

**KESAN PREBIOTIK KE ATAS PROFIL DARAH
INDIVIDU DENGAN PARAS KOLESTEROL
TINGGI**

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UNIVERSITI MALAYSIA SABAH

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UNIVERSITI MALAYSIA SABAH
2015**



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TITUL: KESAN PREBIOTIK KE ATAS PROFIL DARAH INDIVIDU DENGAN
PARAS KOLESTEROL TINGGI

IJAZAH: IJAZAH SARJANA MUDA SAINS MAKANAN DENGAN KEPUJIAN (SAINS
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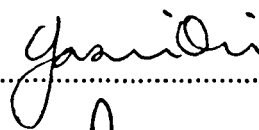
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INDIVIDU DENGAN PARAS KOLESTEROL
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IJAZAH : **SARJANA MUDA SAINS MAKANAN DENGAN
KEPUJIAN (SAINS MAKANAN DAN
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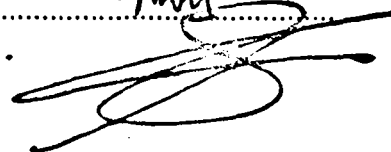
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PENGHARGAAN

Terlebih dahulu, saya amat bersyukur kerana saya dapat menyempurnakan projek penyelidikan ini dengan penuh jayanya dan dapat menghadapi segala pencabaran dengan sekukuhnya. Cadangan, motivasi, bantuan dan kritikan yang diberi merupakan faktor yang membantu saya menyempurnakan projek penyelidikan ini.

Pertama sekali, saya ingin merakamkan setinggi-tinggi penghargaan dan ucapan terima kasih kepada penyelia projek penyelidikan saya, Dr. Yasmin Ooi Beng Houi yang telah banyak memberi tunjuk ajar, cadangan, sokongan, motivasi, bimbingan dan nasihat sepanjang projek penyelidikan ini dijalankan. Segala jasa dan bimbingan beliau amat saya hargai dan berterima kasih.

Saya juga ingin merakamkan penghargaan dan mengucapkan terima kasih kepada Dr. Sophie Van Aerde, Dr. Freddie Robinson dan kakitangan Poliklinik UMS, King Fisher yang banyak memberikan bantuan dan nasihat kepada saya sepanjang projek penyelidikan ini dijalankan.

Seterusnya, penghargaan ini juga ditujukan kepada seorang rakan projek penyelidikan ini iaitu Maryam syahidah Azalan yang banyak memberikan penolongannya, motivasi, meluangkan masa untuk perbincangan dan bersama-sama menyelesaikan masalah yang telah kami hadapi sepanjang projek penyelidikan ini dijalankan.

Akhir sekali, tidak lupa juga saya menggunakan kesempatan ini untuk mengucapkan terima kasih kepada para subjek kajian yang sudi mengambil bahagian, meluangkan masa dan memberi kerjasama untuk melancarkan projek penyelidikan ini. Sekian, terima kasih.

