European Journal of Preventive Cardiology

Original scientific article

European Journal of Preventive Cardiology
0(00) 1–10

DOI: 10.1177/2047487314520924
ejpc.sagepub.com
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Change in health behaviours following acute coronary syndrome: Arab–Jewish differences

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Abstract

Background: Health-promoting behaviours after acute coronary syndrome (ACS) are effective in preventing recurrence. Ethnicity impacts on such behaviours. We assessed the independent association of Arab vs. Jewish ethnicity with persistence of smoking and physical inactivity 6 months after ACS in central Israel.

Design: Prospective cohort study.

Methods: During their admission for ACS and subsequently 6 months later, 420 patients were interviewed about their smoking and exercise habits. The association of ethnicity with health-promoting behaviours was assessed by logistic regression adjusting for socio-demographic and clinical covariates.

Results: Smoking prevalence and physical inactivity were substantially higher among Arab patients than Jewish patients at admission (gender-adjusted prevalence rate ratio (RR) 2.25, 95% CI 1.80–2.81, $p < 0.01$ and RR 1.46, 95% CI 1.28–1.67, $p < 0.001$, respectively). The relative differences increased at 6 months (RR 2.94, 95% CI 2.13–4.07, $p < 0.001$ and RR 3.00, 95% CI 2.24–4.04, $p < 0.001$, respectively). Excess persistent smoking at 6 months among Arab vs. Jewish patients who were smokers at admission (adjusted OR 2.05, 95% CI 1.00–4.20, $p = 0.049$) was largely mediated through the 3.5-fold higher participation of Jewish patients in cardiac prevention and rehabilitation program (CPRP) (OR adjusted also for CPRP 1.31, 95% CI 0.59–2.93, $p = 0.51$). Greater persistent sedentary behaviour at 6 months among nonexercisers at admission among Arab patients (adjusted OR 3.68, 95% CI 1.93–7.02, $p < 0.001$) was partly mediated through attendance of CPRP (OR adjusted also for CPRP 2.38, 95% CI 1.19–4.76, $p = 0.014$).

Conclusions: Culturally sensitive programmes need to be developed to enhance CPRP participation and favourable health-promoting changes among Arab patients. A comprehensive understanding of the determinants of the Arab–Jewish differences in efficacious health-promoting behaviours is crucial to inform appropriate ethnic-specific health-promoting strategies.

Keywords

Acute coronary syndrome, Arabs, Jews, cardiac prevention, ethnicity, exercise, gender, health-promoting behaviours, rehabilitation program, smoking

Received 13 December 2012; accepted 21 December 2013

Introduction

As elsewhere, cardiovascular diseases (CVD) are a leading cause of morbidity and mortality in Israel, among both Jews and Arabs.[1] Although mortality from CVD in Israel has declined substantially over the last four decades, rates of incidence and mortality among Arabs remain higher than among Jews.[1–3]

Despite compelling recommendations by medical professional associations to adopt a healthy lifestyle after an acute coronary syndrome (ACS),[4–6] there is poor implementation of preventive behaviours that is especially evident in ethnic minorities for primary and secondary prevention.[7–9] Among the specific practices

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found to contribute the most to disease progression are cigarette smoking and lack of physical activity.[10,11] In Israel, studies have documented lower levels of adoption of health-promoting behaviours, such as smoking cessation and physical activity, among the Arab population.[1,12–15]

This paper reports on findings from a prospective, longitudinal study that examined ethnic differences in health-promoting behaviours after an ACS in an Israeli medical facility. Extensive data demonstrate the crucial role of participation in cardiac prevention and rehabilitation programmes (CPRP) in influencing such habits. We have reported a 3.5-fold higher participation in CPRP among Jewish compared to Arab patients (61 vs. 17%, respectively) despite equal coverage by the national health insurance law.[16] Given this evidence, the current study assessed the association of ethnicity with health-promoting behaviour, exemplified through smoking cessation and exercise habits of patients 6 months after experiencing an ACS, and the contribution of CPRP participation to change in these behaviours.

Methods

Study population

The methods of the present study have been previously reported.[16–18] The study population consisted of all patients residing in the catchment area of the Meir Medical Center in central Israel who were admitted to the coronary care unit (CCU) or transferred from the internal medicine wards to the CCU for urgent catheterization, between January 2009 and August 2010, with a diagnosis of ACS (based on typical history, positive electrocardiographic changes, or positive troponin levels, as confirmed by a senior cardiologist), and with no severe physical or mental disability that would prevent participation in CPRP. Patients were excluded if: they could not commit to the study (nonpermanent residents in Israel, prisoners, homeless, drug addicts, or alcoholics); they were participating in a CPRP at the time of the index event; they could not be interviewed in Hebrew or Arabic; or they were referred for further treatment in another hospital. Of the 649 eligible patients (463 Jews and 186 Arabs), 501 (359 Jews and 142 Arabs) consented to be interviewed at baseline (77.2% response rate). Of the 501 respondents at baseline, 420 (304 Jews and 116 Arabs) consented to be interviewed after 6 months (83.8% response rate). The study sample flow chart is shown in Figure 1. Informed consent was obtained from each patient. The study was authorized by the Institutional Review Board.

