Diabetes in the Middle East: *Challenges for the Clinician*

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Outlines

- Global Burden of Diabetes Mellitus
- Efficacy and Safety of Gliclazide MR in a Lebanese Population
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  - Rationale of the Study
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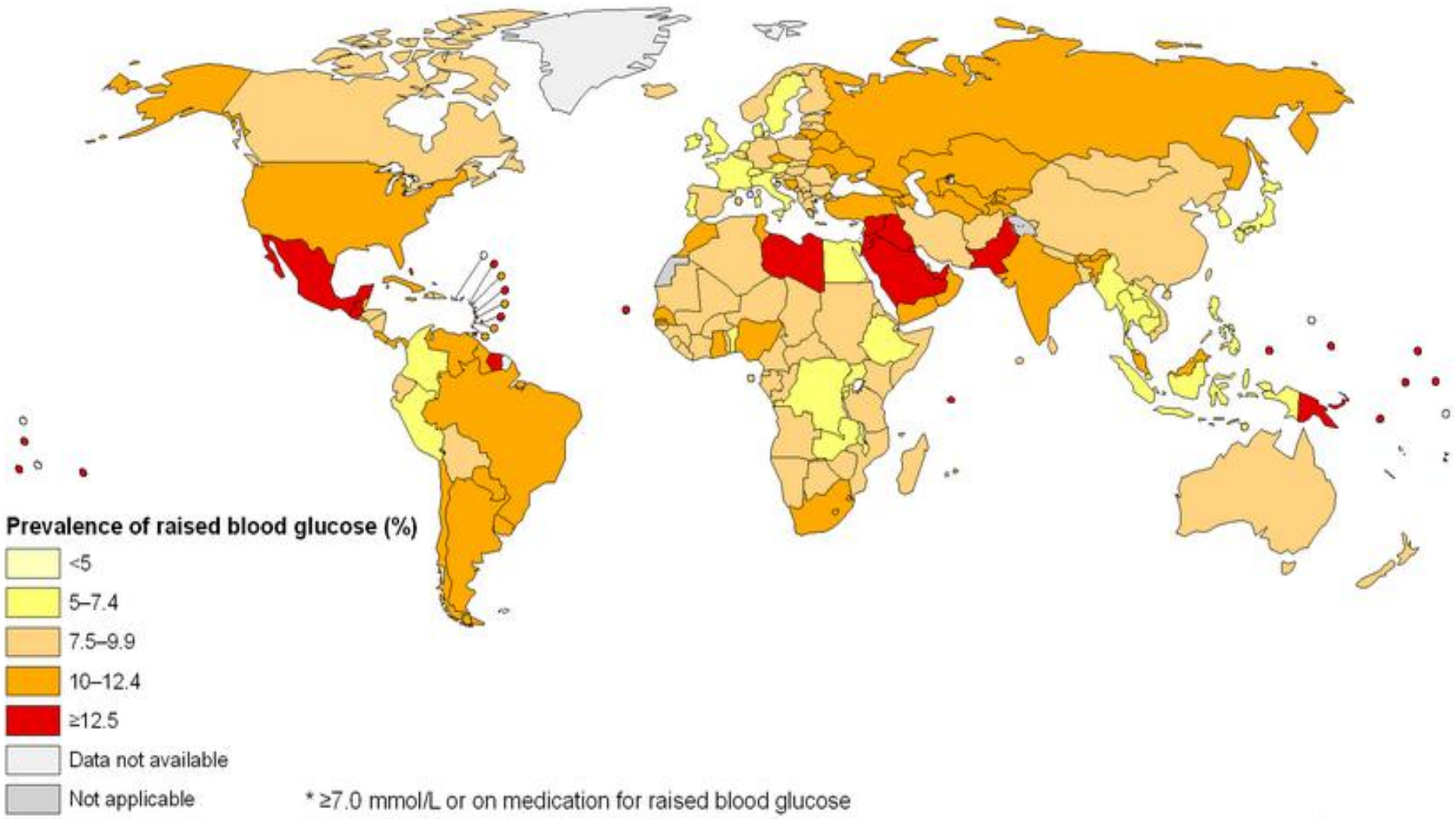
Global Burden of Diabetes Mellitus

