

## Perception of Cardiovascular Risks among Type-2 Diabetic Patient Population in Al-Ahsa, Saudi Arabia

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### ABSTRACT

**Objective:** To determine the awareness of cardiovascular risks among type-2 diabetic patients in Al-Ahsa, Saudi Arabia, to identify factors associated with their perceived risk, and examine whether their perceived risk influences their desire to adopt risk reducing behavior.

**Method:** Any patient diagnosed with type 2 diabetes, with or without a history of cardiovascular disease (CVD), who lives in Al-Ahsa, age from 17 years and older could participate in the study either by filling a printed-out questionnaire, or a computerized questionnaire available on the internet. The questionnaire was designed to collect the participants' biographical data; general knowledge of cardiovascular diseases including the risk factors and the symptoms; as well as preventive practices related to cardiovascular risks.

**Results:** Of all the 85 participants, the majorities (72%) were relatively aware of cardiovascular risks; 76.5% of the participants were aware that they, as diabetic patients, have a higher risk of CVD. There was no indication of a significant association between level of awareness and the different demographical characteristics, neither a significant relationship between level of awareness and adoption of risk reducing behavior.

**Conclusion and Recommendation:** This study demonstrates

that the diabetic population in Al-Ahsa has moderately high knowledge and awareness of CVD and their risk factors. However, this knowledge does not match their practices for reducing risky behaviors. More research is needed to determine the factors that are associated with healthy lifestyle in addition to risk perception. We suggest that healthcare providers provide more practical advices to promote actual risk-reducing behaviors among diabetic patients.

**Key words:** Diabetes, Awareness, Cardiovascular Disease, Prevention.

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### INTRODUCTION

Diabetes mellitus, a condition induced by insulin resistance or the body inability to produce adequate insulin, is one of the leading public health problems globally, especially in the industrialized world, and it is the 8<sup>th</sup> health-related cause of death all over the world.<sup>1</sup> Cardiovascular disease (CVD) is the main cause of mortality and morbidity in persons with diabetes mellitus,<sup>2,3</sup> in which it accounts for 70% of the total mortality.<sup>4</sup> Diabetic patients have ischemic heart disease (IHD) risk two to five times greater than that in non-diabetic individuals,<sup>5</sup> and heart disease death rates among adults two to four times higher than the rate for adults without diabetes.<sup>6</sup> The CVDs that are associated with diabetes other than IHD include stroke, peripheral arterial disease, cardiomyopathy, and congestive heart failure.<sup>7</sup> The rapid economic development, urbanization along with ignorance of DM risk factors fuels the spread of DM in Saudi Arabia; according to

the prevalence of DM worldwide, Saudi Arabia is the 7<sup>th</sup> country among the countries with the highest DM prevalence.<sup>8</sup> Adequate management of CVD risk factors and promotion of risk-reducing health behaviors in individual with diabetes is imperative.<sup>9</sup> According to health behavior models, a risk perception is the key for behavior change.<sup>10</sup> Studies have found that patients who recognize their increased risk for CVD are more likely to engage in preventative behaviors.<sup>11,12</sup> More knowledge is needed, however, as there is limited evidence available in the literature about what people with diabetes know about their risk for CVD, and what factors affect their perceptions of CVD. Such knowledge can significantly enhance the work of health-care professionals in the provision of effective health education, and promotion of risk-reducing behavior to prevent the development and progression of CVD among diabetic patients.

This study was undertaken to determine the perception of risk for the development of cardiovascular disease in a population of type-2 diabetic patients with or without CVD in Al-Ahsa, Saudi Arabia, to identify factors associated with their perceived risk, and examine whether their perceived risk influences their desire to make risk-reducing behavioral changes.

## MATERIALS AND METHODS

### Research Design and Setting

A quantitative cross-sectional study was chosen as it does not require follow-up and is, therefore, less expensive and quicker than other study design. This study was conducted at Al-Ahsa's primary health care centers as well as social gathering places.

### Sample Size

As reported by Saudi Central Department of statistic and information, Al-Ahsa has a population of 1063112 (2010 census). According to the administrator of diabetic center in Al-Ahsa, Dr. Hassan Al-Hamrani, the size of type 2 diabetic patient populations in Al-Ahsa was estimated in 2013 to be around 29,092 patients. Based on this fact, the calculated sample size in reference to Creative Research Systems® is 379 with 95% confidence level and confidence interval of 5%. However, due to shortage of time and difficulty to reach type 2 diabetic patients, the sample size was unwillingly reduced to 85 participants.