KEE WEE BOON

26 MEI 2015

ABSTRAK

KESAN PREBIOTIK KE ATAS PROFIL DARAH INDIVIDU DENGAN PARAS KOLESTEROL TINGGI

Hiperkolesterolemia didefinisikan sebagai paras kolesterol plasma yang terlalu tinggi dan muncul sebagai faktor risiko yang kuat untuk penyakit kardiovaskular (CVD). Objektif kajian ini adalah untuk mengkaji keberkesanan pengambilan prebiotik dalam menurunkan paras kolesterol yang tinggi dan menambahbaik profil lipid darah individu hiperkolesterolemik. Reka bentuk kajian iaitu percubaan terkawal dengan reka bentuk faktoran (*Controlled Trial with Factorial Design*) telah digunakan. Seramai 15 orang dewasa yang memenuhi kriteria pengambilan dan berminat iaitu berumur dengan min \pm sisihan piawaian 34 ± 9.7 tahun, berat badan pada min \pm sisihan piawaian 69.6 ± 16.3 kg, paras jumlah kolesterol, trigliserida, *High Density Lipoprotein*, *Low Density Lipoprotein* dan paras glukosa darah ketika berpuasa adalah pada min \pm sisihan piawaian 5.67 ± 0.40 mmol/L, 0.95 ± 0.68 mmol/L, 1.54 ± 0.40 mmol/L, 3.58 ± 0.56 mmol/L dan 5.28 ± 0.36 mmol/L masing-masing telah terlibat dalam kajian ini yang dijalankan di Poliklinik UMS, *KingFisher*. Kajian ini mengambil masa selama lapan minggu tempoh rawatan dan empat minggu tempoh susulan. Indeks Jisim Tubuh Badan (IJT) mempunyai kolerasi negatif yang kuat secara ketara dengan *High Density Lipoprotein* (HDL) pada permulaan kajian, $r_s = -0.717$, $p = 0.0039$ (Kolerasi *Spearman*). Profil lipid darah subjek yang diberikan prebiotik telah menambahbaik iaitu jumlah kolesterol menurun sebanyak 15.52 % daripada 5.5 mmol/L kepada 4.9 mmol/L, paras trigliserida menurun sebanyak 38.56 % daripada 1.3 mmol/L kepada 0.8 mmol/L, paras *Low Density Lipoprotein* dan *High Density Lipoprotein* telah menurun sebanyak 20.25 % dan meningkat sebanyak 6.4 % iaitu daripada 3.95 mmol/L kepada 3.15 mmol/L dan 1.25 mmol/L kepada 1.33 mmol/L masing-masing. Prebiotik memberikan kesan ketidakselesaan iaitu perut rasa tidak selesa, kembung dan kentut dari tahap sederhana hingga sedikit teruk. Kesimpulannya, prebiotik yang diberikan kepada subjek selama lapan minggu telah membawa kesan hipokolesterolemik terhadap profil lipid darah. Amalan pemakanan ini adalah sesuai untuk diamalkan dan dipatuhi oleh individu hiperkolesterolemik untuk jangka masa yang panjang dalam usaha menambahbaik paras kolesterol dan profil lipid darah.

ABSTRACT

EFFECT OF PREBIOTICS ON BLOOD PROFILE OF INDIVIDUALS WITH ELEVATED CHOLESTEROL LEVELS

Hypercholesterolemia was defined as plasma cholesterol level that is too high and emerged as a strong risk factor for cardiovascular disease (CVD). The objective of this study was to assess the effectiveness of the prebiotics intake in lowering high cholesterol level and improve blood lipid profile of hypercholesterolemic individuals. Randomised controlled trial with factorial design has been used in this study. A total of 15 adults who met the recruitment criteria and are interested with age of mean \pm standard deviation 34 ± 9.7 years, weight of mean \pm standard deviation 69.6 ± 16.3 kg, the level of total cholesterol, triglycerides, High Density Lipoprotein, Low Density Lipoprotein and fasting blood glucose at mean \pm standard deviation 5.67 ± 0.40 mmol/L, 0.95 ± 0.68 mmol/L, 1.54 ± 0.40 mmol/L, $3:58 \pm 0.56$ mmol/L and 5.28 ± 12.36 mmol/L respectively were participated in this study conducted at Polyclinic UMS, KingFisher. The study took eight weeks of treatment period and another four weeks of follow-up period. Body Mass Index (BMI) has a significant strong negative correlation with High Density Lipoprotein (HDL) at the beginning of the study, $r_s = -0.717$, $p = 0.0039$ (Spearman's correlation). Blood lipid profile of subject given prebiotics have improved with total cholesterol level decreased by 15.52 %, from 5.5 mmol/L to 4.9 mmol/L, triglyceride level decreased by 38.56 % from 1.3 mmol/L to 0.8 mmol/L, levels of Low Density Lipoprotein and High Density Lipoprotein have declined by 20.25 % and increased by 6.4 %, from 3.95 mmol/L to 3.15 mmol/L and 1.25 mmol/L to 1.33 mmol/L respectively. Prebiotics has given side effects such as stomach discomfort, bloating and farting from moderate to slight severe level to the subject. In conclusion, prebiotics supplied to the subject for eight weeks has given hypocholesterolemic effects on their blood lipid profile. This dietary practice is suitable to be practised and adopted by hypercholesterolemic individuals for extended periods of time in order to improve their cholesterol levels and blood lipid profile.