- Non Communicable Diseases, *such as heart disease, stroke, cancer, chronic respiratory diseases and diabetes*, are the leading cause of mortality in the world.
- 346 million people have diabetes mellitus in 2008, to reach 600 million in 20 years. *(WHO 2008,IDF 2010)*
- Diabetes kills one person every seven seconds and 4.6 million adults yearly.
- It leads to $ 456 billion in annual health-care spending.

Prevalence of raised fasting blood glucose*, ages 25+, age standardized
Both sexes, 2008



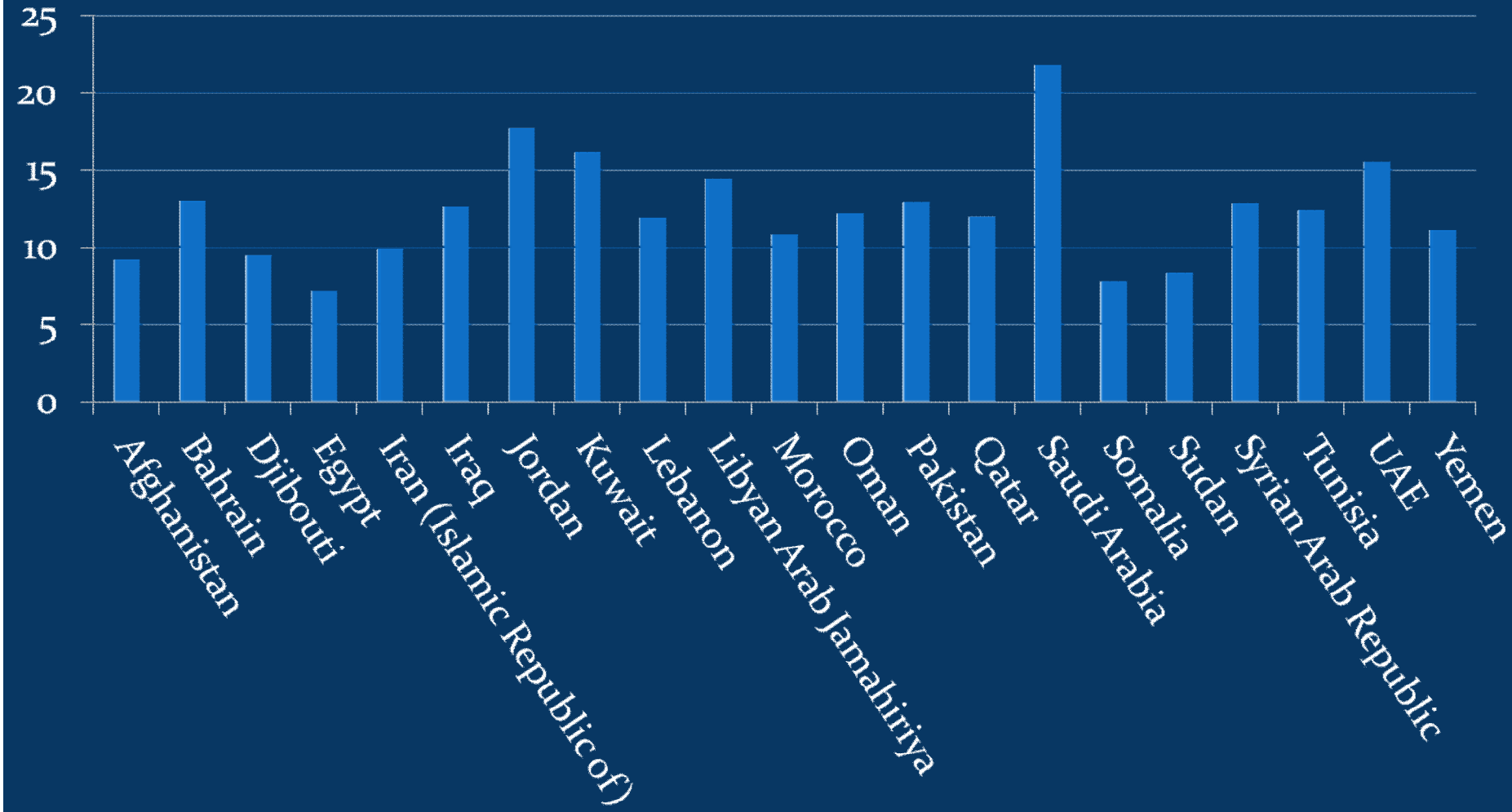
Data Source: World Health Organization
Map Production: Public Health Information and Geographic Information Systems (GIS)
World Health Organization

