

Risk factors of coronary heart disease: attitude and behaviour in family practice in Saudi Arabia

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عوامل اختطار أمراض القلب التاجية: المواقف والسلوكيات في إحدى عيادات الأسرة بالمملكة العربية السعودية

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خلاصة: من أجل دراسة المواقف والسلوكيات التي تمثل عوامل اختطار نجاه أمراض القلب التاجية، أجاب مئتان ومئتان مواطناً سعودياً تبلغ أعمارهم عشرين عاماً أو أكثر من المزددين على إحدى عيادات الأسرة، على استبيان مفصّل حول المسائل الصحية وأنماط الحياة، كما تم قياس وزنهم وطولهم وضغط دمهم وإجمالي الكوليسترول المفحوص عشوائياً. ووجد فرق إحصائي جوهري بين الذكور والإناث في العدد الأوسط لعوامل اختطار أمراض القلب التاجية ($t = -3.03$, $P < 0.01$). ووجد أن عدداً قليلاً ممن يتناولون طعاماً غنياً بالدهنيات، ومن البدناء ومن لا يمارسون الرياضة، كانوا يدركون أن سلوكهم يضرهم. وارتفع عدد الأفراد الذين يدركون وجود أخطار على صحتهم مع ارتفاع معدلات التدخين والبدانة ولكن ليس مع فرط تناول الدهنيات. وكان أقل الناس إدراكاً لمضار سلوكهم هم أولئك الذين لايزاولون الرياضة.

ABSTRACT To study risk factors of attitudes and behaviour towards coronary heart disease (CHD), 280 Saudis ≥ 20 years attending a family practice answered a structured health and lifestyle questionnaire and had their weight, height, blood pressure and random total cholesterol measured. Significant difference was found between males and females in the mean number of cardiovascular risk factors ($t = -3.03$, $P < 0.01$). Few people with high dietary fat intake, obesity or physical inactivity perceived their behaviour as harmful. The number of people who perceived an associated risk to their health increased with incidence of smoking and obesity but not with high fat intake. Physically inactive people were least likely to perceive their behaviour as harmful.

Les facteurs de risque de coronaropathie: attitudes et comportements dans un cabinet de médecine générale en Arabie saoudite

RESUME Deux cent quatrevingt Saoudiens âgés de 20 ans ou plus et consultant dans un cabinet de médecine générale ont répondu à un questionnaire structuré sur la santé et le mode de vie; leur poids et leur taille ont été enregistrés; leur tension artérielle et leur niveau de cholestérol total aléatoire ont été mesurés. Une différence significative a été constatée entre les hommes et les femmes en ce qui concerne le nombre moyen de facteurs de risque cardio-vasculaire ($t = -3,03$, $p < 0,01$). Peu de personnes ayant une alimentation riche en graisses, une obésité ou un mode de vie sédentaire percevaient leur comportement comme étant néfaste. Le nombre de personnes qui percevaient un risque associé pour leur santé augmentait avec l'incidence du tabagisme et de l'obésité mais pas avec la forte consommation de graisses. Les personnes n'ayant pas d'activité physique étaient celles les moins susceptibles de percevoir leur comportement comme étant néfaste.

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Introduction

Ischaemic heart diseases are common health problems in Saudi Arabia. They are the third most common cause of hospital-based mortality after accidents and senility [1]. High dietary fat intake, smoking and lack of exercise have all been documented as independent risk factors for the development of ischaemic heart diseases and are called modifiable risk factors as they result from lifestyle behavioural problems [2]. To reduce such risks at the individual and community levels, it is important to make people aware of the harm they cause and to increase the desire of individuals to change their behaviour [3].

The purposes of this study were: a) to identify some risk factors of coronary heart disease among attendants of a family practice centre in Asir region; b) to identify the individuals' attitudes towards the health risks caused by current diet, smoking and exercise habits; and c) to determine any attempts made by such individuals to modify their behaviour accordingly.

Subjects and methods

This study was conducted in 1996 at Al-Manhal family practice centre in Abha, the capital city of south-western Saudi Arabia. This centre serves a catchment area of about 16 000 inhabitants. The purpose of the study was advertised on the notice boards in the centre and adult Saudis aged 20 years and above were invited to participate in the study. Those who voluntarily agreed to participate were told that their total blood cholesterol concentration would be measured and a health check for any cardiac risk factors would be done in one of the centre clinics.

