Malaysian Society of
Gastroenterology & Hepatology

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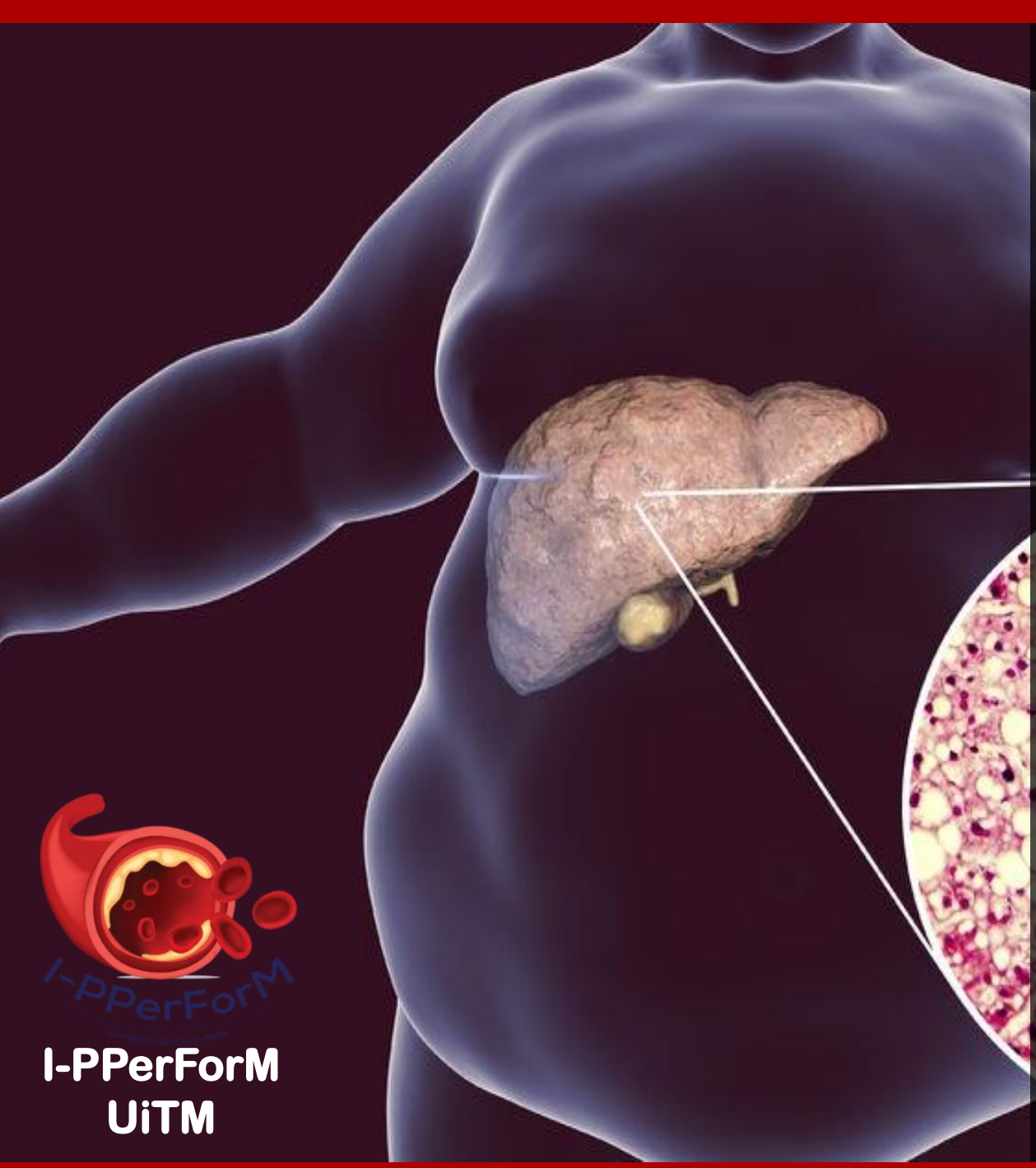

Malaysian Society of Gastroenterology & Hepatology

MSGH Webinar

20th March 2021

WHO'S AT RISK?