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SENARAI SINGKATAN

WHO	<i>World Health Organization</i>
FAO	<i>Food and Agriculture Organization</i>
CVD	Penyakit Kardiovaskular
NCEP	Program Pendidikan Kolesterol National
TLC	Terapi Perubahan Gaya Hidup/ <i>Therapeutic Lifestyle Change</i>
NHMS	<i>National Health and Morbidity Survey</i>
LDL	<i>Low Density Lipoprotein</i>
LDL-C	<i>Low Density Lipoprotein Concentration</i>
HDL	<i>High Density Lipoprotein</i>
HDL-C	<i>High Density Lipoprotein Concentration</i>
TC	Jumlah Kolesterol
TG	Trigliserida
VLDL	<i>Very Low Density Lipoprotein</i>
CPG	<i>Clinical Practice Guideline</i>
CHD	Penyakit Jantung Koronari
ACS	Sindrom Koronari Akut
SFA	Asid Lemak Tepu
MUFA	Asid Lemak Mono Tak Tepu
PUFA	Asid Lemak Poli Tak Tepu
TFA	Asid Lemak Trans
GOS	Galaktooligosakarida/ <i>Galactooligosaccharide</i>
FOS	Fruktooligosakarida/ <i>Fructooligosaccharide</i>
DP	Purata Tahap Pempolimeran/ <i>Degree of Polymerization</i>
IBD	Penyakit Radang Usus/ <i>Inflammatory Bowel Disease</i>
SCFA	Asid Lemak Berantaian Pendek/ <i>Short Chain Fatty Acid</i>
GRAS	<i>Generally Recognized as Safe</i>
LD50	Dos Maut 50/ <i>Lethal Dose 50</i>
LAB	Bakteria Laktik Asid/ <i>Lactic Acid Bacteria</i>
BSH	Hidrolase Garam Hempedu/ <i>Bile Salt Hydrolase</i>

IJT	Indeks Jisim Tubuh Badan/ <i>Body Mass Index</i>
RNI	<i>Recommended Nutrient Intake</i>
MANS	<i>Malaysia Adult Nutrition Survey</i>
BA	Asid Hempedu/ <i>Bile Acid</i>
MW	Berat Molekul/ <i>Molecular Weight</i>
USFDA	<i>US Food and Drug Administration</i>
EFSA	<i>European Food Safety Authority</i>
SE	<i>Standard Error</i>
IPAQ	Borang Soal Selidik Aktiviti Fizikal Antarabangsa/ <i>International Physical Activity Questionnaire</i>
MET	<i>Metabolic Equivalent</i>
SPSS	<i>Statistical Package for Social Science</i>
ANOVA	<i>Analysis of Variance</i>
MOH	<i>Ministry of Health</i>
SP	Sisihan Piawaian (<i>Standard Deviation</i>)
UMS	Universiti Malaysia Sabah

SENARAI SIMBOL

E	Ralat/ <i>Error</i>
Σ	Jangkaan Sisihan Piawaian/ <i>Standard Deviation</i>
%	Peratus
C.I.	Keyakinan Interval/ <i>Confidential Interval</i>
μ	Min
X	Darab
\bar{x}	Min
p	Kebarangkalian
R	Min Jangkaan
n	Nombor
=	Bersama
>	Lebih daripada
<	Kurang Daripada
\geq	Lebih daripada atau sama dengan
-	Tolak
\pm	Campur tolak
σ^2	Varians
™	Tanda Dagangan
g	Gram
mg	Miligram
CFU	<i>Colony Forming Unit</i>
r	Kolerasi <i>Pearson</i>
r_s	Kolerasi <i>Spearman</i>

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BAB 1

PENDAHULUAN

1.1 Latar Belakang Kajian

Hiperkolesterolemia didefinisikan sebagai paras kolesterol plasma yang terlalu tinggi, muncul sebagai faktor risiko yang kuat untuk penyakit kardiovaskular (CVD) (Stapleton *et al.*, 2010). Hiperkolesterolemia adalah faktor risiko yang dapat diubah untuk mencegah penyakit jantung koronari, sebagai contoh, perubahan dalam gaya hidup pemakanan dan aktiviti fizikal boleh digunakan sebagai salah satu cara menurunkan risiko untuk dihadapi penyakit jantung koronari kerana ia mempunyai kesan dalam menambahbaik paras kolesterol (Chan *et al.*, 2014).

Hiperkolesterolemia merupakan satu kebimbangan kesihatan yang utama sama ada di negara maju atau negara membangun. *World Health Organization* (WHO) telah meramalkan bahawa pada tahun 2030, penyakit kardiovaskular akan tetap menjadi punca utama kematian, dan akan mempengaruhi seramai 23.6 juta orang di seluruh dunia. Risiko menghadapi penyakit jantung adalah tiga kali ganda lebih tinggi pada individu hiperkolesterolemik berbanding dengan individu yang mempunyai profil lipid darah yang normal (WHO, 2003). Ia dikaitkan dengan peningkatan risiko penyakit kardiovaskular (CVD) dan penyakit jantung koronari (CHD) (Ueshima *et al.*, 2008). Peningkatan kelaziman hiperkolesterolemia telah dikaitkan dengan kejadian CHD yang semakin meningkat di rantau Asia Pasifik (Zhang *et al.*, 2003). Garis panduan Program Pendidikan Kolesterol Nasional (NCEP) mencadangkan bahawa terapi perubahan gaya hidup (TLC) yang meliputi amalan pemakanan yang sihat terhadap jantung, aktiviti fizikal, dan pengawalan berat badan untuk menurunkan kadar kolesterol darah dan risiko penyakit jantung koronari boleh digunakan untuk individu yang mempunyai hiperkolesterolemia (NCEP Dewasa rawatan Panel III, 2002).