The health check was done by a doctor and a nurse during the low peak hour morning sessions on alternative days, three times per week, for a 3-month period. Height, weight and blood pressure were measured by the nurse. A laboratory technician measured total cholesterol concentration using capillary whole blood with Reflotron (Boehringer, Germany).

A medical history was completed by the doctor who also filled in a health and lifestyle questionnaire using a patient-centred communication model [4]. The health and lifestyle questionnaire used in this study was similar to that used in the Oxcheck study in the United Kingdom [5]. Those agreeing to participate in the study were asked about their perceptions of harm from specific lifestyle behaviours (current diet, smoking habits and exercise level). They were also asked whether they wanted to modify their current lifestyle and whether they had made a serious attempt to do so during the previous year. Those with identified multiple risk factors were given health advice by the doctor and then put in the "at risk" register.

Cardiovascular risk factors that we inquired about were: smoking habits, high fat intake, physical inactivity, history of high blood pressure requiring treatment, personal history of ischaemic heart disease, angina or stroke in a first degree relative before 60 years of age, random cholesterol level >200 mg/dl, body mass index >30 kg/m², male aged >45 years and female aged >55 years.

Dietary fat intake was classified as high or reasonable based on the reported average pattern of daily meals. If the individual was taking ordinary Saudi meals which contain more than 30% saturated fat, his dietary fat intake was classified as high. If the individual was on a type 1 American diet, his dietary fat intake was classified as rea-

sonable. Smoking habits were classified as heavy (15 or more cigarettes a day), light (less than 15 cigarettes a day) or nonsmoker. Exercise grading was classified as active, moderately active or inactive based on an assessment of work activity and leisure time reported during the health check. If the individual undertook some kind of vigorous exercise during work or leisure time once or more than once per week, he/she was considered active; if this occurred once or less than once per month, he/she was considered inactive. Any activity between the two criteria identified above was considered as moderately active [5].

Data were analysed using the *SPSS* statistical package. Pearson chi-squared test was used to compare categorical data and Student's *t*-test to compare between quantitative data. A chi-squared test for linear trend was used to establish whether increasing risk levels were associated with a change in perception of risk or a desire to modify behaviour. Odds ratios were calcu-

lated with 95% confidence intervals for the likelihood of an individual perceiving a behaviour to be harmful and having tried to change such behaviour according to the presence or absence of such behaviour. To estimate the independent effect of each risk factor on health beliefs about diet and attempts to change, adjusted odds ratios were calculated by logistic regression analysis. All risks were treated as dichotomous. *P*-values of 0.05 were considered to be the level of significance.

Results

A total of 280 people were studied. Their characteristics by sex are shown in Table 1. Statistically significant differences occurred between males and females in education ($P < 0.05$) and employment ($P < 0.01$). On the other hand, there were no statistically significant differences according to sex in age or marital status ($P > 0.05$).

Table 1 Characteristics of the study subjects by sex

Characteristic	Males (n = 192)		Females (n = 88)		Total (n = 280)		χ^2	P-value
	No.	%	No.	%	No.	%		
Age (years)								
20-39	40	20.9	14	15.9	54	19.3	1.5	NS
40-65	132	68.7	65	73.9	197	70.4		
> 65	20	10.4	9	10.2	29	10.3		
Education								
Literate	155	80.7	20	22.7	175	62.5	87	< 0.01
Illiterate	37	19.3	68	77.3	105	37.5		
Employment								
Employed	152	79.2	27	30.7	179	63.9	60	< 0.01
Unemployed	40	20.8	61	69.3	101	36.1		
Marital status								
Married	157	81.8	78	88.6	235	83.9	2	NS
Unmarried	35	18.2	10	11.4	45	16.1		

NS - not significant

Table 2 Number of cardiovascular risk factors according to sex among the study subjects

Number of cardiovascular risk factors	Males (n = 192)		Females (n = 88)		Total (n = 280)		t	P-value
	No.	%	No.	%	No.	%		
0	64	33.3	11	12.5	75	26.4		
1	43	22.4	20	22.7	63	22.5		
2	39	20.3	34	38.6	73	26.1		
3+	46	24.0	23	26.1	69	24.4		
Mean \pm s	2.35 \pm 1.18		2.78 \pm 0.98				-3.03	< 0.01

s = standard deviation

Table 2 shows that a greater proportion of females had cardiovascular risk factors than males and the difference in mean number of risk factors was statistically significant ($P < 0.01$).