Improving Cardiovascular Outcomes in Patients with MAFLD

Professor Dr. Anis Safura Ramli

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Universiti Teknologi MARA

I-PPerForM

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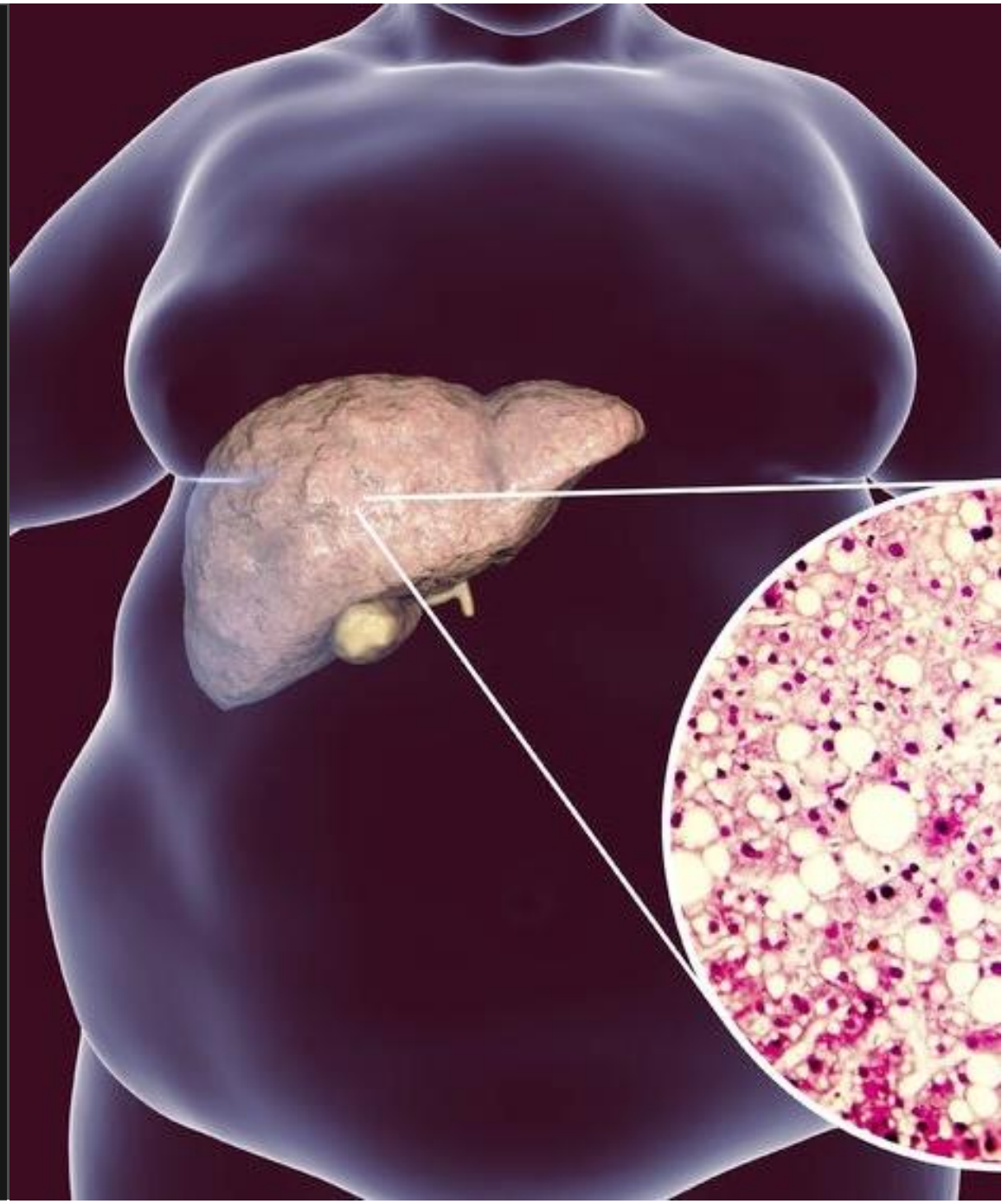
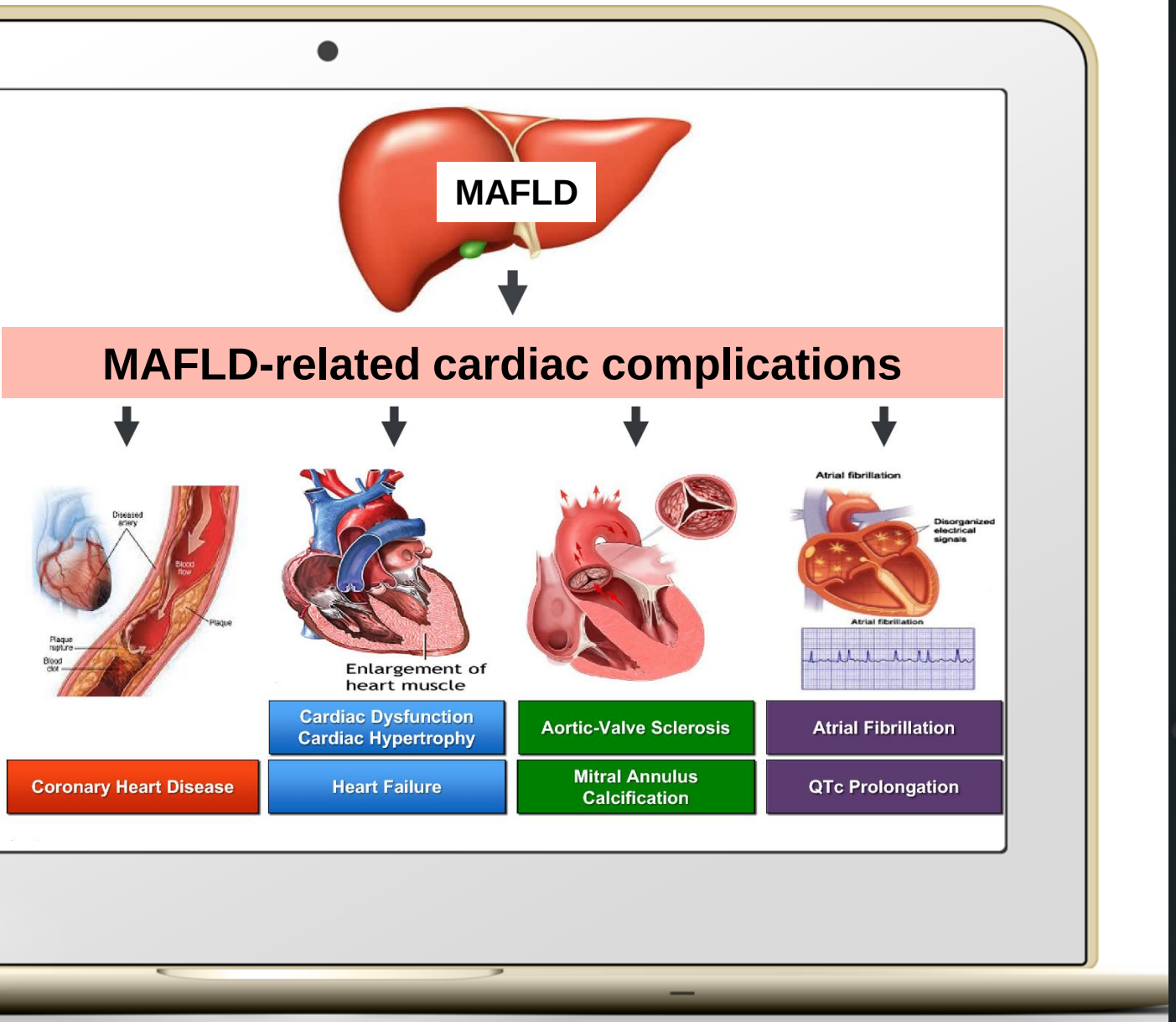
UiTM