World Health Organization

Prevalence* (%) estimates of diabetes (20-79 years) by region, 2010 and 2030

IDF Diabetes Atlas, 4th ed. © International Diabetes Federation, 2009

Raised fasting Blood Sugar , 2008/WHO



Top 10: Prevalence (%) for diabetes (20-79), 2010-2030

	COUNTRY/TERRITORY	2010 PREVALENCE (%)		COUNTRY/TERRITORY	2030 PREVALENCE (%)
1	Nauru	30.9	1	Nauru	33.4
2	United Arab Emirates	18.7	2	United Arab Emirates	21.4
3	Saudi Arabia	16.8	3	Mauritius	19.8
4	Mauritius	16.2	4	Saudi Arabia	18.9
5	Bahrain	15.4	5	Réunion	18.1
6	Réunion	15.3	6	Bahrain	17.3
7	Kuwait	14.6	7	Kuwait	16.9
8	Oman	13.4	8	Tonga	15.7
9	Tonga	13.4	9	Oman	14.9
10	Malaysia	11.6	10	Malaysia	13.8

Includes only countries/territories where surveys with glucose testing were undertaken for that country/territory

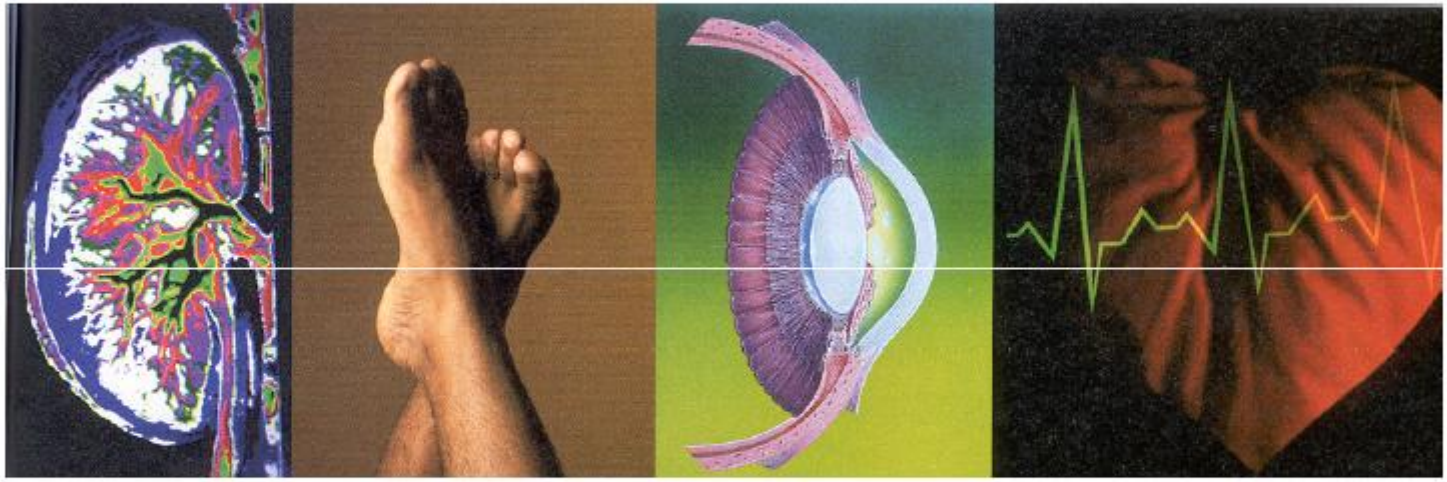
* comparative prevalence

Top 10: number of people with diabetes (20-79),2010-2030