Data collection and variable definition

Patients were interviewed face-to-face as soon as they were stable (2–5 days after admission) and by telephone 6 months after discharge. Data collected from the patient interviews included socio-demographic characteristics, health-promoting behaviours, participation in CPRP, and medical information.

Socio-demographic characteristics included ethnicity (Jews/Arabs), gender, age, place of birth, marital status, education level (highest certificate/degree earned), income (four categories), economic situation (patients reported assessments of their economic situation on a 6-point scale from excellent to very bad), membership of one of the four Health Maintenance Organizations (HMO), religiosity (secular/traditional/religious), and subjective socioeconomic position (SEP; on a scale of 1–10 from lowest to highest).[19]

Health-promoting behaviour variables included exercise and smoking habits reported at baseline and at the 6-month follow up. Participants were classified as smokers if they were regular daily smokers or occasional smokers (of which there were only two), or as nonsmokers if they never smoked or stopped before the index hospitalization. Leisure-time physical activity was reported as a quantitative estimate of leisure-time activities based on a modification of the Minnesota leisure-time physical activity questionnaire.[20] Participants were defined as sedentary if there was no self-reported level of activity at either baseline or follow up or as active if engaged in any leisure-time physical activity.

To assess participation in CPRP, patients were asked at the follow-up interview whether they had joined any CPRP (defined as rehabilitation and not convalescence) after the index hospitalization.

Baseline clinical data included the hospitalization unit (coronary care/internal medicine), diagnosis (myocardial infarction/unstable angina), and history of coronary heart disease (CHD) (yes/no). Risk factor data (family history of CHD, obesity, dyslipidaemia, diabetes, and hypertension) were extracted from patient charts.

Data analysis

Statistical analyses were carried out using SPSS version 18 software. In unadjusted analyses, chi-squared or Fisher exact tests for categorical variables and the t-test for continuous variables were used to evaluate between-group differences and assess associations between variables. The Mantel–Haenszel procedure was applied using Winpepi software[21] to calculate gender-adjusted rate ratios (RR) for the Arab–Jewish comparisons. It was also used to assess suspected confounding (separately for age, gender, marital status,