PRESENTATION OUTLINE

- MAFLD and CVD: Partners in Crime?
- Who's at risk? - Prevalence of Metabolic Syndrome in Malaysia
- How common is MAFLD in Primary Care?
- Who should be screened for MAFLD?
- How do we improve cardiovascular outcomes of patients with MAFLD?
- Take home message

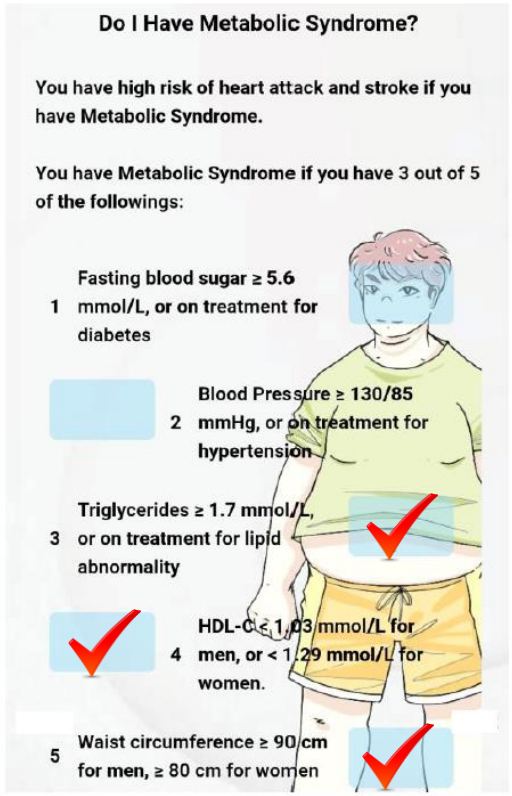




MAFLD and CVD: Partners in Crime?

