Diabetes mellitus in an urban Palestinian population: prevalence and associated factors

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السكّري في مجتمع حضري فلسطيني: معدل انتشاره والعوامل المصاحبة له

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خلاصـــة: قمنا ببحث معدل انتشار السكّري والعوامل المصاحبة له في مسح مقطعي شمل مجتمعاً حضرياً فلسطينياً مكوناً من 492 رجلاً وامرأة تتراوح أعمارهم بين 30 و65 سنة. واستخدمنا اختبار تحمُّل الغلوكوز بطريق الفم من أجل تشخيص السكّري وقصور تحمُّل الغلوكوز. كما طبقنا بروتوكولات المسح التي تحبِّذها منظمة الصحة العالمية. ولقد وُجد السكّري لدى 12.0% من عينة المسح (ومن بينهم 9.4% ممن سبق تشخيصهم). ووُجد قصور تحمُّل الغلوكوز في 5.9% من أفراد العينة. وبتطبيق تحليل التحيُّف اللوجستي مع مراعاة جوانب العمر والجنس، تبيَّن أن مَنْسَب كتلة الجسم ونسبة محيط الخصر إلى محيط الورك، ووجود السكّري بين أفراد العائلة، كانت عوامل مستقلة مصاحبة للسكّري يُعتد بها إحصائياً.

ABSTRACT We investigated the prevalence of diabetes and associated factors in a cross-sectional survey of an urban Palestinian population of 492 men and women aged 30–65 years. The oral glucose tolerance test was used to diagnose diabetes and impaired glucose tolerance. World Health Organization-recommended survey protocols were followed. Diabetes was found in 12.0% of the survey population (including 9.4% previously diagnosed), and impaired glucose tolerance in 5.9%. Logistic regression analysis controlling for age and sex revealed body mass index, waist-to-hip ratio and family history of diabetes to be significantly independently associated with diabetes.

Le diabète sucré dans une population urbaine de Palestiniens : prévalence et facteurs associés

RESUME Nous avons examiné la prévalence du diabète et des facteurs associés au cours d'une étude transversale d'une population palestinienne urbaine composée de 492 hommes et femmes âgés de 30 à 65 ans. L'épreuve d'hyperglycémie provoquée par voie orale a été utilisée pour diagnostiquer le diabète et l'abaissement de la tolérance au glucose. Les protocoles d'enquête recommandés par l'Organisation mondiale de la Santé ont été suivis. Le diabète a été trouvé chez 12,0 % de la population de l'enquête (y compris 9,4 % diagnostiqué précédemment) et l'abaissement de la tolérance au glucose chez 5,9 %. L'analyse de régression logistique avec contrôle de l'âge et du sexe a révélé que l'indice de masse corporelle, le rapport tour de taille/tour de hanches et les antécédents familiaux de diabète étaient associés au diabète de manière significativement indépendante.

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Introduction

Demographic and socioeconomic changes in the Eastern Mediterranean Region of the World Health Organization (WHO) over the past two decades have resulted in a growing population advancing into older age [1]. With the trend of increased urbanization and the concomitant unfavourable changes in diet and levels of physical activity, chronic noncommunicable diseases, such as diabetes and cardiovascular diseases, are becoming major public health concerns [2].

Until recently, comparisons of the prevalence of glucose intolerance in Middle Eastern populations had been hindered by a lack of standardization in survey methodology [3]. However, surveys based on WHO-recommended guidelines from Oman [4] and Egypt [5] have reported a diabetes prevalence of 10% and 9.3% in the respective adult populations ≥ 20 years of age. It is likely that a similarly high prevalence of diabetes will be found in other countries of the Region as the demographic transition accelerates and populations move toward a more sedentary, "modern" lifestyle, with its typically low level of physical activity and high-energy diet.

Until recently, there has been an absence of baseline data on diabetes prevalence in the West Bank Palestinian population. In a study of adults (30–65 year olds) in a rural West Bank community, a prevalence of 9.8% was detected, using WHO-recommended diagnostic criteria [6]. Although this is considered high for a rural area, the rates would be expected to be higher in urban populations. The present cross-sectional population-based survey aimed to investigate the prevalence of diabetes and factors associated with it in an urban Palestinian population.