COUNTRY/TERRITORY	2010 MILLIONS	COUNTRY/TERRITORY	2030 MILLIONS
1 India	50.8	1 India	87.0
2 China	43.2	2 China	62.6
3 United States of America	26.8	3 United States of America	36.0
4 Russian Federation	9.6	4 Pakistan	13.8
5 Brazil	7.6	5 Brazil	12.7
6 Germany	7.5	6 Indonesia	12.0
7 Pakistan	7.1	7 Mexico	11.9
8 Japan	7.1	8 Bangladesh	10.4
9 Indonesia	7.0	9 Russian Federation	10.3
10 Mexico	6.8	10 Egypt	8.6

Chronic Complications of Diabetes

Due to microvascular and macrovascular disease:



Nephropathy	Neuropathy and peripheral vascular disease	Retinopathy	Cardiovascular and Cerebrovascular disease

Prevalence of complications

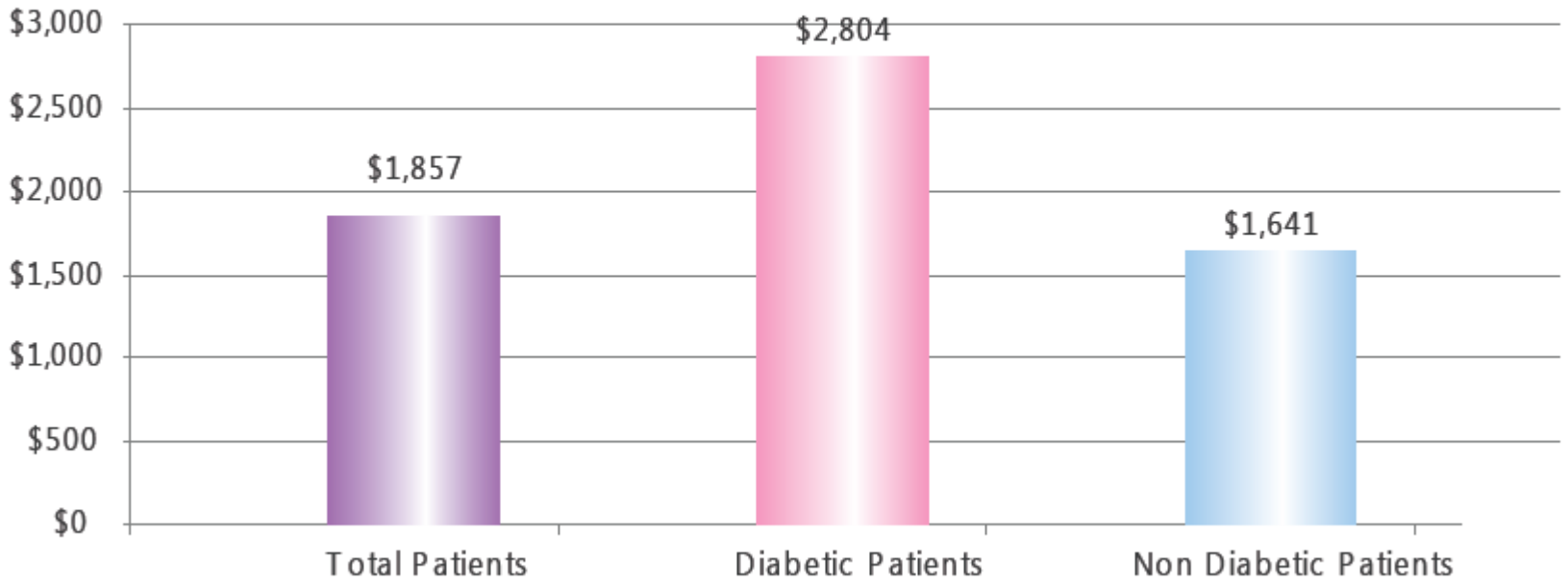
Complications	Lebanon [1]	Saudi Arabia [2]	UAE [3]	NHANES [4]
Retinopathy	33%	31%	54.2%	18.9%
Nephropathy	46.3%	41.3%	40.8%	27.8%
Peripheral neuropathy	39.9%	82%	34.7%	-
Peripheral PVD	18.3%	61%	11.1%	22.9%
Coronary artery disease	19.3%	-	10.5%	9.1%

