

Original Research Article

Family history of diabetes, hypertension, obesity and cardiovascular diseases in relation to self health-care

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ABSTRACT

Background: To assess the prevalence of family history of DM, HT, CVD, and obesity and determine the methods of self-health care among participants with and without a FH of these disease(s). Self-testing methods such as screening for chronic metabolic diseases and lifestyle modifications were focused on.

Methods: A cross-sectional study including 1000 participants above 18 years of age and a self-reported questionnaire was used to collect data. The association was assessed using the Chi-square test. Logistic regression was used to determine the degree of association. $P \leq 0.05$ was considered statistically significant. An informed consent was taken from all participants and ethics approval obtained from International Review of Boards Committee.

Results: Results showed 44.8% with a FH of DM, 49.1% with hypertension, 21.9% with CVD and 17.3% with obesity. The OR showed that the likelihood of testing for FBG (OR=5, $p < 0.001$ those with four FH compared to no FH), Cholesterol (OR=2.4, $p < 0.01$ those with four FH compared to no FH), BP (OR=2.5, $p < 0.05$ those with four FH compared to no FH), ECG (OR=2.1, $p < 0.01$ those with four FH compared to no FH) and BMI (OR=7.7, $p < 0.001$ those with four FH compared to no FH).

Conclusions: Participants with more FH of disease were more likely to test for glucose, cholesterol, blood pressure, electrocardiograms and body mass index.

Keywords: Metabolic diseases, Screening, Prevalence, Health-care

INTRODUCTION

It is amply documented that certain chronic and metabolic diseases prevalent in our population and of public health significance, such as diabetes, hypertension, obesity, cardiovascular diseases, are associated with family history (FH). Diabetes mellitus (DM), hypertension (HT), obesity and cardiovascular diseases (CVD) are prevalent all over the world, especially in developed countries. There is an association with a family history of non-communicable disease and genetic susceptibility, the environment they shared and the common behaviors.¹ Family history of disease is a major non-modifiable risk factor that influences the chance of such diseases.²

Family history and genetic susceptibility play a vital role in the prevalence of non-communicable diseases. Family History of diabetes (FHD) and obesity have a synergic effect on type 2 diabetes. It has been shown that lifestyle modifications such as exercise, dietary habits and weight loss can reduce the risk of T2DM.³ The EPIC-Interact study stated that people with FHD are most likely to be tested and diagnosed with diabetes mellitus compared to the general population of those without FHD.⁴ Zlot et al reported that the risk of diabetes doubles when there is a family history of diabetes in a first-degree relative.⁵ van der Sande et al. reported that those with familial risk of diabetes were three times more likely to have elevated triglyceride levels, had ten times higher risk of stroke, were

2.6 times more likely to have high creatinine concentration.⁶

A study among oregonians reported that respondents with a strong family history of diabetes were trying to modify their lifestyles, such as diet and exercise, to reduce the chance of getting diabetes, compared to those without a family history.⁵ It is possible that even with the presence of a family history of the disease, there is a significant percentage of people that are victims of self-neglect, denial or simply a careless attitude. A study in China reported that FHD is associated with T2DM and may influence risk factors of T2DM. The Chinese population should make lifestyle interventions before the onset of T2DM.⁷ One of the main objectives of our present research was to understand the self health-care methods adopted by people with the presence of a family history of disease compared to those without a family history. We have focused on self health-care methods such as screening for chronic metabolic diseases such as regularly checking for fasting blood glucose, maintaining blood pressure, following up with regular electrocardiograms and repeating cholesterol and BMI levels.

METHODS

The current study was a cross-sectional study which included 1000 individuals who were 18 years of age and above. It was carried out over a period of 6 months in Dubai, Sharjah and Ajman in the United Arab Emirates from August 2018 to January 2019.

Inclusion and exclusion criteria

Inclusion criteria for current study were; both genders, aged 18 and above with or without the following chronic diseases: diabetes, hypertension, obesity and cardiovascular diseases inside Thumbay clinics/hospital. Age <18 years and not in Thumbay clinics/hospital were excluded from the study.

Non probability sampling, convenience sampling was used for this study. A self-administered questionnaire consisting of demographic data, family history, and lifestyle risk factors was used to collect the data. The study protocol was approved by the Institutional Review Board of Gulf Medical University. All participants were given a signed consent form to participate in the study. Chi-Square test was used to test the association and simple and multiple binary logistic regression was used to analyze the data. P-value less than or equal to 0.05 was considered statistically significant.

RESULTS

In the present study, we have included 531 females and 466 males. The age distribution shows 26% were <20 years. 449 (44.9%) reported a family history of DM, 491 (49.1%) with hypertension, 219 (21.9%) with CVD and 173

(17.3%) with obesity. The association between the status of family history of chronic diseases (DM, hypertension, CVD and obesity) and tested for fasting blood glucose showed 60.8% with FH of one disease, 65.2% with FH of 2-3 disease and 82% with FH of all four diseases had been tested. The association observed was statistically significant ($p<0.001$). The association of family history of chronic diseases and tested for cholesterol showed that 52.8% with 2-3 FH and 62.3% with all four FH had been tested.