Methods

The study was carried out in Old Ramallah City, a dynamic commercial and residential centre in the West Bank, 16 km north of Jerusalem. In the early 1940s, vigorous construction and development activities converted most of the agricultural lands of Ramallah into urban areas. Today, the original village forms the core of the modern city, and that core area is referred to as the Old City or Old Ramallah [7]. The demographics of the city have changed considerably over time due to war and the influx of economic refugees, and emigration of the city's original inhabitants to other countries.

The research design and methods were identical to those of a previous study conducted in a rural West Bank population [6]. Following a household census in November 1997, a testing survey of all eligible individuals was conducted in April–May, 1998. Eligibility was based on age (30–65 years), residence within the Old City for at least 6 months prior to the beginning of the individual testing survey, physical ability to participate, and mental ability to comprehend and consent to survey procedures.

In the household census, 569 of approximately 600 households (94.8%) were visited, and 902 men and women identified (age range: 30–65 years). Adjustments based on inclusion criteria yielded a final population of 831 eligible persons. Individual testing included a medical history check, blood pressure measurement, anthropometric measurements, blood tests and questionnaire assessment of established risk factors for diabetes.

Testing was carried out in a community centre. Invitations were sent out by local field workers, along with written instructions to fast 12 hours before the appointment, and to bring all current medications to the survey site. At the testing centre, compliance with fasting was verified by a series of questions from a registration team member. A range of fasting times (between 10 and 14 hours preceding screening) was deemed acceptable. Individuals who had not fasted for the required period of time had their tests deferred. Fasting capillary blood glucose (FCBG) level was measured using a glucometer (Exac Tech Blood Glucose Monitoring System, Medisense, United States of America). Glucometers were calibrated daily and at the beginning of a new batch of strips. Individuals who reported not having diabetes, as well as those reporting having diabetes but not being on medication, were given a load of 75 g of anhydrous glucose in 250 mL of water drunk over a 5-minute period. Excluded from the glucose load, but not from any other procedure in the survey, were those who reported being on medication for diabetes.

Exactly 2 hours after the glucose load, venous blood was collected from each participant in sodium fluoride tubes for plasma glucose measurements and in plain and EDTA-coated tubes for chemistry and haematology analyses respectively. Following plasma and serum separation, samples were transported on ice for analysis to a private laboratory [a member of the Randox (UK) International Quality Assessment Scheme]. Blood chemistry was analysed on a fully automated clinical chemistry analyser (Kone Supra Specific). An 18-parameter Sysmex K4500 analyser was used for haematology analysis. The diagnostic values for the oral glucose tolerance test (OGTT), according to WHO guidelines, are > 11.1 mmol/L for diabetes at 2 hours after glucose load and 7.8–11.1 mmol/L for impaired glucose tolerance (IGT) at 2 hours after glucose load [*8*]. Participants who reported being diagnosed with diabetes by a physician prior to the screening survey were classified as "previously diagnosed". One of the authors (J. Jervell), with extensive clinical experience in diabetes, reviewed the data on these cases to ascertain their diagnoses. For each person reporting diabetes, the author reviewed the results of venous blood glucose measurement (fasting or post-glucose challenge), FCBG and information pertaining to medication. Participants whose glucose tolerance status was unknown to them before the screening survey and who were diagnosed by the OGTT results were classified as 'survey diagnosed'.

The model protocol by Dowse and Zimmet was followed for anthropometric and blood pressure measurements [*9*]. A trained nurse measured each participant's blood pressure. Trained fieldworkers measured the height, weight, and waist and hip circumference of each participant. Height was measured to the nearest cen-timetre, with the subject wearing no shoes and standing against a wall-mounted rod. Weight was measured to the nearest 0.1 kg with participants wearing a light layer of clothing. Waist and hip circum-ferences were measured to the nearest 0.1 cm. Participants were interviewed using a standard questionnaire to obtain information on education level, smoking history and family history of diabetes. Family history was considered positive if the subject reported a first-degree relative with type-2 diabetes.