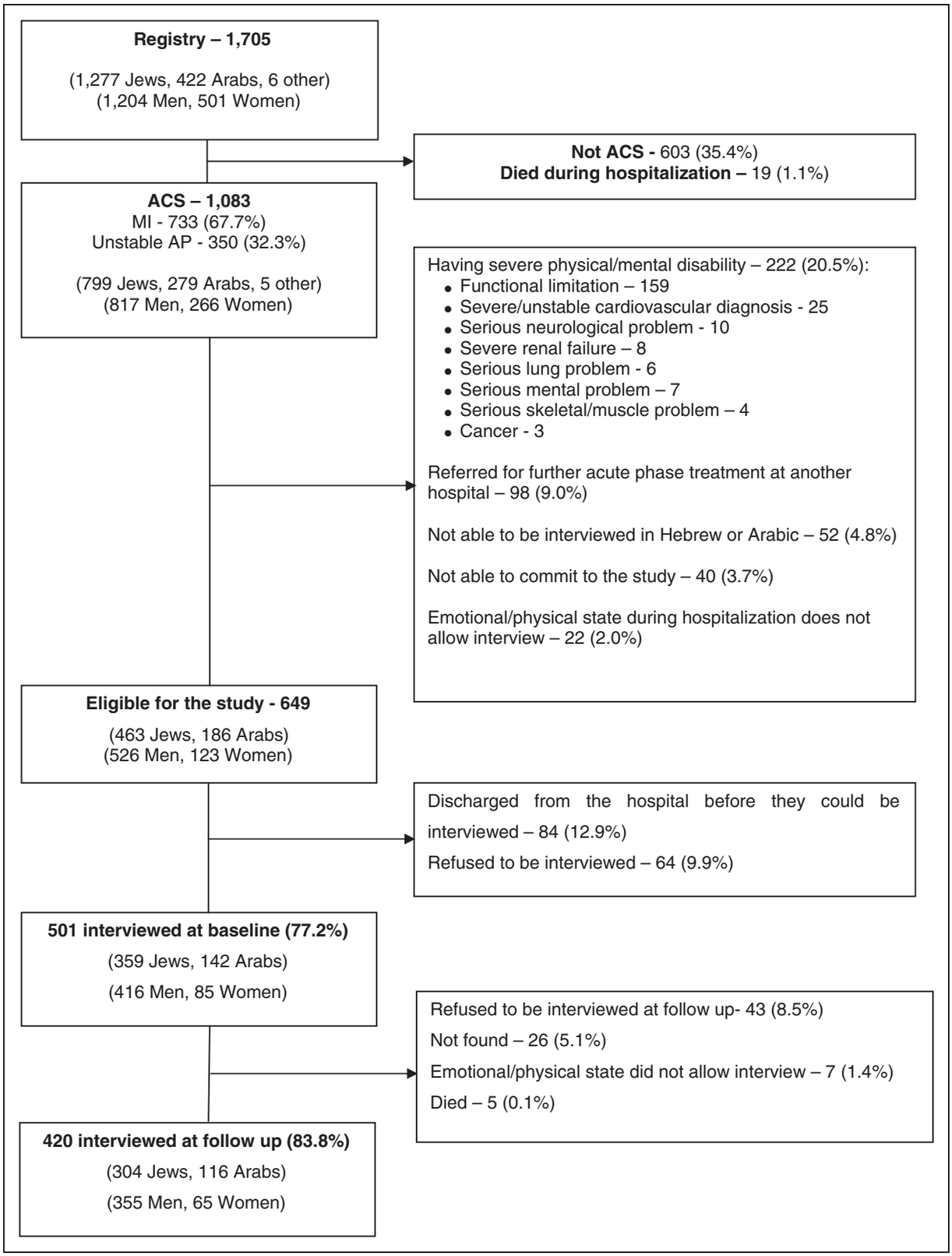

Figure 1. Study sample flow chart.

religiosity, education level, employment status, economic situation, SEP, HMO membership, diagnosis, hospitalization unit, and personal history of CHD) of the association of ethnicity with persistence of the risk behaviours in subsets of patients who smoked at admission or were sedentary at admission. Suspected confounders were to be included in multivariable logistic models if the adjusted Mantel–Haenszel estimator of the RR, reflecting the association of ethnicity with each of the two outcome variables, persistent smoking and persistent sedentary behaviour, differed from the crude estimate by >5% of the excess RR. In addition, Breslow–Day tests of heterogeneity were performed to detect effect modification. Consequently, interaction terms for SEP and ethnicity and for history of CHD and ethnicity were included in the multivariable logistic models predicting physical inactivity.

In order to determine the independent associations of ethnicity and participation in CPRP with absence of change in health behaviours 6 months after the index event, three simultaneous logistic models were performed (with separate analyses for smoking behaviour and exercise habits). The first model assessed the unadjusted contribution of ethnicity to the lack of change in the health behaviour. The second model assessed the contribution of ethnicity adjusted for the potential confounders selected as above and for the above interaction terms (in the case of the sedentary behaviour outcome). An interaction of ethnicity with SEP was removed from the model as it was not statistically significant and led to poorer goodness of fit. The third model included CPRP in addition to the variables included in model 2 to assess the contribution of CPRP to the relevant behaviour and whether an ethnic association with the risk behaviour is mediated through participation in CPRP. Goodness of fit of all logistic models was adequate as appraised by the Hosmer–Lemeshow test.

Results

No material differences between respondents ($n = 420$) and nonrespondents ($n = 229$) were found for age or ethnic group (62% overall response rates for Arabs and 65% for Jews). There were, however, higher response rates among men (67.5%) than women (52.8%), among patients admitted to the CCU (70.6%) than internal medicine wards (54.9%), and among patients admitted for acute myocardial infarction (68.6%) than unstable angina (56.7%). These differences were statistically significant for all patients and for Jewish patients, but not for Arab patients.

According to their baseline socio-demographic characteristics (Table 1), Arab patients were younger, more religious, were more likely to be married, less educated, and had lower SEP and income, and a higher proportion were male and unemployed. No significant differences were found for HMO membership (Table 1) or clinical and risk factor variables (Table 2). Large ethnic differences were observed in baseline smoking status and physical inactivity, with Arab patients at a disadvantage.

Smoking habits

Of the 420 participants, 39.3% were smokers (163 regular, two occasional) and the remainder never smoked or quit smoking before the index hospitalization. At the index hospitalization, the proportion of smokers was higher among Arab patients than Jewish patients (66 vs. 29%, $p < 0.001$, gender-adjusted RR 2.25, 95% CI 1.80–2.81, $p < 0.01$; Figure 2). There were no significant gender differences in the proportion of smokers between Jewish men and women patients (30 vs. 26%, $p = 0.53$) or between Arab men and the small sample of Arab women (69 vs. 40%, $p = 0.08$). Substantial differences were seen, however, between Arab and Jewish men (69 vs. 30%, $p < 0.001$).

Six months after discharge, the proportion of Arab smokers remained high (47.4 vs. 15.5% in Jews, $p < 0.001$, gender-adjusted RR 2.94, 95% CI 2.13–4.07, $p < 0.001$). The proportion of smokers among the Jewish patients includes also five Jewish patients who had stopped smoking just before hospitalization and resumed smoking after discharge.

As for smoking cessation among patients that reported smoking at baseline ($n = 165$), 52% (95% CI 41–63%) of Jewish patients quit after the index cardiac event, compared with only 29% (95% CI 18–40%) among their Arab counterparts (crude OR for persistent smoking in Arabs vs. Jews 2.74, 95% CI 1.43–5.23, $p = 0.002$; Table 3, model 1). This association was somewhat attenuated when the potential confounders were included in the model (OR 2.05, 95% CI 1.00–4.20, $p = 0.049$; Table 3, model 2) but largely disappeared when participation in CPRP was included in the model (OR 1.31, 95% CI 0.59–2.93, $p = 0.51$; Table 3, model 3), due to the strong association between ethnicity and CPRP and between CPRP and smoking cessation.