[1] Taleb et al. Vascular complications of diabetes in Lebanon: experience at the American University of Beirut. Br J Diabetes Vasc Dis 2008;8:80-3.

2Elhadd et al. Epidemiology, Clinical and Complications profile of Diabetes in Saudi Arabia: a review. Ann Saudi Med 2007; 27(4):241-250.

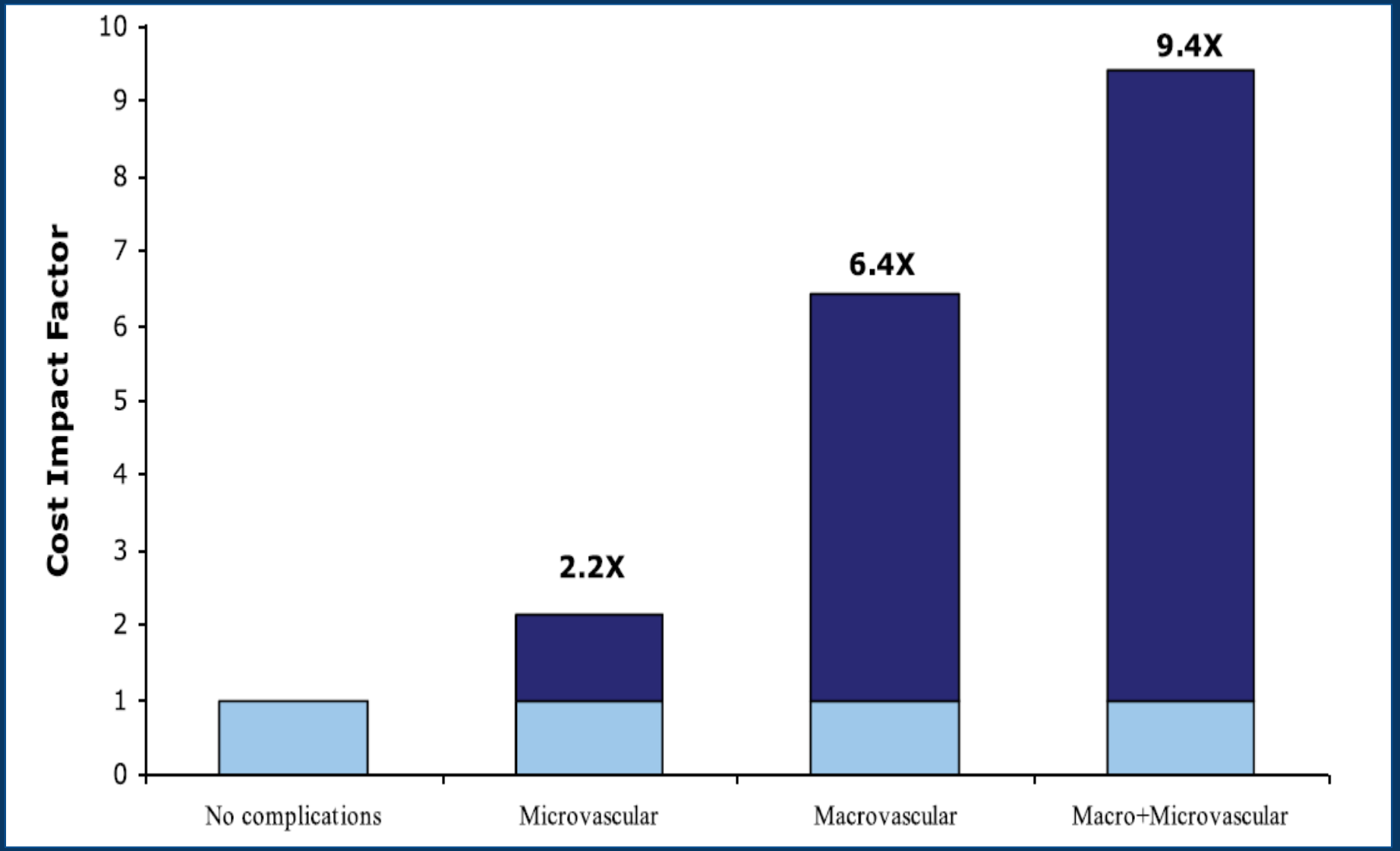
3 Saadi et al. prevalence of diabetes and its complications in a population-based sample in al-Ain, UAE. Diabetes Research and Clinical Practice 78 (2007) 369–377.