Statistical analysis

Data analysis was performed using *SPSS*, version 8.0. Age-adjusted prevalence was calculated by direct standardization, using the WHO world standard population age structure [*10*] and the age structure of the

Palestinian West Bank population obtained from the 1997 National Census [11]. The association between different characteristics of the participants and the dependent variable (glucose tolerance status) was analysed using both bivariate and multivariate analyses. The Student *t*-test was applied in bivariate analyses to investigate differences in mean values of selected independent variables between groups of individuals with IGT or diabetes, and those with normal glucose tolerance. For logistic regression analysis, independent variables were divided either into tertiles designating low, moderate and high levels of exposure, or into two groups using established cut-off points. Age- and sex-adjusted odds ratios (OR) and their 95% confidence intervals (CI) were calculated. Selected age- and sex-adjusted independent variables showing a statistically significant association with glucose tolerance status (normoglycaemia, diabetes) were included in a final logistic regression analysis. Potentially significant interactions between the characteristics of the participants were examined by including product terms in the model [12].

Results

Response rate

The total response rate was 59.2%, (females 71%; males 47%). Among women, the response rate to the survey was highest in the 60–65-year age group (87%). Among men, the highest response rate was in the 50–59-year age group (52%), and lowest (30%) among 60–65 year-olds (the oldest age group).

Approximately two-thirds (61%) of non-responders were male. Citing work as the reason in most cases, men were significantly more likely than women not to participate in the survey (OR = 2.53; 95% CI: 1.88–3.40). The mean ages of non-responding males and females were not significantly different from those of responders. The response rates were also similar in all but two of the eight residence blocks included in the survey area (average 51%). The response rate was lowest in the higher socioeconomic block (45.8%), and highest in a lower socioeconomic block (75.9%).

Prevalence of abnormal glucose tolerance

Prevalence by sex of abnormal glucose tolerance (IGT and diabetes) is shown in Table 1. Previously diagnosed diabetes was found in 5.3% of men and 11.9% of women. The prevalence of survey diagnosed diabetes was 2.1% in men and 3.0% in women, including three participants considered as survey diagnosed without an OGTT because their FCBG level was greater than 13.9 mmol/L. Approximately three-quarters of the women and two-thirds of the men with diabetes were diagnosed by a physician before the survey.

Total diabetes prevalence (previously diagnosed plus survey diagnosed) was 12.0%. Age-adjusted prevalence, based on the WHO world standard population, was 13.9% (10.3% when adjusted to the age structure of the Palestinian West Bank population). As well as diabetes, 4.2% of men and 7.0% of women had IGT, giving a total abnormal glucose tolerance in the population surveyed of 17.9%.

Among the women, the prevalence of diabetes increased steadily with age (Table 2), reaching a peak of 36.6% in 60–65-year-olds (the oldest age group), significantly higher than among men in this age group. There was no significant difference in the prevalence by sex of IGT for any age group.

Previously diagnosed diabetes

Based on the review of the blood glucose results and medication data of the participants with previously diagnosed diabetes, four cases (three females, one male) were identified as possible false-positive diagnoses. If these four are removed from the group with reported diabetes, the prevalence of reported diabetes drops from 9.4% to 8.5% (95% CI: 6.0–11.0).

The average time from initial diagnosis was approximately 6 years for both men and women. Of the 46 people with reported diabetes, 38 reported being on diabetes medication. Of these 38, information could only be verified for 29. The other nine indi-

Table 1 **Prevalence of previously diagnosed diabetes, survey diagnosed diabetes and impaired glucose tolerance (IGT) by sex in an urban Palestinian population**

Sex	No.	Survey diagnosed diabetes %	Survey diagnosed diabetes 95% CI	Previously diagnosed diabetes %	Previously diagnosed diabetes 95% CI	IGT %	IGT 95% CI
Male	190	2.1	(0.1–4.1)	5.3	(2.1–8.3)	4.2	(1.3–7.1)
Female	302	3.0	(1.1–4.9)	11.9	(8.2–15.6)	7.0	(4.1–9.9)
Total	492	2.6	(1.2–4.0)	9.4	(6.9–11.9)	5.9	(3.7–8.1)

CI = confidence interval.