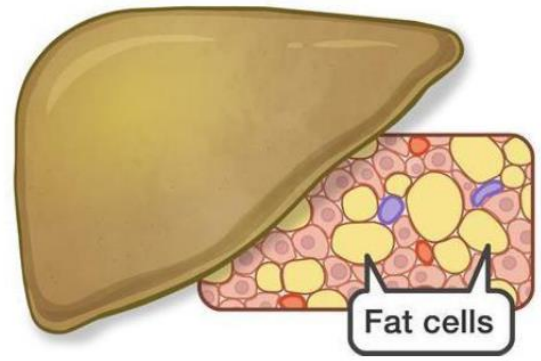
MAFLD AND CVD: PARTNERS IN CRIME?

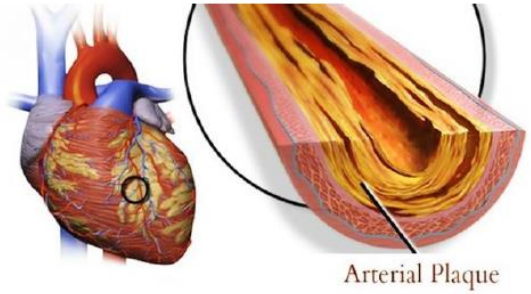
METABOLIC SYNDROME



JIS 2009 Definition

MAFLD



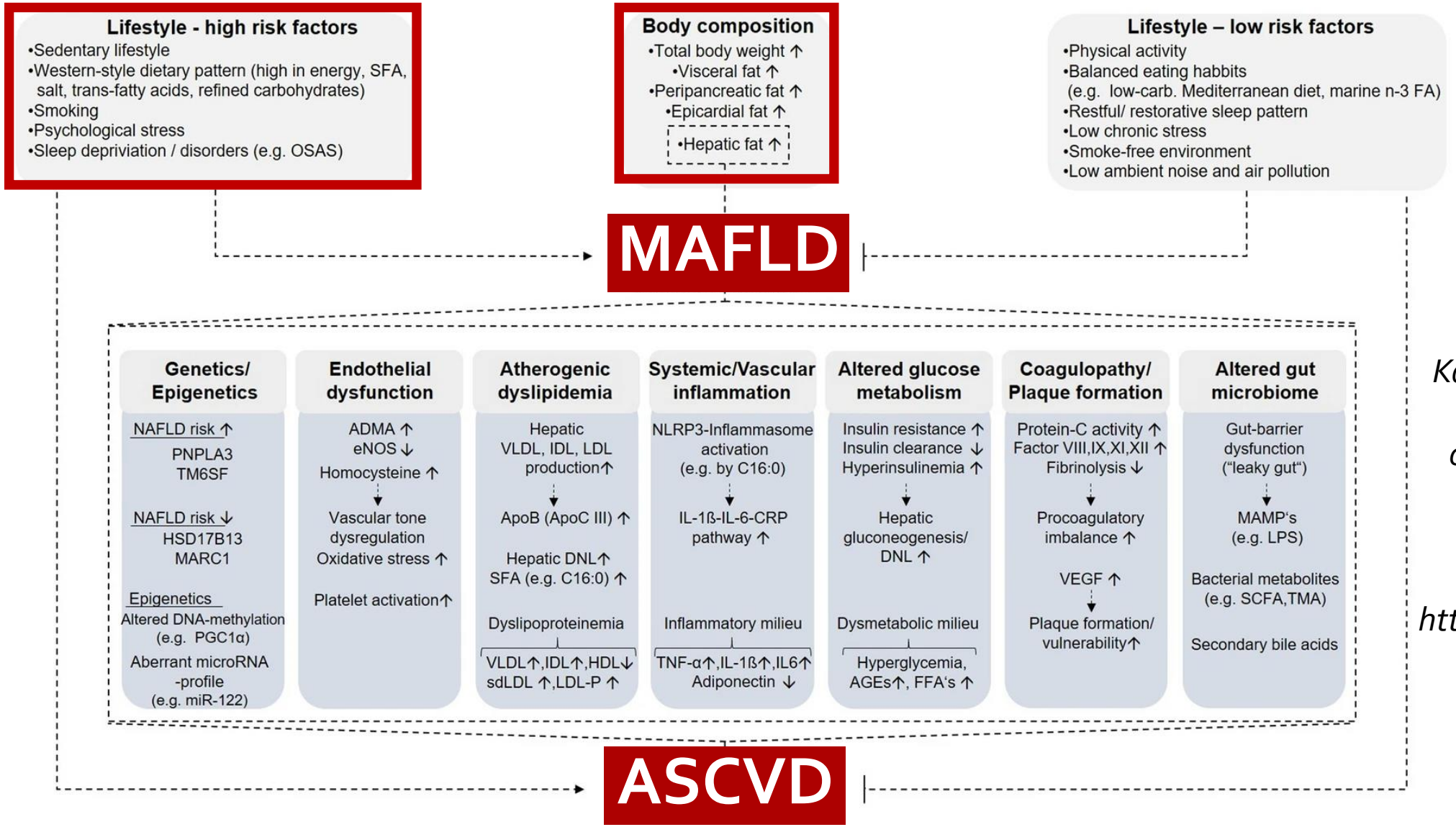


ASCVD

MAFLD and **CVD** are both manifestations of end-organ damage of the **Metabolic Syndrome**

Medina-Santillán R, López-Velázquez J, Chávez-Tapia N, et al . Hepatic manifestations of metabolic syndrome. Diabetes Metab Res Rev. 2013;7:1–16. https://doi.org/10.1002/dmrr.2410

