

UNIVERSITI PUTRA MALAYSIA

FACTORS ASSOCIATED WITH CARDIOVASCULAR DISEASE IN PATIENTS WITH TYPE 2 DIABETES MELLITUS

TAN MUN CHIENG

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Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia, in Fulfilment of the Requirements for the Degree of Master of Science

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Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirement for the degree of Master of Science

FACTORS ASSOCIATED WITH CARDIOVASCULAR DISEASE IN PATIENTS WITH TYPE 2 DIABETES MELLITUS

By

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February 2013

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Cardiovascular disease (CVD) is the leading cause of death in patients with type 2 diabetes mellitus (T2DM). Although patients with T2DM and CVD share common risk factors, the link between these diseases remains largely unexplained. Thus, this study aims to identify the determinants of CVD in T2DM patients. This study involved 313 patients aged 30 to 78 diagnosed with T2DM at two Malaysian government hospitals. Systematic random sampling method was applied in patient selection. Socio-demographic data was assessed using a pre-tested interviewer-administered structured questionnaire. Anthropometric measurements were performed according to standard procedures. Clinical and laboratory characteristics on cardiovascular risk factors [medical history, treatments, blood pressure, fasting plasma glucose, glycated haemoglobin (HbA_{1C}), and lipid profile] were collected from patients' medical records, clinical examination and face-to-face interview. Dietary assessment (by means of a 24 h dietary recall), physical activity level [via



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International Physical Activity Questionnaire (IPAQ)], smoking and alcohol consumption habits were ascertained.

A positive response rate of 100% was achieved. The mean age of study subjects was 55.7 ± 9.2 years, with a mean duration of diabetes of 10.1 ± 8.1 years; 52.1% subjects were females; and majority were Malays (47.0%). Approximately one third (36.1%, n=113) of the subjects were suffering from CVD. High prevalence of established coronary artery disease (30.7%), cerebrovascular disease (10.2%) and peripheral vascular disease (5.1%) were identified. There are significant relationships between CVD and non-CVD patients in the age, DM duration, gender, ethnicity, education, employment, personal and household monthly income, WHR, HDL-C level, triglycerides, hypertension, dyslipidaemia, nutrient intakes (calories, carbohydrate, protein, and total fat), physical activity level, smoking status and alcohol consumption as indicated by bivariate analysis (p<0.05).

Binary logistic regression using forward stepwise method showed age (B=0.056, adjusted $OR_{95\% CI} = 1.058$ [1.018-1.099]; *p*=0.004), lower HDL-C level (B=-1.466, adjusted $OR_{95\% CI} = 0.231$ [0.087-0.613]; *p*=0.003), working status of self-employed (B=1.381, adjusted $OR_{95\% CI} = 3.978$ [1.626-9.733]; *p*=0.002), high (B=-1.114, adjusted $OR_{95\% CI} = 0.328$ [0.172-0.626]; *p*=0.001) compared to low physical activity level were significantly associated with higher CVD risk, upon adjustment for potential covariates.

In conclusion, increased age, lower HDL-C, low physical activity level, and working status appeared to be related with CVD among the T2DM patients studied. Therefore,

the importance of secondary and tertiary preventions to minimise the potential deterioration of metabolic control and quality of life accompanied CVD coexisted T2DM should be highly emphasized.



Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Master Sains

FAKTOR BERKAITAN DENGAN PENYAKIT KARDIOVASKULAR DALAM KALANGAN PESAKIT DENGAN DIABETES MELLITUS JENIS 2

Oleh

TAN MUN CHIENG

Februari 2013

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Penyakit kardiovaskular (CVD) ialah punca utama kematian dalam kalangan pesakit dengan diabetes mellitus jenis 2 (T2DM). Walaupun pesakit T2DM dan CVD berkongsi faktor risiko yang sama, hubungan antara penyakit ini sebahagian besarnya masih tidak dapat dijelaskan. Oleh itu, kajian ini bertujuan untuk mengenalpasti penentu CVD dalam kalangan pesakit T2DM. Penyelidikan ini melibatkan 313 orang pesakit yang berumur 30-78 tahun yang didiagnosis menghidap T2DM di dua buah hospital kerajaan Malaysia. Kaedah persampelan rawak sistematik telah digunakan dalam pemilihan pesakit. Data sosio-demografi dikumpul melalui soal selidik berstruktur menemubual yang telah diuji. Ukuran antropometri telah dilaksanakan mengikut prosedur piawai. Ciri faktor risiko kardiovaskular klinikal dan makmal [sejarah perubatan, rawatan, tekanan darah, glukosa plasma, hemoglobin bergliserin (HbA_{1C}), dan profil lipid] dikumpul dari rekod perubatan pesakit, pemeriksaan klinikal dan temubual bersemuka. Penilaian diet (melalui pengingatan diet 24 jam), tahap aktiviti fizikal [melalui Soal Selidik

Aktiviti Fizikal Antarabangsa (IPAQ)], tabiat merokok dan pengambilan alkohol ditentukan.

Kadar respons positif 100% telah dicapai. Purata umur subjek kajian adalah 55.7 \pm 9.2 tahun dengan purata tempoh diabetes 10.1 \pm 8.1 tahun; 52.1% subjek ialah perempuan; dan majoriti ialah orang Melayu (47.0%). Kira-kira satu pertiga (36.1%, n=113) subjek kajian telah menderita CVD. Prevalens penyakit arteri koronari (30.7%), penyakit serebrovaskular (10.2%) dan penyakit vaskular periferal (5.1%) yang tinggi telah dikenalpasti. Terdapat hubungan yang signifikan antara pesakit CVD dan bukan CVD dalam peningkatan umur, tempoh DM, jantina, etnik, tahap pendidikan, status pekerjaan, peribadi dan pendapatan isi rumah bulanan, WHR, tahap lipoprotein berdensiti tinggi (HDL-C), trigliserida, hypertensi, dyslipidaemia, pengambilan nutrien (kalori, karbohidrat, protein, dan lemak), tahap aktiviti fizikal, tabiat merokok dan pengambilan alkohol seperti yang ditunjukkan oleh analisis bivariat (p<0.05).

Regresi logistik binari menggunakan kaedah ke hadapan langkah demi langkah menunjukkan umur (B=0.056, $OR_{95\% CI}$ terlaras=1.058 [1.018-1.099]; *p*=0.004), tahap HDL-C yang lebih rendah (B=-1.466, $OR_{95\% CI}$ terlaras=0.231 [0.087-0.613]; *p*=0.003), status pekerjaan bekerja sendiri (B=1.381, $OR_{95\% CI}$ terlaras=3.978 [1.626-9.733]; *p*=0.002), tahap aktiviti fizikal yang tinggi (B=-1.114, $OR_{95\% CI}$ terlaras=0.328 [0.172-0.626]; *p*=0.001) berbanding dengan tahap aktiviti fizikal yang rendah berkaitan dengan risiko CVD yang lebih tinggi secara signifikan, selepas pelarasan untuk kovariat yang berpotensi.

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Kesimpulannya, peningkatan umur yang tinggi, HDL-C yang rendah, tahap aktiviti fizikal rendah, dan status pekerjaan berkait rapat dengan CVD dalam kalangan pesakit T2DM yang dikaji. Oleh itu, kepentingan pencegahan sekunder dan tertier untuk mengurangkan potensi kemerosotan kawalan metabolik dan kualiti hidup disertai CVD wujud bersama T2DM harus dititikberatkan.



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I certify that a Thesis Examination Committee has met on **21 February 2013** to conduct the final examination of **Tan Mun Chieng** on her thesis entitled "**Factors associated with cardiovascular disease in patients with type 2 diabetes mellitus**" in accordance with the Universities and University Colleges Act 1971 and the Constitution of the Universiti Putra Malaysia [P.U.(A) 106] 15 March 1998. The Committee recommends that the student be awarded the Master of Science.

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DECLARATION

I declare that the thesis is my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously, and is not concurrently, submitted for any other degree at Universiti Putra Malaysia or at any other institution.



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