Table 2 **Prevalence of diabetes and impaired glucose tolerance (IGT) by age and sex in an urban Palestinian population**

Age group (years)	Sex	No. tested	Diabetes No.	Diabetes %	*P*-value[a]	IGT No.	IGT %	*P*-value[a]
30–39	M	94	1	1.1	1.000	2	2.1	1.00
	F	120	1	0.8		3	2.5	
	All	214	2	0.9		5	2.3	
40–49	M	47	8	17.0	0.590	1	2.1	0.15
	F	72	9	12.5		7	9.7	
	All	119	17	14.3		8	6.7	
50–59	M	35	4	11.4	0.051	4	11.4	0.73
	F	69	20	29.0		6	8.7	
	All	104	24	23.1		10	9.6	
60–65	M	14	1	7.1	0.045	1	7.1	1.00
	F	41	15	36.6		5	12.2	
	All	55	16	29.1		6	10.9	
Total		492	59	12.0		29	5.9	

[a] *P-value was obtained using a 2-sided Fisher exact test.*
M = male.
F = female.

viduals did not bring their medication with them to the survey site, although they did report taking their medication orally. Of the 29 verified cases, 23 (79%) were on oral medication, 5 (17%) were using insulin injections and 1 person reported using both oral and injectable medications. Irrespective of the treatment used, 27 (59%) of the 46 previously diagnosed subjects had FCBG > 7.8 mmol/L.

Factors associated with glucose intolerance

The characteristics of the men and women with normal glucose tolerance, IGT and diabetes are shown in Table 3. Compared to normoglycaemic women, those with diabetes were older and had significantly higher body mass index (BMI), waist-to-hip ratio (WHR), blood pressure (systolic and diastolic) and triglyceride level. Their high-den-

Table 3 **Means and standard errors of characteristics of female and male participants with normal glucose tolerance, impaired glucose tolerance (IGT) and diabetes in an urban Palestinian population**

Characteristic	Normal glucose tolerance Mean ± standard error	IGT Mean ± standard error	Diabetes Mean ± standard error
Females	*n* = 236	*n* = 21	*n* = 45
Age (years)	42.80 ± 0.65	49.90 ± 2.28[a]	54.07 ± 1.01[a]
BMI (kg/m²)	29.30 ± 0.36	33.70 ± 1.45[a]	33.70 ± 1.04[a]
Waist/hip ratio	0.81 ± 0.01	0.83 ± 0.01	0.85 ± 0.01[a]
Systolic BP (mmHg)	116.60 ± 1.19	133.90 ± 5.94[a]	135.90 ± 2.62[a]
Diastolic BP (mmHg)	75.60 ± 0.62	83.90 ± 2.66[a]	79.90 ± 1.51[a]
Cholesterol (mmol/L)	5.19 ± 0.12	5.28 ± 0.23	5.76 ± 0.29
HDL-C (mmol/L)	0.97 ± 0.02	1.01 ± 0.08	0.82 ± 0.05[a]
LDL-C (mmol/L)	3.60 ± 0.07	3.90 ± 0.26	3.87 ± 0.22
Triglycerides (mmol/L)	1.40 ± 0.09	1.51 ± 0.15	3.06 ± 0.60[a]
FCBG (mmol/L)	4.46 ± 0.06	5.15 ± 0.15[a]	8.70 ± 0.54[a]
Males	*n* = 168	*n* = 8	*n* = 14
Age (years)	41.90 ± 0.73	49.40 ± 4.09[b]	48.10 ± 2.00[b]
BMI (kg/m²)	27.06 ± 0.32	30.80 ± 2.19[b]	29.39 ± 1.29[b]
Waist/hip ratio	0.91 ± 0.01	0.97 ± 0.03[a]	0.97 ± 0.02[a]
Systolic BP (mmHg)	122.60 ± 1.33	135.10 ± 8.07[b]	135.30 ± 5.06[a]
Diastolic BP (mmHg)	79.20 ± 0.71	83.80 ± 3.75	84.70 ± 3.16[b]
Cholesterol (mmol/L)	4.91 ± 0.08	4.88 ± 0.48	6.89 ± 0.83[b]
HDL-C (mmol/L)	0.78 ± 0.02	0.92 ± 0.12	0.51 ± 0.09[a]
LDL-C (mmol/L)	3.53 ± 0.08	3.38 ± 0.39	4.41 ± 0.51
Triglycerides (mmol/L)	1.71 ± 0.11	2.57 ± 0.72	5.21 ± 2.11
FCBG (mmol/L)	4.01 ± 0.06	4.73 ± 0.36[b]	8.58 ± 1.21[a]