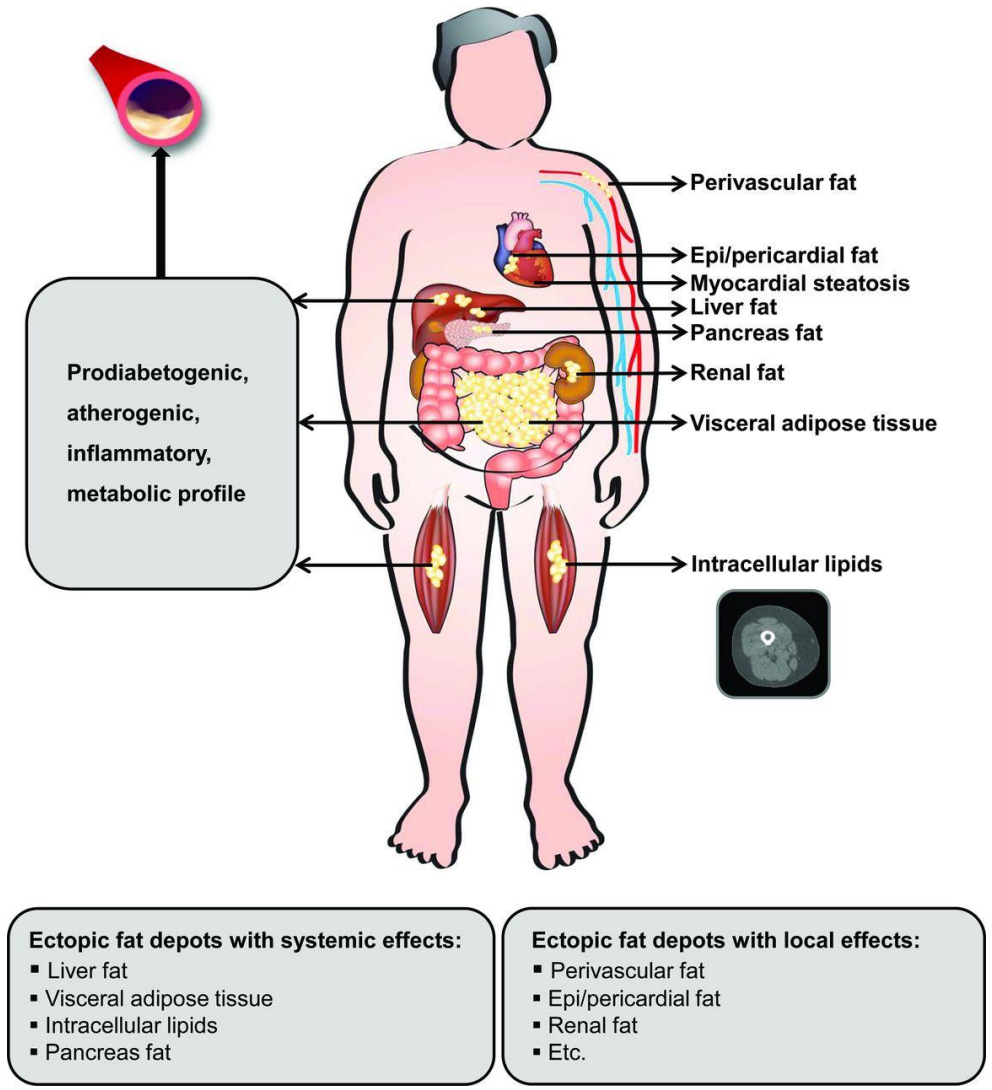
PATHOPHYSIOLOGICAL MECHANISMS LINKING MAFLD AND CVD



Kasper P, Martin A, Lang S, et al. NAFLD and cardiovascular diseases: a clinical review. Clinical Research in Cardiology. 2020. https://doi.org/10.1007/s00392-020-01709-7

PATHOGENIC RELATIONSHIP BETWEEN MAFLD AND CVD

- Ectopic fatty tissue depositions in the liver and the heart explain the **central pathogenic relationship** between **MAFLD** and **CVD**