### Inclusion and Exclusion Criteria

Convenience sampling method was used to recruit the study participants. Any patients diagnosed with type-2 diabetes with or without a history of CVD who live in Al-Ahsa and age from 17 years old and older can participate in the study. Type 1 diabetic patients, non-residents of Al-Ahsa were excluded from the study. Members of the public who had any medical background were also excluded (e.g. physicians, pharmacists or nursing students) based on the assumption that they would have better CVD knowledge.

### Development and Application of Questionnaire

Questionnaire development was based on three published questionnaires which were used to assess CHD knowledge in Northern Ireland,<sup>13</sup> Pakistan<sup>14</sup> and Jordan.<sup>15</sup> The questionnaire was slightly modified to fit the diabetic perspective, as the original questionnaires targets the general population. The questionnaire validity and fitness was assessed by an expert, Dr. Abdul Sattar Khan, a faculty member of family medicine and public health department at medical school of King Faisal University, Al-Ahsa.

The questionnaire consisted of three sections: Section I was designed to collect participants biographical data, including age, gender, level of education, income and occupation, smoking status and self-reported weight and height. Body mass index (BMI) was calculated based on the self-reported weight and height. Section II was designed to assess participant's general knowledge of CVD including risk factors and key symptoms. It consists of 15 multiple-choice questions; the correct response of each questions was assigned one point, and incorrect response was assigned 0, giving maximum score of 15 and minimal score of 0. Participants were categorized into 3 categories based on their total score results: unaware (those who scores 5 or less), moderately aware (those who scores more than 5 but less than 11), and highly aware (those who score 11-15 points).

Section III consist of 5 questions and was designed to assess participant's behaviors that are related to CVD, including

compliance to hypoglycemic medications, glucose self-monitoring, dietary habit and physical activity.

### Pretesting

The developed questionnaire was piloted to check for feasibility, time management, and acceptability of the questions, and to facilitate any needed modifications before the main study. The pilot results were not included in the final data analysis.

### Procedure

The majority of the collected data were obtained through a computerized questionnaire which was accessible online and distributed through social networks. The rest of the questionnaires were printed out and either filled using a structured interview (face-to-face) or solely filled by the participants themselves. The interviews were conducted at primary health care centers and social gathering places in different cities and villages of Al-Ahsa Governorate between 10<sup>th</sup> to 16<sup>th</sup> of April 2014. The participants were approached by the researchers who initially introduced themselves then explained the nature of the study and invited them to participate by signing a form of consent. Each interview required approximately no more than 10 minutes. At the end of the interviews, an information leaflet about cardiovascular health and cardiovascular disease was handed-out for each participant as a step to promote the awareness of CVD risks.

### Statistical Analysis

All variables were computerized and entered into Statistical Package for Social Sciences (SPSS) version 20. Basic frequencies were used for categorical variables and means and standard deviations were calculated for continuous variables. Chi square testing was used to determine which factors associated with CVD knowledge. Analysis results with P-value less than 0.05 were considered significant.