[a]*P = 0.05: the P-value was obtained using an independent t-test comparing with normal glucose tolerance.*
[b]*P < 0.01: the P-value was obtained using an independent t-test comparing with normal glucose tolerance.*
BMI = body mass index.
BP = blood pressure.
HDL-C = high-density lipoprotein cholesterol.
LDL-C = low-density lipoprotein cholesterol.
FCBG = fasting capillary blood glucose.

sity lipoprotein cholesterol (HDL-C) levels were significantly lower than those of normoglycaemic women. Women with IGT had significantly higher BMI and blood pressure (systolic and diastolic) compared to women with normal glucose tolerance.

Men with diabetes had significantly higher BMI, WHR, blood pressure (systolic and diastolic) and cholesterol levels compared to normoglycaemic men, and their HDL-C was significantly lower. Similarly, men with IGT had significantly higher BMI, WHR and systolic blood pressure.

After adjustment for age and sex, several factors were found to be significantly associated with an outcome of diabetes (Table 4). Among blood lipids, low and moderate levels of HDL-C as well as moderate and high levels of triglycerides were implicated. Anthropometric measurements (BMI and WHR) were also found to be significantly associated with diabetes after adjustment for age and sex, as were systolic blood pressure and positive family history of diabetes.

Age, sex, BMI, WHR and family history of diabetes were entered into a logistic regression model (Table 5). As expected, older age, obesity, upper body obesity (as measured by WHR) and positive family history were significantly associated with the condition.

The associations of HDL-C, triglycerides and systolic blood pressure with diabetes were also investigated in separate regression models (data not shown). The factors were entered in the model as tertiles. Each model also included age, sex, BMI and WHR. Low and moderate levels of triglycerides had significant protective effects (OR = 0.12; 95% CI: 0.04–0.37 and OR = 0.24; 95% CI: 0.12–0.51 respectively). Moderate and low levels of HDL-C were significantly associated with a higher risk of diabetes (OR = 2.90; 95% CI: 1.23–6.86 and OR = 3.12; 95% CI: 1.30–7.49 respectively). Finally, low systolic blood pressure was significantly associated with diabetes (OR = 0.18; 95% CI: 0.06–0.57).

Discussion

The community under study — a mixture of immigrants and indigenes — is situated in the heart of one of the most urban Palestinian cities. It compares favourably with other urban communities of the West Bank in terms of possession of household amenities, household density, average family size, access to public services (e.g. water, electricity), and the availability of modern health care facilities [*11,14*]. The age structure in this population is older, and the population slightly more educated [*14*]. Because of the homogenous conditions in Palestinian cities, the prevalence of diabetes is likely to be similar in other urban populations in the Palestinian West Bank.