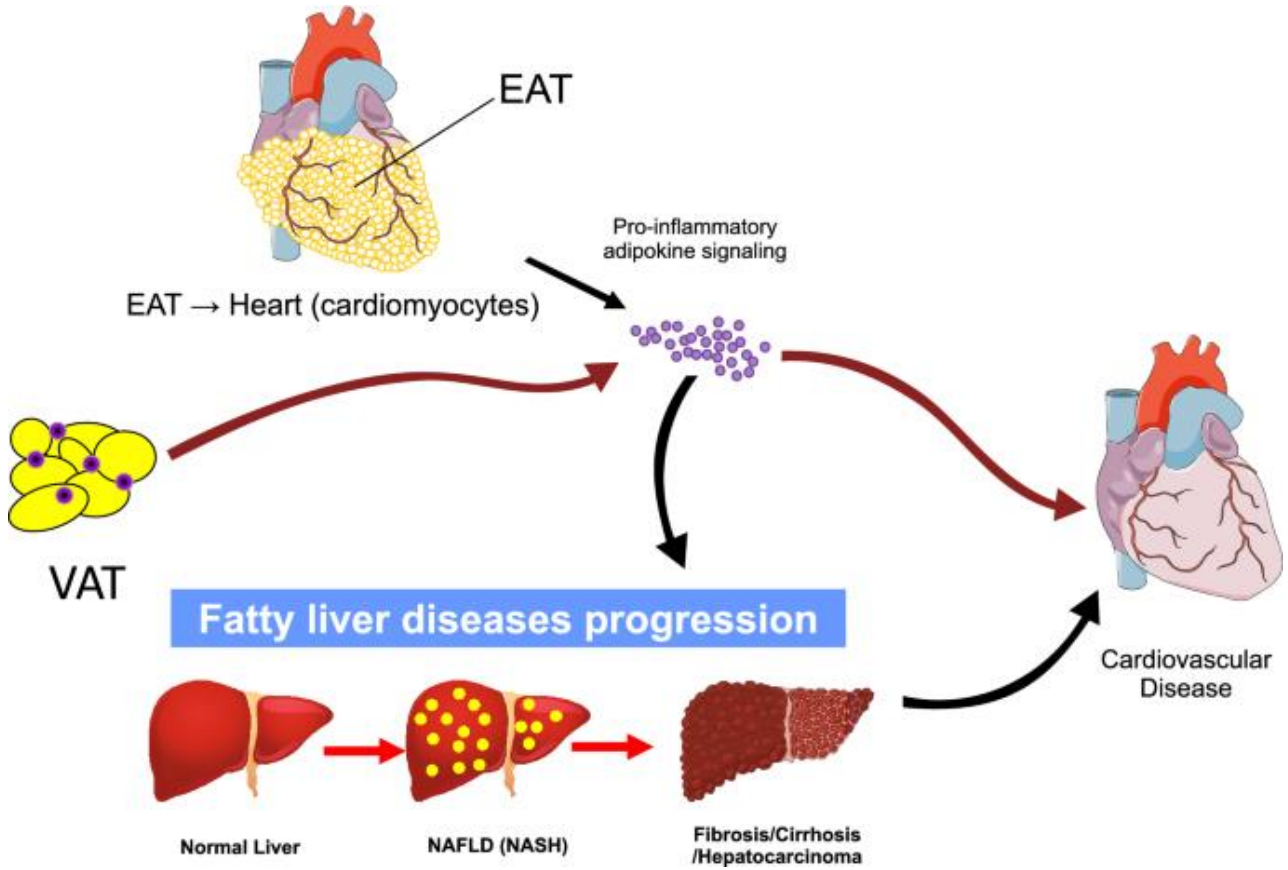


Després J-P. Body Fat Distribution and Risk of Cardiovascular Disease: An Update. Circulation. 2012;126:1301–1313. https://doi.org/10.1161/CIRCULATIONAHA.111.067264

PATHOGENIC RELATIONSHIP BETWEEN MAFLD AND CVD

- A recent meta-analysis of 2260 individuals found that **Epicardial Adipose Tissue (EAT)** was significantly increased in those with **MAFLD** compared to those without MAFLD.