Table 3 shows the prevalence of nine cardiovascular risk factors among males and females. Risk factors which tended to occur more significantly among females were: hypertension, hypercholesterolaemia, obesity, physical inactivity and high dietary fat intake ($P < 0.01$). None of the females in the studied group were smokers, while 35.4% of males were smokers ($P < 0.01$). No significant differences between males and females occurred in diabetes ($P > 0.05$), personal history of cardiovascular disease or family history of cardiovascular disease ($P > 0.05$).

Perception of risk to health

Table 4 shows the perception of risk associated with each lifestyle factor. Only 18 people (15.7%) with high dietary fat intake perceived their diet to be a health risk; 15 obese people (16.5%) perceived their body build to be a health risk; and 33 physically inactive people (22.6%) perceived their inactivity as harmful to health. This was in contrast to 75.5% of heavy smokers who felt that their behaviour was harmful. The

proportion of people who perceived an associated risk to their health increased significantly with the level of smoking ($P < 0.001$) and overweight/obesity ($P > 0.05$) but not with high fat intake ($P < 0.05$). Inactive people, however, were least likely to perceive their behaviour as harmful (OR = 0.2; 95% CI 0.1–0.3). All of these trends except for dietary intake fat were significant ($P < 0.01$). The proportion of smokers who perceived a health risk associated with smoking increased significantly with the number of cardiovascular risk factors present ($P < 0.05$) (Table 5).

Desire to change and attempt to change

The proportion of people desiring to change behaviour increased with the level of smoking (OR = 3; 95% CI 1.1–8.4), with dietary fat intake (OR = 2.1; 95% CI 1.3–3.4), overweight (OR = 3.4; 95% CI 1.6–7.1) and obesity (OR = 10.5; 95% CI 4.9–22.4) but not for physical activity ($P > 0.05$).

The proportion of people desiring to stop smoking rose significantly ($P < 0.01$) with increasing number of risk factors (Table 5). Of 68 smokers, 42 (61.8%) wanted to reduce their smoking but only 31 (45.6%) had tried to do so during the past

Table 3 Prevalence of cardiovascular risk factors according to sex

Risk factors	Males (n = 192)		Females (n = 88)		Total (n = 280)		χ^2	P-value
	No.	%	No.	%	No.	%		
<i>Hypertension</i>								
Present	27	14.1	29	33.0	56	20.0	13.46	< 0.01
Absent	165	85.9	59	67.0	224	80.0		
<i>Hypercholesterolaemia</i>								
Normal	111	57.8	42	47.7	153	54.6	22.2	< 0.01
Borderline	64	33.3	19	21.6	83	29.6		
Hypercholesterolaemia	17	8.9	27	30.7	44	15.7		
<i>Smoking</i>								
Non-smoker	124	64.6	88	100.0	212	75.7	41.16	< 0.01
Smoker	68	35.4	0	0	68	24.3		
<i>Diabetes</i>								
Present	57	29.7	30	34.1	87	31.0	0.55	NS
Absent	135	70.3	58	65.9	193	68.9		
<i>Obesity</i>								
Non-obese (BMI < 24)	66	34.4	16	18.2	82	29.3	23.0	< 0.01
Overweight (BMI 25–29)	80	41.2	26	29.5	106	37.8		
Obese (BMI > 30)	45	23.4	46	52.3	91	32.5		
<i>History of cardiovascular disease</i>								
Present	7	3.6	4	4.5	11	3.9	0.04	NS
Absent	185	96.4	84	95.5	269	96.1		
<i>Family history of cardiovascular disease</i>								
Present	10	5.20	9	10.2	19	6.8	2.40	NS
Absent	182	94.8	79	89.8	261	93.2		
<i>Physical activity</i>								
Active	71	37	3	3.4	74	26.4	43.8	< 0.01
Moderately active	44	22.9	16	18.2	60	21.4		
Inactive	76	40.1	69	78.4	145	51.8		
<i>Dietary fat intake</i>								
Reasonable	131	68.2	34	38.6	165	58.9	21.83	< 0.01
High	61	31.8	54	61.4	115	41.1		

NS = not significant

year. The corresponding figures were 31 (26.9%) for people with a high dietary fat intake, 29 (19.9%) for inactive people and 24 (26.4%) for obese people.