We note that the RR for quitting smoking was 1.75 (95% CI 0.86–3.56) among Jews who participated in CPRP vs. their Arab counterparts. This suggestion of a differential response to CPRP was not statistically significant, which may be attributable to the small number of Arab patients who participated in CPRP.

Exercise habits

Of the 420 participants, 38% exercised regularly before hospitalization, while 61.9% led sedentary lifestyles,

Table 1. Socio-demographic characteristics of Jewish and Arab participants[a]

	Jews ($n = 304$)	Arabs ($n = 116$)	Total ($n = 420$)
Age (years)	61.9 ± 10.5	53.7 ± 9.6***	59.6 ± 10.8
Gender			
Male	249 (81.9)	106 (91.4)*	355 (84.5)
Female	55 (18.1)	10 (8.6)	65 (15.5)
Marital status			
Married	243 (79.9)	107 (92.2)**	350 (83.3)
Other	61 (20.1)	9 (7.8)	70 (16.7)
Education level[b]			
No formal education	17 (5.6)	8 (7.1)***	25 (6.0)
Elementary school or junior high	49 (16.2)	54 (47.8)	103 (24.8)
High school	90 (29.7)	39 (34.5)	129 (31.0)
Higher education	147 (48.5)	12 (10.6)	68 (16.3)
Socioeconomic position	6.5 ± 2.0	5.7 ± 2.2**	6.2 ± 2.1
Employment status[c]			
Working for pay	173 (58.3)	67 (59.8)***	240 (58.7)
Retired[d]	96 (32.3)	11 (9.8)	107 (26.2)
Unemployed	28 (9.4)	34 (30.4)	62 (15.1)
Income (NIS per month)[e,f]			
<4000	32 (11.6)	51 (47.2)***	83 (21.6)
4001–6000	40 (14.4)	21 (19.4)	61 (15.8)
6001–8000	37 (13.4)	22 (20.4)	59 (15.3)
>8000	168 (60.6)	14 (13.0)	182 (47.3)
Economic situation[g]			
Excellent	10 (3.3)	3 (2.7)***	13 (3.1)
Very good	60 (19.9)	8 (7.1)	68 (16.4)
Good	170 (56.3)	58 (51.3)	228 (54.9)
Not so good	43 (14.2)	19 (16.8)	62 (14.9)
Bad	7 (2.3)	11 (9.7)	18 (4.3)
Very bad	12 (4.0)	14 (12.4)	26 (6.3)
Religiosity[h]			
Secular	180 (59.4)	17 (14.9)***	197 (47.2)
Traditional	96 (31.7)	59 (51.8)	155 (37.2)
Religious	27 (8.9)	38 (33.3)	65 (15.6)
Health Maintenance Organization			
Clalit	222 (73.0)	89 (76.7)	311 (74.0)
Maccabi	15 (4.9)	5 (4.3)	20 (4.8)
Leumit	13 (4.3)	7 (6.0)	20 (4.8)
Meuhedet	54 (17.8)	15 (12.9)	69 (16.4)

[a]Values are mean ± standard deviation or *n* (%); [b]$n = 416$; [c]$n = 418$; [d]The large difference in the proportion of retirees between Arab and Jewish patients reflects the substantially younger age distribution of the Arab patients and the Arab population; [e]$n = 385$; [f]Monthly wage of employees in Israel: 2009, 8108 NIS; 2010, 8430 NIS; [g]$n = 415$; [h]$n = 417$; *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

with a higher proportion of Arab patients leading a sedentary lifestyle compared to Jewish patients (81 vs. 55%, $p < 0.001$, gender-adjusted RR 1.46, 95% CI 1.28–1.67, $p < 0.001$; Figure 3). No significant difference was observed between Jewish men and women who did not exercise on a regular basis at the time of hospitalization (56.6 vs. 45.4%, $p = 0.08$). There were too few Arab women to make a parallel comparison.

The ethnic difference in exercise prevalence after 6 months increased, so that 53% (95% CI 43–62%) of the Arab patients led a sedentary lifestyle compared to only 18% (95% CI 14–23%) of the Jewish patients

Table 2. Baseline clinical data and coronary heart disease risk factors: comparison between Jews and Arabs at index hospitalization

	Jews	Arabs	Total
Hospitalization unit			
Coronary care	214 (70.4)	72 (62.1)	286 (68.1)
Internal medicine	90 (29.6)	44 (37.9)	134 (31.9)
Diagnosis[a]			
Myocardial infarction	222 (73.0)	79 (68.1)	301 (71.7)
Unstable angina	82 (27.0)	37 (31.9)	119 (28.3)
History of CHD[b,c]	117 (38.7)	44 (38.3)	161 (38.6)
Family history of CHD[b,c]	120 (39.9)	46 (39.7)	166 (39.8)
Obesity[b,d]	130 (43.0)	57 (49.1)	187 (44.7)
Dyslipidaemia[b,e]	207 (69.0)	87 (75.0)	294 (70.7)
Diabetes[b,d]	81 (26.9)	41 (35.3)	122 (29.3)
Hypertension[b,d]	161 (53.3)	62 (53.4)	223 (53.3)
Smoking habits[f]	88 (28.9)	77 (66.4)	165 (39.3)
Sedentary lifestyle[f]	166 (54.6)	94 (81.0)	260 (61.9)

Values are *n* (%); [a]As confirmed by a senior cardiologist; [b]Extracted from the patient chart; [c]$n = 417$; [d]$n = 418$; [e]$n = 416$; [f]Based on self-reports during face-to-face interview; CHD, coronary heart disease.