- The increase in **EAT** was associated with the **severity of hepatic steatosis**, **hepatic fibrosis** and **CVD** in patients with **MAFLD**.



Liu B, Li YR, Li Y, et al. Association of epicardial adipose tissue with non-alcoholic fatty liver disease: A meta-analysis. Hepatol. Int. 2019; 13:757–765. https://doi.org/10.1007/s12072-019-09972-1

IMPACT OF MAFLD ON CVD MORBIDITY AND MORTALITY

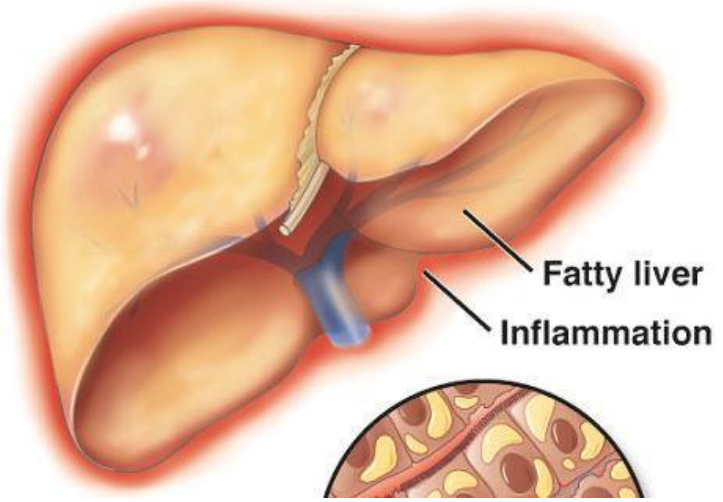
- A meta-analysis of 16 observational studies consisting of **34,043** patients with a median 7-year follow-up

- Patients with **MAFLD** had a **higher risk of fatal** and/or **non-fatal CVD events** than those without MAFLD [random effect OR 1.64; 95% CI 1.26–2.13]

Targher G, Byrne C, Lonardo A, et al. Non-alcoholic fatty liver disease and risk of incident cardiovascular disease: a meta-analysis. J Hepatol. 2016; 65:589–600. https://doi.org/10.1016/j.jhep.2016.05.013

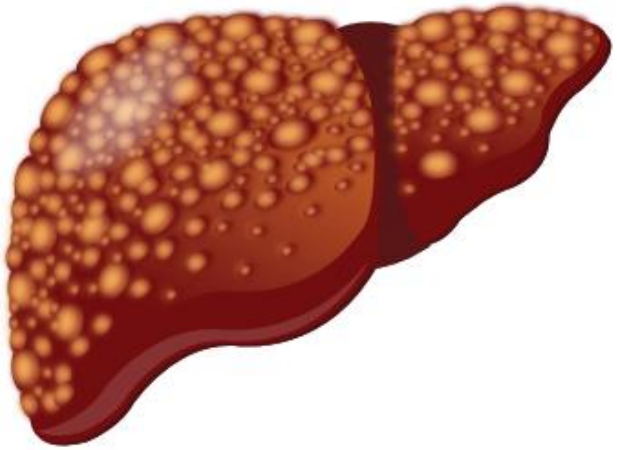
IMPACT OF MAFLD SEVERITY ON CVD MORBIDITY AND MORTALITY

- Patients with more **'severe' MAFLD** were also more likely to **develop fatal and non-fatal CVD events** [OR 2.58; 95% CI 1.78-3.75]



MASH

CIRRHOSIS



Targher G, Byrne C, Lonardo A et al. Non-alcoholic fatty liver disease and risk of incident cardiovascular disease: a meta-analysis. J Hepatol. 2016; 65:589–600. https://doi.org/10.1016/j.jhep.2016.05.013

IMPACT OF MAFLD ON CVD MORBIDITY AND MORTALITY

RESEARCH

Non-alcoholic fatty liver disease and risk of incident acute myocardial infarction and stroke: findings from matched cohort study of 18 million European adults