Economic burden of Diabetes Complications in Lebanon



Echtay et al. Poster 73.PACED 2011,Beirut-Lebanon

Effect of DM complications on the Average cost per patient in the UAE in 2004



Al-Maskari et al. BMC Publlic Health 2010;10:679.

Background

- Type 2 diabetes mellitus (type 2 DM) is characterized by resistance to the action of insulin and progressive beta-cell loss leading to relative insulin deficiency.
- It accounts for at least 90% of all cases of diabetes.
- Insulin is a key hormone regulating glucose metabolism.
- Gliclazide , a insulin-secreting agent, has demonstrated efficacy in elderly patients.

Rationale of the study

- To asses the efficacy and acceptability of once-daily gliclazide 30 mg with diet, or in combination with diet and other anti-diabetic agents, in type 2 diabetic patients, 25 to 65 years old.
- Open-label , prospective study

Study design

- Inclusion criteria
  - Male or female
  - Outpatients with known type 2 diabetes≥7% (ADA or WHO criteria)
  - Patients giving informed consent for the active treatment phase
  - 25 years ≤ age ≥ 65 years
  - Treatment with at least 3 months with diet alone or diet plus oral antidiabetic drug and/or insulin

Study design

- Exclusion criteria
  - Type 1 diabetes or history of ketoacidosis
  - A known contraindication to gliclazide
  - A known allergy to sulfonylurea, sulfonamide or any excipient of gliclazide modified release
  - Severe renal insufficiency : creatinine clearance < 20 ml/min
  - Hepatic insufficiency: AST or ALT > 3 times the upper normal range
  - FPG > 400 mg/dl
  - Age 66 years and above
  - Concurrent treatment with a Sulphonylurea (free or present in combination), or a glinide
  - Pregnancy or lactation

Study design

- Treatment strategy
  - Ambulatory type 2 diabetic patients attending diabetes clinics who meets the inclusion criteria for the study will be provided with a patient information sheet and asked to sign an informed consent.
  - Patients will be allocated to treatment based on their current antidiabetic therapy, as follows:

Previous Therapy	Treatment Allocation
Diet-alone	Diet+ 2 tabs once-daily Gliclazide 30 mg
Diet+ Oral antidiabetic drug(except classic Gliclazide 80 mg tablets, other insulin secretagogue)+/_ insulin	Adjust treatment if needed and Add to treatment 2 tabs once-daily Gliclazide 30 mg

Results

- A total of 2514 patients with type 2 diabetes met the inclusion criteria.
  - DIAMOND 1: 919 patients, recruited by Endocrinologists.
  - DIAMOND 2: 1049 patients, recruited by internists, general practionners, cardiologists and other specialties
  - DIAMOND 3: 546 patients, recruited by Endocrinologists.