The association observed was statistically significant ($p<0.001$). The association between the number of family history of chronic diseases and tested for blood pressure showed that 74% with one FH, 81.3% with 2-3 FH and 83.3% with all four family history of diseases measured their blood pressure. The observed association was statistically significant ($p<0.001$). The association between the number of FH of diseases and performing ECG showed that 56.5% with one FH, 52.9% with 2-3 FH and 51.7% with all four FH of diseases performed an ECG test. There was a statistically significant association between taking the ECG test and the number of family history of diseases ($p<0.001$). The association between the number of FH of chronic disease and participants who had checked their BMI found 56%; with one FH, 60.3% with 2-3 FH, and 85% with all four FH of diseases checked for BMI. There was a statistically significant association with checking BMI and number of family history of diseases ($p<0.001$) (Table 1).

For those with one family history, the chance for measuring blood glucose level is 1.7 times more; among those with 2-3 family history of diseases, the likelihood of measuring blood glucose is 2.1 higher; those with a family history of all four diseases, the chance for measuring blood glucose is five times higher compared to those with no family history of disease. This shows a trend in the relationship between testing for glucose and the number of family history of chronic diseases. Concerning the number of chronic family history and tests for cholesterol showed that those with 2-3 family history of diseases are 1.6 times more likely to test for cholesterol, and the chance increases to 2.4 times in people with a family history of all four diseases compared to those with no family history of the disease.

Measuring blood pressure showed that for those with 2-3 family history of diseases, the chance for measuring blood pressure is 2.1 times, increasing to 2.5 times higher among those with a family history of all four diseases, compared to those with no family history. For those with one family history, the chance for doing an ECG is 1.7 times, with 2-3 family histories of diseases the chance two times and those with a family history of all four diseases, the likelihood increases to 2.1 times higher compared to those with no family history of disease. This shows a trend in the relationship with performing an ECG and the number of family history of diseases.

Table 1: Association between the number of family history of chronic diseases and testing for chronic diseases.

Variable	Group		No FH	One FH	2-3 FH	All four	P value
Tested for fasting blood glucose	Yes	N	163	146	229	50	<0.001
		%	47.8	60.8	65.2	82	
	No	N	178	94	122	11	
		%	52.2	39.2	34.8	18	
Tested for cholesterol	Yes	N	139	115	186	38	<0.001
		%	40.8	48.3	52.8	62.3	
	No	N	202	123	166	23	
		%	59.2	51.7	47.2	37.7	
Tested for blood pressure	Yes	N	229	177	287	50	<0.001
		%	67	74	81.3	83.3	
	No	N	113	61	66	10	
		%	33	25.6	18.7	16.7	
Tested for ECG	Yes	N	105	103	163	29	<0.001
		%	30.9	43.5	47.1	48.3	
	No	N	235	134	183	31	
		%	69.1	56.5	52.9	51.7	
Tested for BMI checking	Yes	N	143	132	210	51	<0.001
		%	42.4	56.2	60.3	85	
	No	N	194	103	138	9	
		%	57.6	43.8	39.7	15	

Table 2: Odds ratio and its confidence interval: number of family history of chronic diseases and testing for chronic diseases.

Type of test		No FH	One FH	2-3 FH	All four FH
Fasting blood glucose	OR	1	1.7	2.1	5.0
	CI	--	1.2-2.4	1.5-2.8	2.5-9.9
	P value	--	<0.01	<0.001	<0.001
Cholesterol	OR	1	1.4	1.6	2.4
	CI	--	1.0-1.9	1.2-2.2	1.4-4.2
	P value	--	NS	<0.01	<0.01
Blood pressure	OR	1	1.4	2.1	2.5
	CI	--	1.0-2.1	1.5-3.0	1.2-5.0
	P value	--	NS	<0.001	<0.05
ECG	OR	1	1.7	2.0	2.1
	CI	--	1.2-2.4	1.5-2.7	1.2-3.7
	P value	--	<0.01	<0.001	<0.01
BMI	OR	1	1.7	2.1	7.7
	CI	--	1.2-2.4	1.5-2.8	3.7-16.1
	P value	--	<0.01	<0.001	<0.001

Table 3: Odds ratio in relation to smoking vs. number of FH of disease(s).