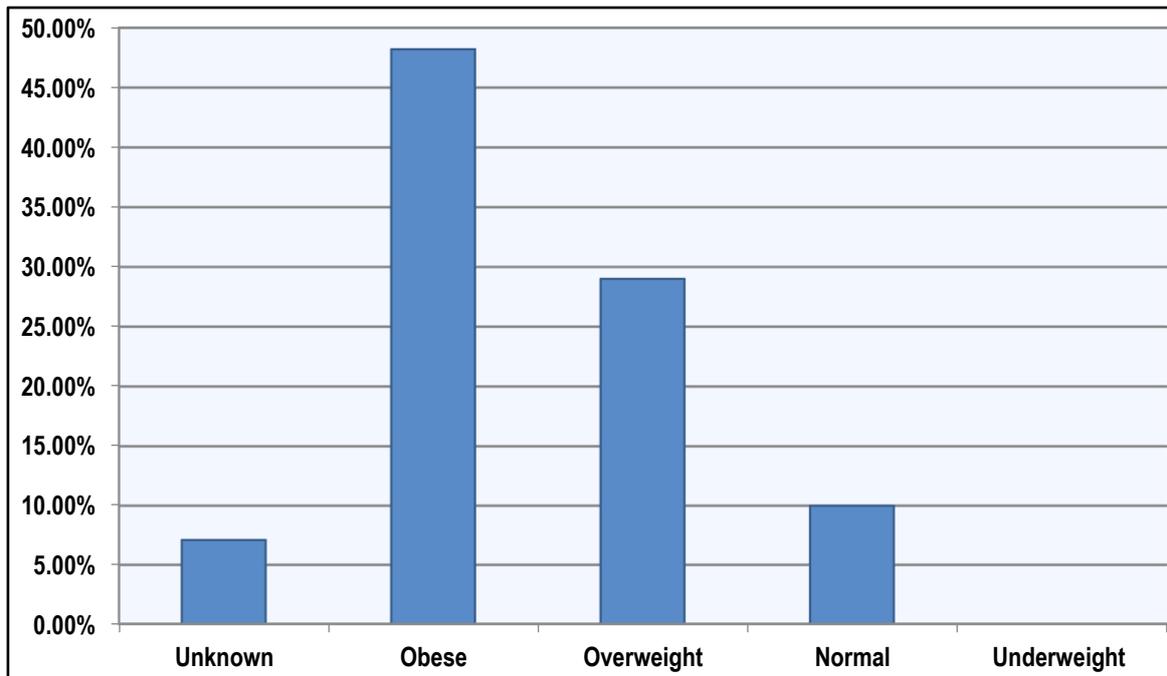
## RESULTS AND DATA ANALYSIS

A total of 114 diabetic patients filled the study questionnaire. 29 participants were excluded because they were not from Al-Ahsa, were younger than 17 years old, or were health professionals. Hence, the final sample included 85 participants. 81.2% of those were males, 64% reside in cities, 55.3% older than 46 years, 60.0% have income higher than 8000 SR, and 55.3% had education level lower than college. Participants' demographic characteristics are presented in Table 1. 20% of participants were diagnosed with CVD, 36.4% thought that they are less healthy compared to others of the same age, 18.8% were smokers, 50% were obese (BMI higher than 30), and 71% reported that they need to reduce their weight. All clinical characteristics are presented in Table 2 and Graph 1.

### Level of Awareness

Of all the 85 participants, the majority (72%) scored at least 11 out of 15 and was considered highly aware of CVD risks. Those who were unable to score at least 6 questions (3.4%) were considered unaware. (Tables 3 and Graph 2 show the participants distribution based on the level of CVD risk awareness). 64.7% of participants were aware of the definition of IHD, and 87.1% of them reported that chest pain is the main symptoms of IHD. When asked about risk factors, sedentary life style (100%) was the most frequently reported risk factor, followed by fatty food (98.8%), and smoking and obesity (both 96.5%). The least frequently reported risk factor was being a male (only 42.2%). Frequency of CVD symptoms and risk factors reported by participants are presented in Table 4.

**Graph 1: Distribution of participants based on their BMI**



**Table 1: Demographic and clinical characteristics**

Variables	Frequency (%)
Gender	Male 69 (81.2%)
	Female 16 (18.8%)
Residency	Cities 55 (64%)
	Villages 30 (35%)
Age	Mean (std. deviation) 45.1 (10.6) years
	Median 48 years
	46 years and younger 38 (44.7%)
Income	47 years and older 47 (55.3%)
	Less 8000 SR 27 (30.6%)
Education	More than 8000 SR 51 (60%)
	High school and lower 47 (55.3%)
	College 38 (44.7%)

**Table 2: Clinical characteristics of participants**

Variables	Frequency (%)
CVD diagnosed	17 (20.0%)
Duration of diabetes diagnosis:	Mean (std. deviation) 8.6 (7.0) years
	Median 6.5 years
	7 years and less 38 (44.7%)
	More than 7 years 32 (47.7%)
Smoking Status	Didn't respond 15 (17.2%)
	Current smokers 16 (18.8%)
Self-reported General health compared to someone with the same age:	Ex-smokers 9 (10.6%)
	No difference 12 (14.1%)
	Less healthy 32 (37.6%)
	Healthier 21 (24.7%)
BMI	Unknown 20 (23.5%)
	Mean (std. deviation) 31.3 (52.2) kg/m <sup>2</sup>
	Median 30.1 kg/m <sup>2</sup>

**Table 3: Participants level of awareness**

Median of score	12.0 out of 15
Categorical distribution	High 63 (71.6%)
	Moderate 33 (25%)
	Low 3 (3.4%)

