A Kuwaiti risk score for detecting diabetes

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INTRODUCTION

- The Middle East and North Africa (MENA) have been heavily hit by the global diabetes epidemic.
- Early detection and cost-effective screening are important health tools in managing and reducing the prevalence of diabetes.
- A national survey of adults was conducted in Kuwait in 2014 to determine the prevalence of non-communicable diseases and their risk factors. Here, we describe a diabetes risk score for a Kuwaiti population.

METHODS

- 3915 Kuwaiti men and women aged 18-69 were surveyed using the WHO Instrument for Chronic Disease Risk Factor Surveillance
- Three consecutive steps:
 - Demographics and medical history
 - Physical measurements
 - Blood biochemistry, including fasting plasma glucose and HbA1c
- Predictive models of diabetes risk factors were created using logistic regression on IBM SPSS Statistics v.24

RESULTS

Table 1: Participant characteristics			
	Total	Male	Female
n	3915 (100)	1456 (37.2)	2459 (62.8)
Age (Years)	37.2 (12.3)	36.9 (12.6)	37.3 (12)
BP (Systolic)	121.8 (16.4)	126.9 (16.2)	118.6 (15.7)
BP (Diastolic)	78.2 (10.5)	80.9 (10.5)	76.6 (10.2)
Height (cm)	163.7 (9.2)	171.9 (7.25)	158.6 (6.05)
Weight (kg)	79.5 (17.7)	86.2 (17.1)	75.4 (16.7)
BMI (kg/m ²)	29.6 (6.15)	29.2 (5.62)	29.9 (6.44)
Waist Circumference (cm)	90.7 (15.2)	94.2 (15.2)	88.6 (14.8)
Hip Circumference (cm)	106.6 (14.6)	105.8 (14.3)	107.1 (14.8)
Total Cholesterol (mmol/l)	5.05 (0.99)	5.09 (1.04)	5.02 (0.96)
Triglycerides (mmol/l)	1.47 (1.03)	1.73 (1.35)	1.32 (0.73)
HDL Cholesterol (mmol/l)	1.29 (0.31)	1.13 (0.27)	1.38 (0.3)
LDL Cholesterol	3.1 (0.86)	3.2 (0.91)	3.05 (0.81)
Fasting Plasma Glucose (mmol/l)	5.74 (2.43)	5.9 (2.47)	5.65 (2.39)
HbA1c (%)	5.81 (1.36)	5.83 (1.34)	5.80 (1.37)

RESULTS

Table 2: Logistic regression models with diabetes status as the dependent variable

	Full model (n=1842)			Concise model (n=2064)	
	Beta C.	OR (CI)	Sig.	Beta C.	OR (CI)
Intercept	-3.569			-3.268	
Are you over 45 years of age?	0.84	2.32 (1.62-3.34)	0.000	0.96	2.6 (1.87-3.62)
Have you previously been diagnosed with diabetes?	1.37	3.94 (1.83-8.48)	0.000	1.10	3 (1.47-6.13)
Are you obese (BMI ≥25kg/m ²)?	0.42	1.53 (1.09-2.14)	0.014	0.43	1.54 (1.12-2.11)
Is your waist/hip ratio ≥0.9 for men or ≥0.85 for women?	0.58	1.79 (1.27-2.53)	0.001	0.61	1.84 (1.33-2.55)
Are you currently a smoker?	0.57	1.77 (1.16-2.72)	0.008	0.63	1.87 (1.31-2.68)
Are you male?	0.18	1.2 (0.82-1.75)	0.353		
Do you eat fewer than 5 portions of fruit or vegetables a day?	0.13	1.14 (0.82-1.6)	0.436		
Do you exercise (walk or bike) for less than 10 minutes a day?	0.30	1.34 (0.93-1.94)	0.114		
Have you previously been diagnosed with high blood pressure?	-0.26	0.77 (0.41-1.47)	0.434		
Are you taking any medication for high blood pressure?	0.46	1.57 (0.79-3.13)	0.193		

Figure 1: ROC Curve and optimum cutoff points

Table 3: The diabetes risk score for the Kuwaiti population

Question	Yes	No
Are you over 45 years of age?	4	0
Have you previously been diagnosed with diabetes?	5	0
Are you obese (BMI ≥25kg/m ²)?	2	0
Is your waist/hip ratio ≥0.9 for men or ≥0.85 for women?	3	0
Are you currently a smoker?	3	0

CONCLUSION

A screening tool capable of detecting diabetes in over two thirds of Kuwaiti adults was created