Per specialty

- Specialties:
  - Endocrinologists: 133
  - Cardiologists: 69
  - Others: 80
  - UNK: 12
- Date of first visit : 2nd of May 2006
- Date of last visit: 13th of January 2009.
- Study duration: 14 weeks ± 3.6 weeks(2-37).

Baseline Characteristics

Criteria	Result
Age -*years*	53.8 ± 7.5
Gender % male % female	 55.4 % 44.6 %
BMI (Kg/m^2)	29.1 ± 4.52
Blood pressure (mmHg) Systolic Diastolic	 137 ± 17 83 ± 9.7
Hba1c (%)	8.8 ± 1.4
FPG (mg/dl) at selection	199 ± 53
Time since diagnosis 0-4 years 5-9 years 10-14 years 15-19 years 20 + years	 61% 28 % 9% 1.5 % 0.8 %

Criteria	Result
Micro-Macro vascular Complications § Angina Pectoris §Myocardial Infarction §Stroke §Peripheral vascular disease §Diabetic nephropathy §Retinopathy	 18 % 9 % 5 % 16 % 11 % 14 %
Currently treated for Diabetes *SMBG*	70 % *43%*
Current antidiabetic treatment •Diet alone •Metformin •Alpha –glucosidase inhibitor •Glitazone •Insulin •Others	 8 % 77 % 8% 16 % 5 % 12%
Prescribed Gliclazide at selection visit	99.8%

Results

- 80.4% and 15.5% of patients were prescribed 2 and 3 tablets of Gliclazide, respectively on selection visit.
- At the final visit, 59.2% are still taking 2 tabs and 27.6% are being treated with 3 tablets.
- 12.4 % required 4 tablets for BG control.
- No significant difference noted between specialty groups.
- No serious adverse events were noted.