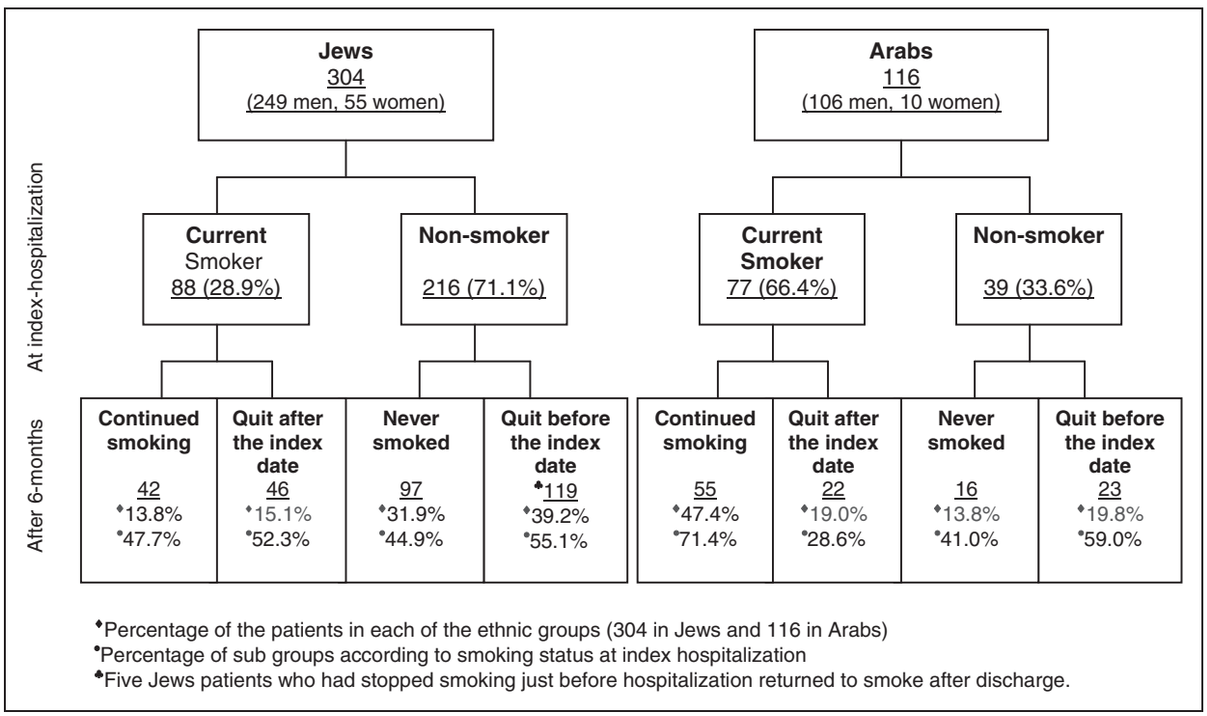

Figure 2. Smoking habits by ethnic group at index hospitalization and at follow up.

(gender-adjusted RR 3.00, 95% CI 2.24–4.04, $p < 0.001$).

Among participants who did not exercise on a regular basis at baseline, 74% (95% CI 68–79%) of Jewish patients adopted healthier exercise habits after the index event compared with only 41% (95% CI 32–50%) among their Arab counterparts (crude OR for persistent sedentary behaviour in Arabs vs. Jews 4.00, 95% CI 2.33–6.87, $p < 0.001$; Table 4, model 1). This association was modestly attenuated when adjusted for the covariates and the significant interaction between ethnicity and history of CHD

Table 3. Association of ethnic group and participation in CPRP with persistent smoking 6 months after acute coronary syndrome among patients who smoked at admission

	Model 1 ($n = 165$)		Model 2 ($n = 165$)		Model 3 ($n = 165$)	
	OR (95% CI)	*p*-value	OR (95% CI)	*p*-value	OR (95% CI)	*p*-value
Ethnicity	2.74 (1.43–5.23)	0.002	2.05 (1.00–4.20)	0.049	1.31 (0.59–2.93)	0.51
CPRP	Not introduced		Not introduced		0.32 (0.15–0.70)	0.004
Nagelkerke R square	0.08		0.15		0.21	

Seven of the subjects had some missing covariate data. We imputed the mean values for education ($n = 2$), economic situation ($n = 2$), and socio-economic position ($n = 4$). Repetition of the analysis for the 158 individuals with complete data was entirely consistent with the analysis presented in the table. Model 1, unadjusted; variables: smoking after 6 months: 0 = no; 1 = yes (dependent variable); ethnic group: 0 = Jews, 1 = Arabs. Model 2: adjusted for socio-demographic and clinical variables; values of variables: variables of model 1 plus age introduced as a continuous variable (years); education level introduced as an ordinal variable (5-point scale from 1 = no formal education to 5 = academic education); economic situation introduced as an ordinal variable (6-point scale from 1 = excellent to 6 = very bad); SEP introduced as an ordinal variable (10-point scale from 1 = the least well off to 10 = the best off); hospitalization unit: 1 = cardiac care unit, 2 = internal medicine; and diagnosis: 0 = myocardial infarction, 1 = unstable angina. Model 3: adjusted for CPRP (0 = no, 1 = yes) in addition to the covariates in model 2. CPRP, cardiac prevention and rehabilitation programme.