Menurut laporan *National Health and Morbidity Survey* (NHMS) IV 2011, sebanyak 35.1 % iaitu 6.2 juta orang dewasa berumur 18 tahun dan ke atas mempunyai hiperkolesterolemia berbanding NHMS III 2006 iaitu 20.7 %. Daripada 35.1 %, sebanyak 8.4 % telah diketahui mempunyai hiperkolesterolemia sebelum kaji selidik ini, manakala sebanyak 26.6 % yang sebelum ini tidak didiagnosis dengan hiperkolesterolemia, baru sahaja mengetahui bahawa mereka mempunyai tahap kolesterol yang tinggi melalui kaji selidik ini. Kelaziman masalah hiperkolesterolemia di kawasan luar bandar dan bandar adalah 37 % dan 34.3 % masing-masing, dengan lebih banyak kes tidak didiagnosis iaitu 30.4 % di kawasan luar bandar berbanding 25.3 % di kawasan bandar. Kaji selidik ini juga melaporkan bahawa golongan wanita berumur 18 tahun dan ke atas yang mempunyai masalah hiperkolesterolemia adalah lebih banyak iaitu 40.2 % berbanding golongan lelaki iaitu 30.1 %. Masalah hiperkolesterolemia adalah lebih tinggi pada golongan etnik Melayu iaitu sebanyak 38.4 % diikuti oleh golongan etnik India (35.5 %), Cina (33.4 %) dan 29.8 % pada golongan bumiputera yang lain. Kita mestilah mengatasi masalah hiperkolesterolemia supaya mengurangkan risiko untuk dijangkiti penyakit kardiovaskular (CVD) dan penyakit jantung koronari (CHD).

Prebiotik adalah substrat makanan fermentasi yang tidak dapat dicerna, secara terpilih merangsangkan pertumbuhan, komposisi dan aktiviti mikroflora dalam saluran pencernaan dan dengan itu menambahbaik kesihatan individu (Roberfroid, 2007a). Menurut kajian *in vivo* yang dijalankan oleh para pengkaji yang lalu, prebiotik adalah berkesan dalam menambahbaik profil lipid darah, termasuklah penurunan jumlah kolesterol dalam serum/plasma, kolesterol LDL (*Low Density Lipoprotein*) dan trigliserida atau peningkatan kolesterol HDL (*High Density Lipoprotein*). Namun, kajian lain yang lepas juga melaporkan bahawa prebiotik mempunyai kesan yang tidak ketara pada profil lipid darah, mempertikaikan tuntutan hipokolesterolemik daripada prebiotik (Ooi & Liong, 2010). Oleh itu, kajian ini dijalankan untuk mengkaji kesan hipokolesterolemik prebiotik pada individu yang mempunyai paras jumlah kolesterol tinggi, pada masa yang sama membandingkan kesan hipokolesterolemik probiotik, gabungan prebiotik dan probiotik (sinbiotik), serat makanan dan gabungan ketiga-tiga bahan tersebut. Selain daripada mengkaji perbezaan kesemua bahan dalam menambahbaik profil lipid darah yang akan berlaku, kajian ini juga bertujuan untuk mengkaji kumpulan

mana satu yang akan memberi kesan lebih ketara pada profil lipid darah individu hiperkolesterolemik.

1.2 Objektif

1.2.1 Objektif Umum

Objektif umum kajian ini adalah untuk mengkaji keberkesanan pengambilan prebiotik dalam menambahbaik profil lipid darah individu hiperkolesterolemik, iaitu *High Density Lipoprotein Concentration* (HDL-C), *Low Density Lipoprotein Concentration* (LDL-C), jumlah kolesterol (TC) dan trigliserida (TG).

1.2.2 Objektif Spesifik

Objektif spesifik kajian ini adalah

1. Untuk menentukan tahap ketidakselesaan seperti perut rasa tidak selesa, kembung dan kentut selepas pengambilan prebiotik, probiotik dan serat makanan.
2. Untuk menentukan kesesuaian pengambilan prebiotik sebagai salah satu amalan pemakanan yang boleh diamalkan dan dipatuhi oleh individu hiperkolesterolemik untuk jangka masa yang panjang sebagai usaha untuk menambahbaik paras kolesterol dan profil lipid darah.

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