**Table 4: Symptoms and risk factors of CVD reported by study participants.**

Factors assessed	Frequency of perceived individual
IHD definition	55 (64.7%)
Diabetes as a risk factor	65 (76.5%)
Smoking as a risk factor	82 (96.5%)
Stress as a risk factor	74 (87.1%)
Family history as a risk factor	42 (49.4%)
Cholesterol level as a risk factor	77 (90.6%)
Fatty food as a risk factor	84 (98.8%)
Obesity as a risk factor	82 (96.5%)
Physical inactivity as a protective factor	85 (100%)
Age as a risk factor	66 (76.6%)
High blood pressure as a risk factor	69 (81.2%)
Gender (male) as a risk factor	36 (42.4%)
Chest pain as a symptom	74 (87.1%)
Dyspnoea as symptom	66 (77.6%)
Diaphoresis as a symptom	39 (45.9%)
Total scores: 15	

**Table 5: Different factors that were hypothesized to influence or to be influenced by level of awareness of participants**

Factors		Unaware/ moderately aware	Aware	Chi-Square/ fisher exact test
Gender	Male	36.2%	63.8%	X <sup>2</sup> =1.0
	Female	50.0%	50.0%	P value= 0.3
Residency	Villages	46.7%	53.3%	X <sup>2</sup> =1.2
	Cities	34.5%	65.5%	P value= 0.2
CVD-diagnosed	No	39.7%	60.3%	X <sup>2</sup> =0.1
	Yes	35.3%	64.7%	p value= 0.7
Age	46 years and younger	55.3%	44.7%	X <sup>2</sup> =7.8
	47 years and older	25.5%	74.5%	P value=.005
Education	High school and lower	42.6%	57.4%	X <sup>2</sup> =0.6
	College	34.2%	65.8%	P value =0.4
Socioeconomic status	less than 8000SR	47.1%	52.9%	X <sup>2</sup> =1.6
	8000SR and higher	33.3%	66.7%	P value=0.2
Years of Diagnosed diabetes	7 years and less	42.1%	57.9%	X <sup>2</sup> =0.154
	More than 7 years	37.5%	62.5%	P value= 0.7
Taking prescribed medication Regularly	Yes	40.6%	59.4%	X <sup>2</sup> = 0.088
	No	36.8%	63.2%	P values= 0.8
Own glucose monitoring device	No	64.3%	35.7%	X <sup>2</sup> =4.2
	Yes	34.8%	65.2%	p value= 0.040
Last month physical activates	No	36.2%	63.8%	X <sup>2</sup> =0.3
	Yes	42.9%	57.1%	P value =0.6
Diet low in fatty food	No	24.0%	76.0%	X <sup>2</sup> =3.7
	yes	46.6%	53.4%	p value 0.054

**Table 6: Risk factors influenced by gender**

Factors/Gender		Male	Female	X <sup>2</sup> or Fisher's test
Taking prescribe medication regularly	No	17.6%	46.7%	Fishers' exact
	Yes	82.4%	53.3%	test= 0.03
Smoking status:	No/ex-smoker	76.8%	100%	Fishers' exact
	Yes	23.2%	00.00%	test=0.03

**Factors associated with level of awareness**

Table 5 shows the association between the level of awareness, demographic factors, and risk lowering behavior. Age was the only demographic factor that influences the level of awareness; participants who were above 46 years had significantly higher perception of their CVD risk. Perceived participants were more likely to own a glucose monitoring device. Other risk reducing behaviors, however, were shown not to be significantly influenced

by the level of awareness. Some risk reducing behaviors were found to be more likely to be adopted by females than males and vice versa. For example, diabetic females are less likely to smoke. Whereas diabetic males are more likely to adhere to their prescribed medications; no similar correlation was found with other risk reducing behaviors. Risk factors influenced by gender are presented in Table 6.

## DISCUSSION

This study shows a relatively moderate perception of the fact that diabetes mellitus is a risk factor for CVD; 76.5% of the participants are aware that they have a higher risk of CVD. Compared to other studies, our study demonstrates comparatively higher patients' knowledge about CVD risk. For example, compared to a study with the same scoring system that was conducted in Pakistan (by Jafary et al)<sup>14</sup>, the median knowledge score of 3.0 out of 15, our study shows a median knowledge score of 12. The relative increased knowledge particularly about the modifiable risk factors for CVD, including smoking, sedentary lifestyle and dietary fat in our study population may be explained by the increased representation in mass media campaigns against smoking and dietary fat.

Our study, however, shows no significant relationship between increased perception of CVD risks and actual risk-reducing behaviors. This suggests a need for practical strategies that promote actual risk-reducing behaviors rather than focusing on theoretical education alone.

The fact that there is no significant relationship between junior and senior diabetic patients (i.e. those who have longer experience versus shorter experience) may indicate impairment in health education of diabetic patients with each periodic visit to the primary health care centers. More research is needed to detect where the problem lies.

