Factors Associated With HbA1c Levels In Type 2 Diabetic Patients In Negeri Sembilan and Pahang

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Introduction

- Diabetes mellitus is becoming a serious epidemic, especially in the low and middle-income countries   (IDF Diabetes Atlas 4th edn.,2009)

- The prevalence is increasing rapidly worldwide including in Malaysia :
    - NHMS I (1986)   =   6.3%
    - NHMS II (1996)   =   8.3%
    - NHMS III (2006)   =   14.9%

          (Zanariah et al., 2006)

Introduction – cont.

- Diabetes mellitus

  – a major cause of morbidity and mortality

  – the leading cause of blindness, renal failure and limb amputations

  – One of the leading cause of death through cardiovascular complications

  (IDF Diabetes Atlas 3rd edn., 2006)

Objective of the study

To determine the factors associated with HbA1c levels in type 2 diabetic patients
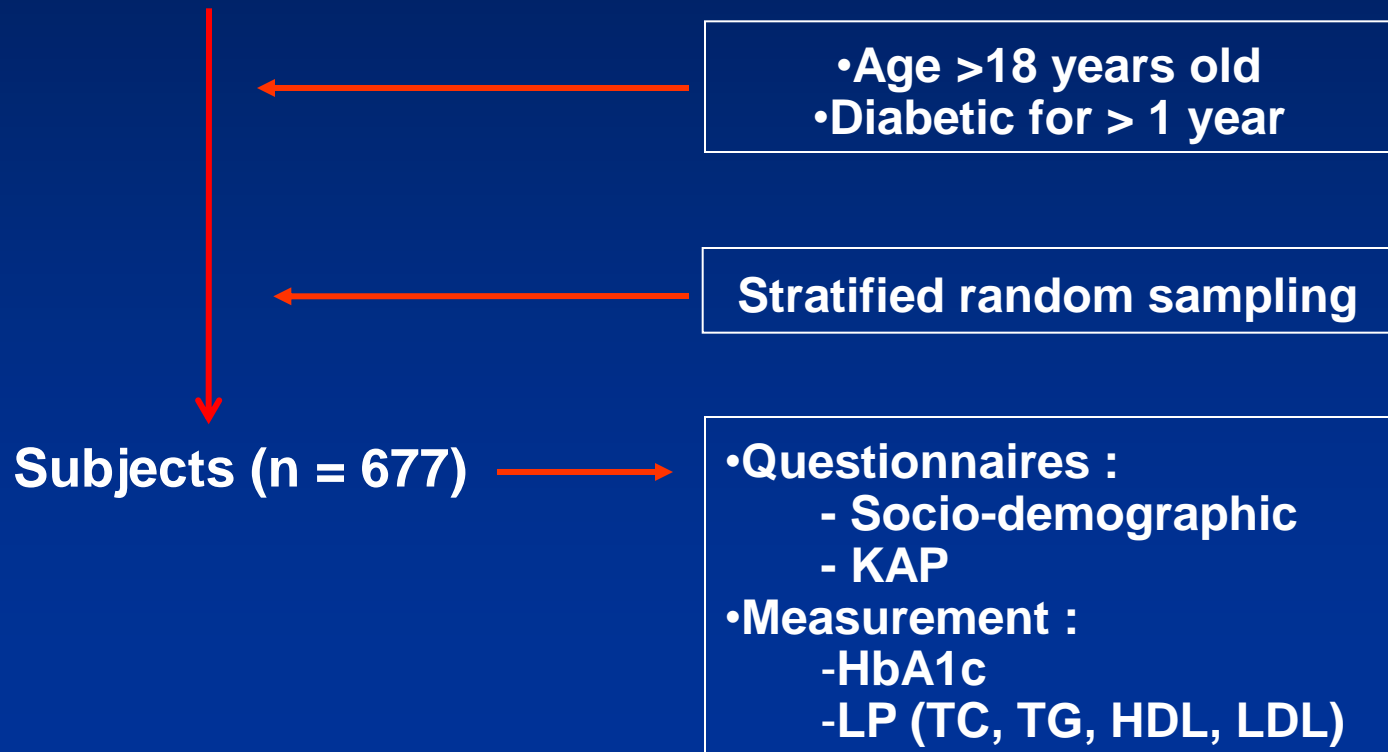
Rationale of the study

- Diabetes mellitus caused large economic burden on the healthcare system of a country → 11.6% of the total healthcare expenditure in the world in 2010   (IDF Diabetes Atlas 4th edn., 2009)

- Finding common factors associated with diabetic control can give us better idea in managing our diabetic patients
  → prevent complications
  → reduced financial implication

Research Methodology

Cross-sectional study

Type 2 Diabetic Patients from selected health centres in Pahang and Negeri Sembilan

•Age >18 years old
•Diabetic for > 1 year

Stratified random sampling

Subjects (n = 677)

•Questionnaires :
    - Socio-demographic
    - KAP
•Measurement :
    -HbA1c
    -LP (TC, TG, HDL, LDL)

Results

Factors associated with HbA$_{1c}$ levels by MLR*

	b coefficient (95% CI[a] of β)	t-statistic (df[b])	p-value
Age (years)	-0.051 (-0.067, -0.035)	-6.28 (661)	< 0.001
Duration of diabetes (years)	0.090 (0.063, 0.118)	6.45 (661)	< 0.001
Total cholesterol (mmol/L)	0.174 (0.070, 0.277)	3.30 (661)	0.001
Educational level			
No formal education	0.000		
1°education	-0.643 (-1.148, -0.138)	-2.50 (661)	0.013
2° and 3° education	-0.699 (-1.252, -0.145)	-2.48 (661)	0.013
Type of clinic			
With FMS[c]	0.000		
With Medical Officer (MO)	-0.011 (-0.388, 0.366)	-0.06 (661)	0.955
With Assistant MO only	0.690 (0.309, 1.072)	3.55 (661)	< 0.001

* MLR = Multiple Linear Regression   [a] CI = confidence interval
[b] df = degree of freedom   [c] FMS = Family Medicine Specialist

Comparison with other studies

Associated factors	Azlina et al (2011)	Similar findings	No Association	Reverse findings
Older age	Lower HbA1c	Eid et al (2003) Nichols et al (2000)	Rahman et al (2008) Suhaiza et al (2004)	-
Longer duration	Higher HbA1c	Eid et al (2003) Blaum et al (1997)	Rahman et al (2008) Suhaiza et al (2004)	Nichols et al (2000)
Higher TC	Higher HbA1c	Ferrannini et al. (1992)	Rahman et al (2008)	-
Higher education level	Lower HbA1c	Rahman et al (2008) Hawthorn & Tomlinson (1999)	Blaum et al (1997)	-
Clinic without specialist	Higher HbA1c	Rahman et al (2008) Zgibor et al (2000, 2002*)	Greenfield et al (1995)*	-

Conclusions

- Higher levels of HbA1c were associated with
  - longer duration of having diabetes
  - higher total cholesterol levels
  - receiving care in health clinics without resident FMS or MO
- Lower levels of HbA1c were associated with
  - having had formal education
  - older patient

Limitations

- Causal relationship cannot be established due to cross-sectional study design

- Generalizability to other health clinics must be done with caution

Recommendations

- Diabetic patients education must be individualized :
  - ➤ age
  - ➤ duration of having diabetes
  - ➤ education level
- Better referral system to specialist
- Training to Assistant Medical Officer

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