The proportion of people who seriously tried to change behaviour increased with the level of smoking (OR = 3.4; 95%

CI 1.2–9.5) and dietary fat intake (OR = 1.9; 95% CI 1.1–3.4). In contrast, attempts to increase exercise were inversely related to the level of activity in that inactive people were the least likely to attempt increasing exercise (OR = 0.4). The proportion of smokers who tried to stop smoking rose significantly ($P <$

Table 4 Perception of lifestyle behaviour according to the level of risk of cardiovascular disease

Risk factor	Perceived harmful			Wanted to change			Tried to change		
	No.	%	Odds ratio (95% CI)	No.	%	Odds ratio (95% CI)	No.	%	Odds ratio (95% CI)
<i>Smoking</i>									
Non-smoker (n = 212)	200	94.3	1 ^a	-	-	-	-	-	-
Light smoker (n = 28)	12	42.9	0.05 (0.02-0.12)	13	46.4	1 ^a	8	28.6	1 ^a
Heavy smoker (n = 40)	30	75.0	0.18 (0.07-0.45)	29	72.5	3.04 (1.1-8.4)	23	57.5	3.38 (1.2-9.49)
χ^2 , P-value		42.60, <0.001			4.74, <0.05			5.56, <0.05	
<i>Physical inactivity (exercise)</i>									
Active (n = 74)	47	63.5	1 ^a	35	47.3	1 ^a	28	37.9	1 ^a
Moderately active (n = 60)	20	33.3	0.29 (0.14-0.59)	22	36.7	0.65 (0.32-1.29)	22	36.7	0.95 (0.47-1.92)
Inactive (n = 146)	33	22.6	0.17 (0.09-0.31)	77	52.7	1.24 (0.71-2.18)	29	19.9	0.41 (0.22-0.76)
χ^2 , P-value		34.10, <0.001			1.13, >0.05			9.14, <0.01	
<i>Obesity</i>									
Normal, BMI < 24 (n = 83)	4	4.8	1 ^a	11	13.2	1 ^a	12	14.5	1 ^a
Overweight, BMI 25-29 (n = 106)	19	18	4.31 (1.41-13.23)	36	34	3.87 (1.59-7.13)	22	20.8	1.55 (0.72-3.35)
Obese, BMI > 30 (n = 91)	15	16.5	3.90 (1.24-12.27)	56	51.5	10.47 (4.89-22.44)	24	26.4	2.12 (0.98-4.57)
χ^2 , P-value		4.82, >0.05			43.77, <0.001			3.75, >0.05	
<i>Dietary fat intake</i>									
Reasonable (n = 165)	20	12.1	1 ^a	49	29.7	1 ^a	27	16.4	1 ^a
High (n = 115)	18	15.7	1.35 (0.68-2.67)	54	47	2.10 (1.28-3.44)	31	26.9	1.89 (1.05-3.38)
χ^2 , P-value		0.72, >0.05			8.68, <0.01			4.63, <0.05	

^a = reference category

CI = confidence interval

0.01) with increasing number of risk factors (Table 5).

Being overweight or obese seemed to be the main motivator for dietary changes as

well as the main factor associated with an actual attempt to change diet (Table 6).