Type of FH	OR	CI	P value
No FH	1	--	--
One FH	1.2	0.8-1.9	NS
2-3 FH	1.2	0.8-1.7	NS
All four	2.4	1.3-4.3	<0.01

For those with one family history of chronic disease, the chance for measuring BMI is 1.7 times, those with 2-3 family history of diseases; the likelihood is 2.1 times and the chance for those with all four family history of diseases increases to 7.7 times compared to those without a family

history of diseases. This shows a trend with measuring BMI and the number of family history of diseases (Table 2). Smoking habit was reported by 17% of participants with FH of DM, 18.2% of participants with FH of HT and 16% of participants with CVD. The association between

smoking status and family history of chronic diseases showed that 40 (11.8%) with no FH, 43 (17.9%) had one FH, 54 (15.3%) with 2-3 FH and 15 (24.2%) with four FH of diseases were current smokers in the present study. Those with a family history of all four diseases were significantly 2.4 times more likely to smoke (Table 3).

DISCUSSION

In the present study, 80.6% of individuals with a family history of DM performed physical activity and for those who have a family history of DM, 17% were current smokers. A study conducted among the US population, there was no significant association between family history and lifestyle factors such as diet and physical activity. This study also reported that participants with a FH of only CVD were 1.68 times more likely to be smokers and those with FH of both CVD and DM were 1.71 times more likely to be smokers.⁸ The present study observed that for those with FHCD, 53.4% of people tested cholesterol compared to those who did not have FHCD 44.1%. Similarly, we found regarding blood glucose that 66.6% of people who had FHCD tested for fasting blood glucose compared to those who did not have FHCD, 53.2%. A study by Murff and others reported an association between FHCD and testing for blood glucose. Who had FHCD, 52% tested for plasma blood glucose compared to 19% of individuals who did not have a family history.⁹

A study by Zlot and others concluded that from those who had strong familial risk, 11.7% screened for cholesterol in comparison with those who did not have their cholesterol levels checked 10.5%, which showed the practice of checking cholesterol is almost the same in with and without a family history of chronic diseases. The study also observed that 17.4% with moderate familial risk were 1.2 times more likely to have screened for cholesterol.⁵ Nikkar et al reported that there wasn't a clear difference in age, BMI, WC, sex, weight between those who had FHD and those who did not. When following a normal diet plan, significant weight loss and decreased BMI were observed in those who had FHD and those without FHD, but there was no remarkable difference in the reductions between them.³ Dietary interventions were made in people with FHD without being diagnosed with T2DM and do a higher level of physical activity and increased walking.¹⁰ Zlot et al reported that those with a strong or moderate family history of diabetes were more 1.7 times more likely to make changes in lifestyle, diet, and exercise than those who did not have a family history.⁵

A study was done to determine the family history of CVD and its association with health-related factors reported that subjects with a family history had many risk factors which could have been modified. However, they did not consider themselves at risk, which showed in their lifestyle behaviour.¹¹ In coloration with our study, the smoking habit was reported in 16% of participants with a family history of CVD. On the other hand, 62.3% with a family history of all four (CVD, T2DM, CVD, Obesity) tested for

cholesterol. The association observed was statistically significant ($p < 0.001$). It has been shown that lifestyle modifications such as exercise, dietary habits and weight loss can reduce the risk of T2DM.³ To correlate dietary habits and onset of T2DM in people with FHD, a research showed that patients with FHD were diagnosed with T2DM earlier than those without FHD. This explains that FHD could be associated with the earlier onset of T2DM, which indicates environmental and genetic influences.⁷ This can be correlated with our objectives of relating FH of T2DM and testing for blood glucose to detect the disease earlier and start treatment. 446 people had FH of T2DM, of which 297 (66.6%) tested for fasting blood glucose compared to 545 people without FH of T2DM, of which 290 (53.2%) tested for the same ($p \leq 0.001$).

A study about family history of cardiovascular diseases with health-related behavior revealed that those students with family history were less likely to be physically active (OR:0.398). However, this finding was not statistically significant. The same students were significantly 1.73 times more likely to feel fat or overweight (OR:1.73) when compared to those without a family history.¹¹ In comparison, our study revealed that 80.8% of those with a family history of CVD were more likely to perform physical activity. In addition, factors like smoking were also considered in an article that included the United States population. Members with FH of diabetes, CVD, or both diseases are more 1.71 times more likely to be smokers than those without FH.⁸ Compared to our study; smoking habits were followed by 16% of participants with a family history of CVD and 18.2% of them with a family history of HT.

Limitations

This study has potential limitations. As the selection of participants was not done by random sampling, the outcome of the study cannot be generalized to the population. In addition to that, as our research investigated self-health-care in individuals with family history of non-communicable diseases, a bigger sample size would have given us more data to support our investigation for the general population.

CONCLUSION

This study observed 49.1% had family history of hypertension, family history of diabetes 44.9%, family history of cardiovascular disease 21.9% and obesity being the least prevalent 17.3%. The likelihood of measuring blood glucose, cholesterol, blood pressure, ECG and BMI increase as the number of family history increases. On the other hand, individuals who have all four family histories were 2.4 times likely to smoke.

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