In the present survey, the response was greater among women than among men. The lower response rate among men was, in part, due to their being at their places of work during the survey, especially those men who work outside the Old Ramallah area. Most of the women participating in the survey were housewives (79%). Non-participation due to work must, however, only be part of the explanation for the lower male participation rate, since the lowest response rate (30%) occurred, surprisingly, in the oldest age group (60–65 years). A sizable proportion of this community is made up of economic migrants, and it is possible that old men who are no longer economically active return to their home villages. In this case, those men should have been excluded from the census survey. However, the dynamic nature of this community and the fact that those older

Table 4 **Proportion of participants with diabetes, and sex- and age-adjusted odds ratios for selected factors associated with diabetes in an urban Palestinian population**

Variable	Participants with diabetes No.	%	Adjusted OR (95% CI)
Sex			
Male®	14	23.7	1.00
Female	45	76.3	1.93 (0.99–3.77)
Age group (years)			
50–65®	40	67.8	1.00
40–49	17	28.8	0.49 (0.26–0.93)
0–39	2	3.4	0.03 (0.01–0.11)
BMI (kg/m²)			
< 30®	18	30.5	1.00
≥ 30	41	69.5	2.63 (1.40–4.93)
Waist/hip ratio			
Low (≤ 0.81)®	9	15.3	1.00
Moderate (0.82–0.89)	23	39.0	2.78 (1.18–6.56)
High (≥ 0.90)	27	45.8	4.88 (1.92–12.40)
HDL-C (mmol/L)			
High (> 1.01)®	9	15.3	1.00
Moderate (> 0.72 to ≤ 1.01)	23	39.0	3.47 (1.48–8.18)
Low (≤ 0.72)	27	45.8	3.67 (1.58–8.52)
LDL-C (mmol/L)[a]			
Low (≤ 3.10)®	10	17.0	1.00
Moderate (> 3.10 to ≤ 4.10)	18	32.1	1.13 (0.47–2.71)
High (> 4.10)	28	50.0	1.50 (0.66–3.42)
Cholesterol (mmol/L)			
Low (≤ 4.59)®	8	13.6	1.00
Moderate (> 4.59 to ≤ 5.47)	21	35.6	1.59 (0.64–3.93)
High (> 5.47)	30	50.8	1.81 (0.75–4.35)
Triglycerides (mmoL)			
Low (≤ 1.07)®	4	6.8	1.00
Moderate (> 1.07 to ≤ 1.76)	13	22.0	2.58 (0.80–8.40)
High (> 1.76)	42	71.2	10.10 (3.39–30.10)
Systolic BP (mmHg)			
Low (≤ 110)®	4	6.8	1.00
Moderate (111–126)	17	28.8	4.34 (1.36–13.92)
High (≥ 127)	38	64.4	6.46 (2.11–19.79)
Diastolic BP (mmHg)			
Low (< 72)®	14	23.7	1.00
Moderate (73–80)	19	32.2	1.41 (0.65–3.10)
High (≥ 81)	26	44.1	1.56 (0.73–3.30)

Table 4 **Proportion of participants with diabetes, and sex- and age-adjusted odds ratios for selected factors associated with diabetes in an urban Palestinian population** *(concluded)*

Variable	Participants with diabetes No.	%	Adjusted OR (95% CI)
Family history of diabetes			
None®	23	39.0	1.00
Family history present	36	61.0	2.54 (1.39–4.64)
Smoking			
Non-smoker®	44	74.6	1.00
Smoker	15	25.4	0.83 (0.41–1.67)
Years of education[b]			
≥ 12®	35	60.3	1.00
7–11	17	29.3	3.43 (1.23–9.60)
≤ 6	6	10.3	2.24 (0.87–5.79)

[a]*Three cases missing.*
[b]*One case missing.*
OR = odds ratio.
CI = confidence interval.
® = reference group.
BMI = body mass index.
HDL-C = high-density lipoprotein cholesterol.
LDL-C = low-density lipoprotein cholesterol.
BP = blood pressure.

men are still considered by their families as heads of household regardless of their place of residence, pose a complication. Interpretation of prevalence results among older men should therefore be made with caution. Their absence from the survey might have reduced the overall prevalence of diabetes — a speculation supported by the finding that the highest number of people with diabetes in developing countries (including the Eastern Mediterranean Region), are in the 45–64-year-old age group [*15*]. Further, Table 1 shows that while the prevalence of previously diagnosed diabetes is approximately twice as high in women than men, survey diagnosed diabetes is almost equally prevalent between sexes. Since there are no cultural or social reasons to suspect an advantage for women in accessing health care services and being diagnosed [*16*], one could speculate that reported diabetes was higher in women due to the non-participation in the survey of older men already diagnosed with diabetes. In the survey conducted in the rural community, the prevalence of either previously diagnosed or survey diagnosed diabetes was not significantly different between sexes [*6*]. In addition, data from studies in the Eastern Mediterranean Region have shown an almost equal distribution of diabetes cases among males and females [*15*].