## LIMITATION

In addition to the small sample size to be generalized over all diabetic population of Al-Ahsa, the fact that the most tested participants were from the online could have introduced selection bias into the study as it may have created a narrow demographic spectrum. Moreover, the BMI was calculated using self-reported weight and height, both are known to be inaccurate and unreliable.

## RECOMMENDATION AND CONCLUSION

The results show that the diabetic population in Al-Ahsa Governorate, Saudi Arabia, have a moderately high knowledge and awareness of CVD risk factors. However, this high knowledge does not match with their practices for reducing risky behaviors. Although knowledge of diseases alone is insufficient for good healthcare outcomes, still it is highly required along with encouraging patients to go through risk-reducing behaviors as it is well documented that knowledge plays an essential role in helping individuals make better decisions regarding their health care.<sup>14,15</sup> In addition to keep on promoting theoretical education about CVD risks, it's a must to establish some campaigns and programs to promote the need of making actual risk-reducing behaviors including paying more attention to diabetic patient's dietary habits and increasing their physical activities. A suggested approach is to mobilize the health educator and social workers at the primary health centers to have more influence on diabetic patients' lifestyle. Health educators can keep direct contact with the patients by the modern electronic means of communication to achieve optimal outcomes. Further investigation is required to determine what factors, beside level of perception, promote adoption of risk-reducing behaviors. Such investigation can significantly help the health-care professionals in the provision of effective health education.

## REFERENCES

1. Wild S, Roglic G, Green A, Sicree R and King H. Global prevalence of diabetes: estimates for the year 2000 and projections for 2030. *Diabetes Care*. 2004;27(5):1047-53.
2. Lotufo PA, Gaziano JM, Chae CU, et al. Diabetes and all-cause and coronary heart disease mortality among US male physicians. *Arch Intern Med*. 2001; 161: 242-7.
3. Hu FB, Stampfer MJ, Solomon CG, et al. The impact of diabetes mellitus on mortality from all causes and coronary heart disease in women: 20 years of follow-up. *Arch Intern Med*. 2001; 161: 1717-23.
4. Laakso M. Hyperglycemia and cardiovascular disease in type 2 diabetes. *Diabetes*. 1999; 48: 937-42.
5. Bamashmoos and Mohammed. Prevalence of Cardiovascular Risk Factors in Type 2 Diabetic Patients with IHD. *World Family Medicine Journal: Incorporating the Middle East Journal of Family Medicine*. 2012; 10(2): 4-8.
6. National Diabetes Information Clearinghouse. National Institutes of Health. Bethesda, MD: Health information; National Institute of Diabetes and Digestive and Kidney Diseases. Available at: [www.niddk.nih.gov/-/media/Files/Research-Areas/DPP\\_508.pdf](http://www.niddk.nih.gov/-/media/Files/Research-Areas/DPP_508.pdf).
7. Buse JB, Ginsberg HN, Bakris GL, et al. Primary prevention of cardiovascular diseases in people with diabetes mellitus: a scientific statement from the American Heart Association and the American Diabetes Association. *Diabetes Care*. 2007; 30: 162-72.
8. Chan JCN, Malik V, Jia W, et al. Diabetes in Asia: epidemiology, risk factors, and pathophysiology. *JAMA*. 2009; 301: 2129-40.
9. Allen J, Purcell A, Szanton S, et al. Perceptions of Cardiac Risk among a Low-Income Urban Diabetic Population. *J Health Care Poor Underserved*. 2010; 21: 362-370.
10. Janz NK and Becker MH. The Health Belief Model: a decade later. *Health Educ Q*. 1984;11(1):1-47.
11. Kreuter MW and Strecher VJ. Changing inaccurate perceptions of health risk: results from a randomized trial. *Health Psychol*. 1995;14(1):56-63.
12. Steptoe A, Doherty S, Rink E, et al Behavioural counselling in general practice for the promotion of healthy behaviour among adults at increased risk of coronary heart disease: Randomised trial. *BMJ*. 1999; 319: 943-948.
13. Al Hamarneh YN et al. Coronary heart disease: health knowledge and behaviour. *Int J Clin Pharm*. 2001;33(1):111-23.
14. Jafary F, Aslam F, et al. Cardiovascular health knowledge and behavior in patient attendants at four tertiary care hospitals in Pakistan – a cause for concern. *BMC Public Health*. 2005; 5: 124.
15. Mukattash TL, Mohd S et al. Public knowledge and awareness of cardiovascular disease and its risk factors: a cross-sectional study of 1000 Jordanians. *Int J Pharm Pract*. 2012; 20(6) :367-76.

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