Metabolic Control

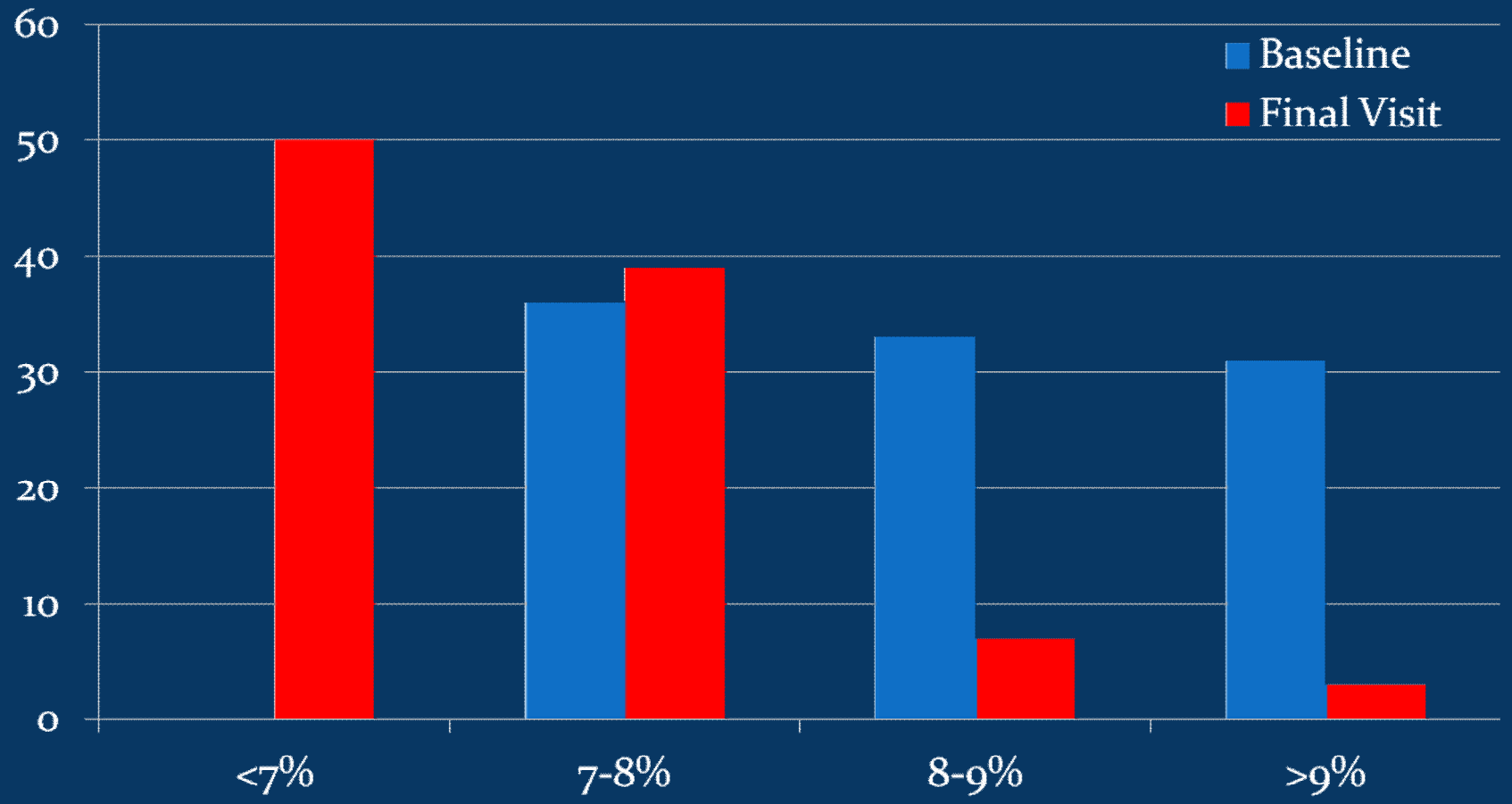
		Baseline Visit		Final Visit	
	Specialty of MD	N	Mean ± SD	Mean ± SD	*P* value
HbA1c	Endocrinologist	1347	9.1 ±1.5	7.1± 0.9	<0.001
	All other	1123	8.6 ± 1.3	6.8± 0.8	<0.001
	Total	2470	8.9 ±1.5	7 ± 0.8	<0.001
FPG	Endocrinologist	1337	204 ± 54	123 ± 32	<0.001
	All Other	1107	193 ± 51	119 ± 26	<0.001
	Total	2444	199 ± 53	121 ± 29	<0.001

Efficacy of Diamicron MR

	n	Mean Diff in HbA1c	95% CI
One tablet	19	1.9 ± 2.0	0.9- 2.9
2 tablets	1398	1.7 ± 1.2	1.6- 1.7
3 tablets	655	1.9 ± 1.2	1.8- 2.0
4 tablets	297	2.00± 1.4	1.8- 2.1
Total	2369	1.8 ± 1.2	1.7- 1.8

There was a further significant drop in HbA1c when giving 3 tablets versus 2 tablets and when giving 4 tablets versus 2 tablets. *P<0.001*
But no significant drop between 3 and 4 tablets.

Achieved HbA1c



P<0.001 for all Hba1c intervals.

Discussion

- Again, Gliclazide MR has demonstrated efficacy and tolerability in a group of type 2 diabetic young Lebanese patients.
- The DIAMOND study population reflects the reality of our daily practice: young, mostly male patients, obese, with comorbidites; uncontrolled on diet and metformin alone.

Limitations

- No placebo (cannot make conclusions comparing to other drugs, cannot rule out placebo effect totally)
- Open label, there may be selection bias.
- Heterogeneity of lab results.
- One can make some assumptions regarding the above because of large study, and compatible with prior results.
- Study's strength is its large sample size, from all over Lebanon.

Conclusion: Perspectives for the future

- Primary Prevention and screening programs to identify high risk patients
- Expansion of diabetes care delivery and handling of complications with better treatment strategies
- Further studies are required to evaluate the nature of diabetes mellitus in the Lebanese population