Both high cholesterol and diabetes were significantly associated with a lower moti-

Table 5 Perceptions of lifestyle behaviours according to overall cardiovascular risk

Behaviour	No. of risk factors				χ^2	P-value
	0 (n = 75) No. (%)	1 (n = 63) No. (%)	2 (n = 73) No. (%)	3+ (n = 69) No. (%)		
<i>Smoking^a</i>						
Perceive harmful	55 (73.3)	8 (12.7)	15 (20.5)	19 (27.5)	4.45	< 0.05
Want to quit	—	7 (11.1)	13 (17.9)	22 (31.9)	8.83	< 0.01
Tried to quit	—	5 (8.0)	8 (11.0)	18 (26.1)	8.64	< 0.01
<i>Diet</i>						
Perceive harmful	18 (24.0)	4 (6.3)	7 (9.6)	9 (13.1)	3.13	> 0.05
Want to change	24 (32.0)	22 (34.9)	30 (41.0)	26 (37.7)	0.86	> 0.05
Tried to change	16 (21.3)	13 (20.6)	12 (16.4)	17 (24.6)	0.06	> 0.05
<i>Exercise</i>						
Perceive harmful ^b	38 (50.7)	46 (73.0)	48 (65.7)	39 (56.5)	0.29	> 0.05
Want to increase	40 (53.3)	29 (46.0)	31 (42.5)	31 (42.5)	1.27	> 0.05
Tried to increase	25 (33.3)	20 (31.7)	12 (16.4)	22 (31.9)	0.51	> 0.05

^aResponses limited to smokers only (n = 62)

^bThose respondents who thought they did not get enough exercise to maintain health

Table 6 Effect of cardiovascular risk factors on health beliefs about diet

Risk factor	Current diet perceived as harmful		Tried to change diet ^a	
	c OR	a OR	c OR	a OR
Smoking	1.14	1.11	0.95	1.10
High blood pressure	1.78	0.96	2.18*	1.13
Diabetes	0.65	0.38*	1.64	1.05
Inactivity	1.48	1.57	1.08	0.78
High fat intake	1.35	0.91	2.10*	1.48
High blood cholesterol	0.65	0.44*	1.13	0.57
Obesity	4.12*	4.22*	5.74*	5.25*
Cardiovascular disease	1.44	1.59	0.63	0.35
Family history of cardiovascular disease	2.46	1.54	5.38*	3.16*

^aAt least one serious attempt to modify diet during the past 12 months

cOR = crude odds ratio;

aOR = odds ratio adjusted for all other risk factors

*Significant at 5%

vation to change diet. Conversely, positive family history of ischaemic heart disease was significantly associated with a greater likelihood of having tried to change diet.

Discussion

The present study showed that cardiovascular risk factors were present in a considerable proportion of the study subjects and that females were more prone to most cardiovascular risks than males. Physical inactivity, obesity, high dietary fat intake and hypercholesterolaemia were present among more females than males, while smoking was present only among males. This difference could be explained by some sociobehavioural factors of the study subjects.

Studies have shown that the most important factor in determining the success of a smoking cessation programme is the attitude and desire of smokers to stop smoking and that poor motivation among patients is a barrier to success [6]. The findings of this study showed that 61.8% of the smokers had a positive attitude (want to change behaviour) regarding smoking and 45.5% had tried to stop but had failed. This positive attitude was illustrated in their response that smoking is harmful to their health. In a study among physicians in Riyadh, 79% of the study subjects expressed positive attitudes regarding smoking [7]; in another study among medical students in Riyadh, 59% of smokers had tried to stop smoking but failed [8]. The differences between our study and such studies could be attributed to the difference in the sociodemographic characteristics of the studied groups.

The findings of this study showed also that the positive attitude (want to change behaviour) and behaviour (tried to change behaviour) of smokers towards smoking increased with the level of smoking and the

increasing number of cardiovascular risk factors for smokers. This would suggest that a sizeable proportion of heavy smokers are aware of the health hazards of smoking and have tried sincerely to stop smoking but have failed. This is consistent with other studies which showed that heavier smokers and those with smoking-related diseases are aware of the health hazards of smoking and are more likely to be offered advice [9]. Nevertheless, the failure of most smokers to stop smoking might be attributed to the addictive nature of smoking and the failure of health programmes to support smokers who are willing to stop. Some reports have shown that some family physicians are not interested in dealing with the smoking problem and place a low priority on preventing smoking, possibly as the result of lack of training, a lack of time or the greater satisfaction to be gained from the treatment of diseases [10]. Family physicians should be trained to counsel and to make use of the available evidence from medical literature to help their patients quit smoking. The present study and other studies [11] suggest that smoking topics should be introduced in the continuous education programmes of family physicians.