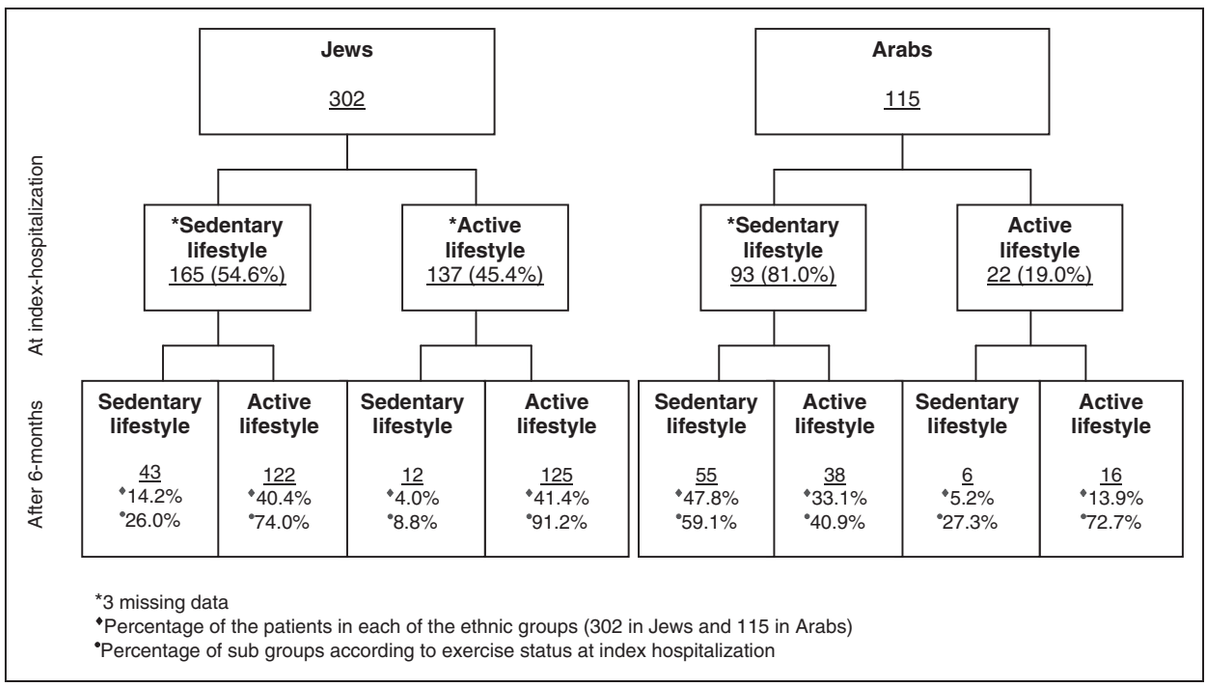

Figure 3. Exercise habits by ethnic group at index hospitalization and at follow up.

(OR 3.68, 95% CI 1.93–7.02, $p < 0.001$; Table 4, model 2) and was further diminished when participation in CPRP was included in the model, although an independent association persisted (OR 2.38, 95% CI 1.19–4.76, $p = 0.014$; Table 4, model 3).

Discussion

It is generally accepted that promoting changes in healthy lifestyle behaviours is vital for patients after an ACS,[10] and formal CPRP offers a structured approach focusing on changing these health habits. Despite this, reports indicate low rates of participation in CPRP and adoption of healthy lifestyles associated with increasing age, female gender, lower SEP, and cultural background.[7,22–29] The current study may provide important direction for interventions among diverse ethnic groups by reporting on patterns of smoking cessation and physical activity and the role of participation in CPRP in enhancing these behaviours.

Significant differences between Arabs and Jews in practicing health-promoting behaviours after an ACS

Table 4. Association of ethnic group and participation in CPRP with persistent sedentary behaviour 6 months after acute coronary syndrome among patients who were sedentary at admission

	Model 1 ($n = 256$)		Model 2 ($n = 256$)		Model 3 ($n = 256$)	
	OR (95% CI)	*p*-value	OR (95% CI)	*p*-value	OR (95% CI)	*p*-value
Ethnicity	4.00 (2.33–6.87)	<0.001	3.68 (1.93–7.02)	<0.001	2.38 (1.19–4.76)	0.014
CPRP	Not introduced		Not introduced		0.30 (0.16–0.56)	<0.001
Nagelkerke R square	0.14		0.22		0.28	