Reasons for non-response included time limitations as well as people's belief that they were healthy and not in need of testing. Some non-participants cited their proximity to health services and their access to them through medical insurance as reasons for non-response. To a lesser extent, fear of blood draw and the desire not to divulge any personal or family medical information were also reported as reasons for refusing participation.

The ratio of previously diagnosed to survey diagnosed diabetes was unexpect-

Table 5 **Logistic regression analysis, including selected independent variables bivariately significantly associated with diabetes, after controlling for age and sex in an urban Palestinian population**

Variable	Odds ratio	95% CI	*P*-value
Age (years)			
> 42	6.62	2.97–14.75	< 0.0100
≤ 42®	1.00		
Sex			
Female	3.57	1.56–8.16	0.0030
Male®	1.00		
BMI (kg/m²)			
≥ 30	2.04	1.06–3.90	0.0300
< 30®	1.00		
Waist/hip ratio			
High (≥ 0.90)	5.53	2.11–14.52	0.0005
Moderate (0.82–0.89)	2.88	1.21–6.88	0.0200
Low (≤ 0.81)®	1.00		
Family history of diabetes			
Yes	2.42	1.30–4.51	0.0050
No®	1.00		

CI = confidence interval.
® = reference group.
BMI = body mass index.

edly high. Alwan reported that various diabetes surveys from the Eastern Mediterranean Region have consistently found low detection rates [*2*]. In this community, access to health services appears to be high, as does awareness and vigilance with regard to diabetes symptoms. The results in this community concur with those in the rural community, where the diagnosis rate was also high [*6*].

The majority of previously diagnosed people using medication reported using oral hypoglycaemic agents. However, 13 out of the 23 (57%) had FCBG > 7.8 mmol/L. Even more disturbing is the finding that of the 5 participants with diabetes using insulin, 4 had FCBG > 7.8 mmol/L. The reasons behind this poor control could not be identified by this survey, but it might indicate poor compliance with treatment or inadequate patient education.

Prospective studies have shown that there is an increased risk of developing diabetes in obese subjects [*17*]. In this population, obesity, as measured by BMI, was found to be prevalent. Among normoglycaemic women, the average BMI was 29.3 ± 0.36 kg/m². The prevalence of obesity will have an impact on the future risk of women developing diabetes.

Since most of the participants with diabetes were already diagnosed, the potential bias in recall of relatives with diabetes was considered. A comparison between persons with known diabetes and persons diagnosed with diabetes during the survey showed no significant differences in the prevalence of reporting a family history of diabetes. Bias due to diagnosis status was also considered for modifiable factors such as weight and smoking, especially since the average time from initial diagnosis was approximately 6 years for both men and women. A comparison between participants with previously diagnosed diabetes and those diagnosed during the survey showed no significant differences in smoking habits, weight, BMI and WHR. Due to the limitations of the survey design, however, it was not possible to determine whether the participants with previously diagnosed diabetes had already changed their habits since their diagnosis, so that the current observed characteristics were, in fact, a result of those past changes.

The findings of this study point to a high prevalence of diabetes in this urban Palestinian West Bank community as well as a high diagnosis level. Further, elements of the metabolic syndrome, such as high triglycerides, hypertension and obesity are prevalent. In particular, obesity, high triglyceride levels, older age and a positive family history of diabetes were found to be significantly and independently associated with diabetes. In a rapidly urbanizing population, targeting the modifiable risk factors should be an important goal of health education both in the general population and in high-risk groups.

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Note from the Editor

We wish to inform our readers that the next issue (Volume 7 No. 3) of the EMHJ will be a special issue on the subject of Mental Health.