>Upper 95% CI</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>3.66</td>
<td>1.48</td>
<td>9.05</td>
<td>0.005</td>
</tr>
<tr>
<td>Aged &lt; 60 years</td>
<td>2.73</td>
<td>1.35</td>
<td>5.53</td>
<td>0.005</td>
</tr>
<tr>
<td>No high cholesterol</td>
<td>2.73</td>
<td>1.30</td>
<td>5.73</td>
<td>0.008</td>
</tr>
<tr>
<td>No angina</td>
<td>2.30</td>
<td>1.07</td>
<td>4.94</td>
<td>0.033</td>
</tr>
<tr>
<td>No health insurance</td>
<td>1.85</td>
<td>0.91</td>
<td>3.77</td>
<td>0.088</td>
</tr>
<tr>
<td>Non-Australian born</td>
<td>1.31</td>
<td>0.65</td>
<td>2.66</td>
<td>0.453</td>
</tr>
</tbody>
</table>

N = 168; CI = confidence intervals.
to be non-English speaking (37 vs. 18%, \( P=0.005 \)) and to be obese (39 vs. 16%, \( P=0.002 \)). Language problems [40] and obesity [41] have been associated with non-participation at both cardiac rehabilitation and prevention programs, suggesting that these factors might have restricted attendance for younger patients in the present study.

It is perhaps not surprising that patients with long-standing coronary heart disease, including a history of high cholesterol and/or angina, might be more motivated to accept help when it is offered. In contrast, prior risk factors do not appear to have the same salience in encouraging attendance at cardiac rehabilitation programs held in the early post-event period. Studies have shown that patients with angina [16] or a ‘personal history’ of coronary heart disease [42] are less likely to attend either cardiac rehabilitation programs or secondary prevention programs. Likewise, beliefs about greater susceptibility are not associated with cardiac rehabilitation program attendance [43]. We found the reverse in the present study. On the other hand, some of the patients who did not attend the FARIS clinic might have felt satisfied to continue management by their own physician. Others might have already attended the earlier cardiac rehabilitation program and considered further hospital attendances unnecessary.

Although not significant in multivariate analyses, being born outside Australia was associated with non-attendance at the clinic. Whilst English-speaking patients are more likely to be referred to and attend cardiac rehabilitation programs [40], language barriers might not fully explain the present finding. Indeed, language itself was not significantly associated with attendance. Patients born outside Australia were younger than Australian-born patients (53 vs. 39% aged <60 years, \( P=0.041 \)), which might instead account for their poorer attendance. Moreover, it should be pointed out that over one-third of the 628 patients successfully recruited to the clinic had been born overseas.

Finally, lack of health insurance was associated with non-attendance in bivariate analyses. While previously identified as a barrier to cardiac rehabilitation program attendance [35,44], insurance coverage per se is unlikely to have influenced attendance at the clinic, given that all patients were invited to attend and the clinic was free of charge. Rather, it is likely that this finding is indicative of the influence of socio-economic status on participation, as has been found in studies of attendance patterns at cardiac rehabilitation programs [24,42,43,45–47] and screening clinics [28]. Further, patients with private health cover might have been more health conscious and prepared to invest in future health care. In the present study, insured patients were more likely than non-insured patients to be in the workforce (42 vs. 23%, \( P=0.009 \)) and to have ‘non-manual’ occupations (55 vs. 26%, \( P<0.001 \)). It might be that those of lower socio-economic status were less concerned about the prevention of illness in the future than about immediate health and social problems they might have been experiencing.

There were a number of other factors previously shown to predict non-attendance at rehabilitation programs that were not significantly associated with non-attendance at the FARIS clinic. Specifically, PCI and AMI patients were no less likely to attend than were CABGS patients. Perhaps the focus upon secondary prevention attracted such patients, especially PCI patients, who might not have perceived a need for physical reconditioning or psychological rehabilitation.

Past studies of non-participation in CVD programs suggest that individuals are less likely to attend if they have adverse health behaviours, such as smoking [24] or physical inactivity [48]. However, the present study found that a history of elevated cardiovascular risk factors was not associated with non-attendance at the FARIS clinic. Patients with risk factors such as smoking, hypertension and diabetes were no less likely to attend the clinic, supporting the view that most patients, irrespective of their level of risk, appreciated the opportunity to attend a secondary prevention clinic aimed at reducing future cardiac illness. It is also possible that patients who typically avoid interventions to improve their health were persuaded to attend the clinic by other family members who accompanied them as a family group.

There are several limitations to this study that should be noted. First, documentation of CVD risk factors at the time of the event was based upon patient self-report, potentially limiting the reliability of the findings. Second, follow-up interviews with patients took place on average 30 months after hospital admission, which could have reduced the accuracy of the information provided. However, the risk factor profiles of those interviewed within 30 months and after 30 months of their event were not significantly different, suggesting that this was not the case. Third, although an important risk factor, physical inactivity was not investigated in this study. Measurement of physical inactivity as a risk factor prior to a cardiac event lacks validity because of limitations associated with symptoms and restrictions imposed by physicians.

The high attendance of older patients at the clinic was encouraging, since older persons bear the greatest burden of ill-health and disability. However, it was disappointing that women were less likely than men to attend, even with the emphasis on family and spousal support in the FARIS study. Strategies need to be devised which can improve access to programs, as well as increasing the personal relevance of secondary prevention interventions to all eligible patients. For those who are unable or unwilling to attend structured programs, individual follow-up by primary care nurses or other
health professionals is particularly important. Further studies are needed to test the efficacy of a variety of models of long-term care.

Acknowledgments

This study was supported by a grant from the National Heart Foundation of Australia.

References