Four of the subjects had some missing covariate data. We imputed the mean values for education ($n = 3$) and religiosity ($n = 2$). Two subjects had missing data for history of CHD and were excluded from the analysis. Model 1, unadjusted; variables: smoking after 6 months: 0 = no; 1 = yes (dependent variable); ethnic group: 0 = Jews, 1 = Arabs. Model 2: adjusted for socio-demographic and clinical variables; variables of model 1 plus education level introduced as an ordinal variable (5-point scale from 1 = no formal education to 5 = academic education); marital status: 0 = married, 1 = other; religiosity introduced as an ordinal variable (3-point scale from 1 = secular to 3 = religious); history of CHD: 0 = no, 1 = yes; and an interaction term for history of CHD and ethnicity was introduced as a multiplicative term (by multiplying the z-scores of the variables). Model 3: adjusted for CPRP (0 = no, 1 = yes) in addition to the covariates in model 2. CHD, coronary heart disease; CPRP, cardiac prevention and rehabilitation programme.

were demonstrated here among a sample of Jewish and Arab patients covered by the same health insurance programme. Smoking prevalence and physical inactivity were substantially higher among Arab than Jewish patients at both reporting periods; the relative ethnic difference in these risk behaviours was even more accentuated 6 months after the event. A strong association between ethnicity and smoking habits is consistent with previous Israeli publications that report higher prevalence of smokers among Arab men than Jewish men in the general population.[1,30] Similarly, the lower levels of exercise activity among Arab patients compared with Jewish patients are consistent with previous studies conducted in the general population in Israel.[15,31] Our study demonstrated that, even after a cardiac event, favourable change in exercise habits was more marked among Jewish patients than Arab patients, independently of covariates (Table 4, model 2).

Multivariable analyses revealed that participation in CPRP is a major determinant of healthier behaviour 6 months after ACS. The far lower level of participation of Arab patients in CPRP explained much of the ethnic differences in these behaviours, observations that are consistent with the effectiveness of CPRP in promoting health behaviour. However, the findings in this observational study might also reflect selection, so that patients with positive beliefs and perceptions tend to change their health behaviours in general, including participation in CPRP as well as smoking cessation and exercise. Factors explaining these nonadherent behaviours among Arab patients, including the overwhelming underutilization of CPRP,[16] still require further exploration.

Several limitations of the study are noted. Uneven response rates may have influenced the representativeness of our sample and underscores the difficulties in recruiting critically ill patients for studies. Nevertheless, our overall favourable response rates of 77% at baseline and 84% at follow up, and the similar response rates among the Arab and Jewish patients, ameliorate this concern. The study represents the experience of one single centre, which has a uniquely aggressive recruitment programme for CPRP and is proximate and accessible to both the Arab and Jewish communities. The small number of Arab women in our sample is an important limitation that needs to be redressed in future studies. Arab women are poorly represented in many studies, and their health needs should be addressed in a culturally sensitive manner.[32] This study focused on meeting the short-term health recommendations while CPRP is still reimbursed by the HMOs and not the long-term recommendations. It also did not attempt to assess possible participation in smoking cessation workshops and other structured programmes other than CPRP or take into account work-related physical activity. Future studies could focus on these issues.

A comprehensive understanding of the personal and cultural determinants of the differences between Jews and Arabs in the uptake of healthier lifestyles is crucial to develop culturally sensitive programmes that are appropriate for the two ethnic groups.

Funding

This study was supported the Israel National Institute for Health Policy and Health Services Research (NIHP) and the Israel Heart Fund.

Conflict of interest

The authors declare that there is no conflict of interest.