Obesity constituted a remarkable problem among the female subjects of the study (52.3%), while among males it was a lesser problem (23.4%). In a practice-based study similar to ours in Dammam, Saudi Arabia [12], the prevalence of obesity (BMI > 30 kg/m²) was 31.1% among females and 16.1% among males. The high proportion of obesity in the present study, especially among females, might be attributed to high dietary fat intake. About two-thirds of females, compared to one-third of males, were eating high fat diets. In addition, physical inactivity was common especially among females (78.4%). Some sociocultural factors in Saudi communities might con-

tribute to such findings. These factors may include the rising economic situation in which a large number of families own more than one car, the high unemployment rate among females (69.3%), restricted female activities, the high illiteracy rate among females, and local cultural food habits. The latter include foods which are high in calories, saturated fat and cholesterol and comprise mainly rice, lamb and dairy products.

This study also found that the positive attitude of obese subjects in terms of their perception of health harm increased significantly with increasing body mass; the behaviour of these obese people, however, did not follow their positive attitudes. The discrepancy between attitude and behaviour towards obesity might be explained by some of the cultural barriers highlighted above. Also, the failure of women who tried to reduce weight might be attributed to the inappropriateness of the strategies adopted by their primary care physicians to help and support them in this aspect or to a lack of physicians' interest in this regard.

Although the study found that a sizeable proportion of study subjects ate high fat diets, only 15.7% of such people perceived their diet to be a health harm. This perception was not significantly associated with other risk factors. People who had high fat diets showed positive attitude and behaviour towards such behaviour. However, when diet intake was adjusted with other risk factors, such an effect upon attitude and behaviour was absent. Obesity seemed to be the main trigger for change of attitude and behaviour towards diet while the role of other cardiovascular risk factors was small. This finding might be explained by the lack of awareness among study subjects towards the health harm of high fat diets. It would also suggest that the desire and attempt to change behaviour regarding diet and weight among obese people might be

better explained by psychosocial reasons and role model behaviours rather than health reasons, particularly among the study's female subjects.

Our study found that physically inactive people were the least likely to perceive their behaviour as harmful and the least likely to attempt to increase exercise. However, in one community-based survey in Oxford, UK, physically inactive people were found to have positive attitudes regarding physical inactivity [5]. The inactive people in our study might have been unaware of the relationship between exercise and health even in the presence of other risk factors. This was demonstrated by the lack of a significant linear association between perception of such behaviour and the increasing number of other risk factors. Such a lack of awareness might also explain the insignificant independent effect of exercise upon diet.

Conclusion

This study revealed that a sizeable proportion of study subjects were unaware of the health risks of physical inactivity, high dietary fat intake and obesity. This might represent a challenge to primary care policy and planning in our community. Similar reports have found that the rate of advice offered by family physicians to their patients regarding these modifiable cardiovascular risk factors is relatively low [13]. Other reports have found also that the primary care physicians felt that they are ill-prepared to perform such tasks, that they need training to undertake such tasks [14,15] and that they felt that these tasks are important parts of their role. Practice-based health education programmes are needed to develop awareness and create positive attitudes towards such risks.

Some studies have found that such primary care intervention programmes could profoundly increase the physical activity levels of primary care clients [16], promote dietary change, reduce cholesterol levels [17] and reduce smoking [3,18]; however, other studies have not found any such impact [19,20]. Further research is needed in Saudi Arabia to study the cost-effectiveness

of alternative strategies and intervention programmes in reducing the overall morbidity and mortality of cardiovascular disease. The present study represents the first phase and background of an intervention programme to be conducted in the same community aiming at reducing cardiovascular risk factors.

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Community-based intervention programmes have been shown to be effective in promoting healthy lifestyles and reducing the incidence of cardiovascular diseases. WHO is therefore working with countries to establish pilot projects to provide information on risk factors and to promote healthy lifestyles with regard to tobacco use, diet and physical activity. Special emphasis is placed on inculcating good habits in children and adolescents. Efforts are made to involve local groups and community decision-makers, so as to mobilize the community and ensure that people are able to follow healthier lifestyles.

Source: The World Health Report, 1999. Making a Difference. World Health Organization, Geneva, 1999. Page 17.