References

1. Israel Center for Disease Control and Israel Ministry of Health. [*The state of health of the Arab population 2004*], publication no. 226. 2005 (in Hebrew). Ramat Gan, Israel: Israel Center for Disease Control (ICDC).
2. Kark JD, Fink R, Adler B, et al. The incidence of coronary heart disease among Palestinians and Israelis in Jerusalem. *Int J Epidemiol* 2006; 35: 448–457.
3. Kark JD, Gordon ES and Haklai Z. Coronary heart disease mortality among Arab and Jewish residents of Jerusalem. *Lancet* 2000; 356: 1410–1411.
4. Eyre H, Kahn R, Robertson RM, et al. Preventing cancer, cardiovascular disease, and diabetes: a common agenda for the American Cancer Society, the American Diabetes Association, and the American Heart Association. *Circulation* 2004; 109: 3244–3255.
5. Smith SC Jr., Blair SN, Bonow RO, et al. AHA/ACC Guidelines for preventing heart attack and death in patients with atherosclerotic cardiovascular disease: 2001 update. A statement for healthcare professionals from the American Heart Association and the American College of Cardiology. *J Am Coll Cardiol* 2001; 38: 1581–1583.
6. Israel Medical Association. *Cardiac rehabilitation in Israel*. Israel: Committee in the name of Cardiac Rehabilitation Institute and the Israeli Cardiology Institute, 2000 (in Hebrew).
7. Lee J. An ethnic-sensitive approach for the promotion of a healthy lifestyle: is it warranted? *J Hum Hypertens* 2008; 22: 587–589.
8. Baron-Epel O, Keinan-Boker L, Weinstein R, et al. Persistent high rates of smoking among Israeli Arab males with concomitant decrease among Jews. *Isr Med Assoc J* 2010; 12: 732–737.
9. McGorrian C, Daly L, Fitzpatrick P, et al. Cardiovascular disease and risk factors in an indigenous minority population. The All-Ireland Traveller Health Study. *Eur J Prev Cardiol* 2012; 19: 1444–1453.
10. Mozaffarian D, Wilson PW and Kannel WB. Beyond established and novel risk factors: lifestyle risk factors for cardiovascular disease. *Circulation* 2008; 117: 3031–3038.
11. Franklin BA and Cushman M. Recent advances in preventive cardiology and lifestyle medicine: a themed series. *Circulation* 2011; 123: 2274–2283.
12. Jabara R, Namouz S, Kark JD, et al. Risk characteristics of Arab and Jewish women with coronary heart disease in Jerusalem. *Isr Med Assoc J* 2007; 9: 316–320.
13. Kalter-Leibovici O, Atamna A, Lubin F, et al. Obesity among Arabs and Jews in Israel: a population-based study. *Isr Med Assoc J* 2007; 9: 525–530.
14. Kalter-Leibovici O, Chetrit A, Lubin F, et al. Adult-onset diabetes among Arabs and Jews in Israel: a population-based study. *Diabet Med* 2012; 29: 748–754.
15. Baron-Epel O, Haviv A, Garty N, et al. Who are the sedentary people in Israel? A public health indicator. *Isr Med Assoc J* 2005; 7: 694–699.
16. Reges O, Vilchinsky N, Leibowitz M, et al. Arab–Jewish differences in attending cardiac rehabilitation programs following acute coronary syndrome. *Int J Cardiol* 2013; 163: 218–219.
17. Reges O, Vilchinsky N, Leibowitz M, et al. Systemic determinants as barriers to participation in cardiac prevention and rehabilitation services after acute coronary syndrome. *Int J Cardiol* 2013; 168: 4865–4867.
18. Reges O, Vilchinsky N, Leibowitz M, et al. Illness cognition as a predictor of exercise habits and participation in cardiac prevention and rehabilitation programs after acute coronary syndrome. *BMC Public Health* 2013; 13: 956.
19. Adler NE, Epel ES, Castellazzo G, et al. Relationship of subjective and objective social status with psychological and physiological functioning: preliminary data in healthy white women. *Health Psychol* 2000; 19: 586–592.
20. Taylor HL, Jacobs DR Jr, Schucker B, et al. A questionnaire for the assessment of leisure time physical activities. *J Chronic Dis* 1978; 31: 741–755.
21. Abramson JH. WINPEPI (PEPI-for-Windows): computer programs for epidemiologists. *Epidemiol Perspect Innov* 2004; 1: 6.
22. Leon AS, Franklin BA, Costa F, et al. Cardiac rehabilitation and secondary prevention of coronary heart disease: an American Heart Association scientific statement from the Council on Clinical Cardiology (Subcommittee on Exercise, Cardiac Rehabilitation, and Prevention) and the Council on Nutrition, Physical Activity, and Metabolism (Subcommittee on Physical Activity), in collaboration with the American association of Cardiovascular and Pulmonary Rehabilitation. *Circulation* 2005; 111: 369–376.
23. Rahimi AR, Spertus JA, Reid KJ, et al. Financial barriers to health care and outcomes after acute myocardial infarction. *JAMA* 2007; 297: 1063–1072.
24. Suaya JA, Shepard DS, Normand SL, et al. Use of cardiac rehabilitation by Medicare beneficiaries after myocardial infarction or coronary bypass surgery. *Circulation* 2007; 116: 1653–1662.
25. Vanhees L, McGee HM, Dugmore LD, et al. A representative study of cardiac rehabilitation activities in European Union Member States: the Carinex survey. *J Cardiopulm Rehabil* 2002; 22: 264–272.
26. Daly J, Sindone AP, Thompson DR, et al. Barriers to participation in and adherence to cardiac rehabilitation programs: a critical literature review. *Prog Cardiovasc Nurs* 2002; 17: 8–17.
27. Jackson L, Leclerc J, Erskine Y, et al. Getting the most out of cardiac rehabilitation: a review of referral and adherence predictors. *Heart* 2005; 91: 10–14.
28. Alter DA, Chong A, Austin PC, et al. Socioeconomic status and mortality after acute myocardial infarction. *Ann Intern Med* 2006; 144: 82–93.
29. Dergance JM, Mouton CP, Lichtenstein MJ, et al. Potential mediators of ethnic differences in physical activity in older Mexican Americans and European Americans: results from the San Antonio Longitudinal Study of Aging. *J Am Geriatr Soc* 2005; 53: 1240–1247.
30. Baron-Epel O, Haviv-Messika A, Tamir D, et al. Multiethnic differences in smoking in Israel: pooled

analysis from three national surveys. *Eur J Public Health* 2004; 14: 384–389.

31. Merom D, Sinnreich R, Aboudi V, et al. Lifestyle physical activity among urban Palestinians and Israelis: a cross-sectional comparison in the Palestinian-Israeli Jerusalem risk factor study. *BMC Public Health* 2012; 12: 90.
32. Kalter-Leibovici O, Younis-Zeidan N, Atamna A, et al. Lifestyle intervention in obese Arab women: a randomized controlled trial. *Arch Intern Med* 2010; 170: 970–976.