Myriam Alexander,[1] A Katrina Loomis,[2] Johan van der Lei,[3] Talita Duarte-Salles,[4] Daniel Prieto-Alhambra,[5] David Ansell,[6,7] Alessandro Pasqua,[8] Francesco Lapi,[8] Peter Rijnbeek,[3] Mees Mosseveld,[3] Paul Avillach,[3,9] Peter Egger,[1] Nafeesa N Dhalwani,[10] Stuart Kendrick,[11] Carlos Celis-Morales,[12] Dawn M Waterworth,[13] William Alazawi,[14*] Naveed Sattar[12*]

WHAT IS ALREADY KNOWN ON THIS TOPIC

Non-alcoholic fatty liver disease (NAFLD) is associated with metabolic syndrome and other risk factors for acute myocardial infarction (AMI) or stroke

NAFLD is associated with increased risk of AMI and stroke and cardiovascular surrogate markers

The association between NAFLD and AMI and stroke after adjustment for established risk factors has yet to be fully established however

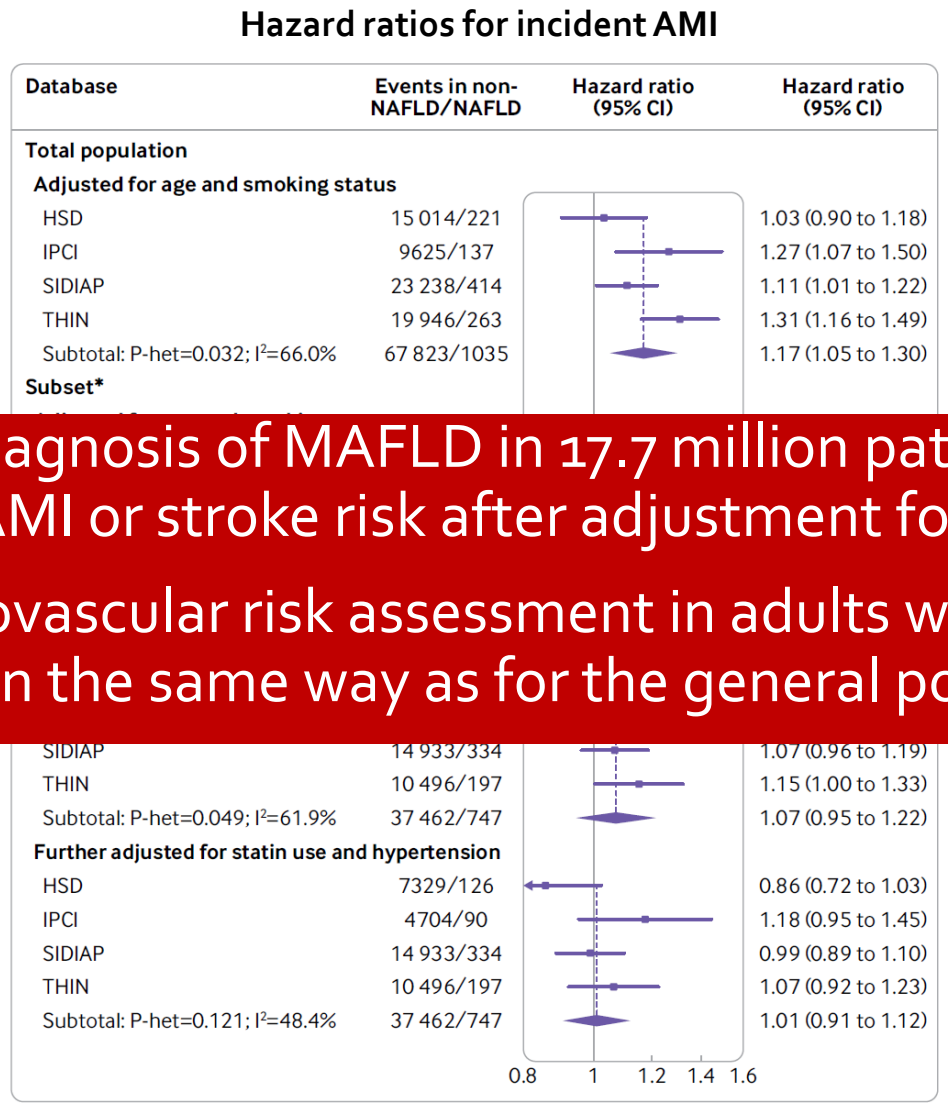
WHAT THIS STUDY ADDS

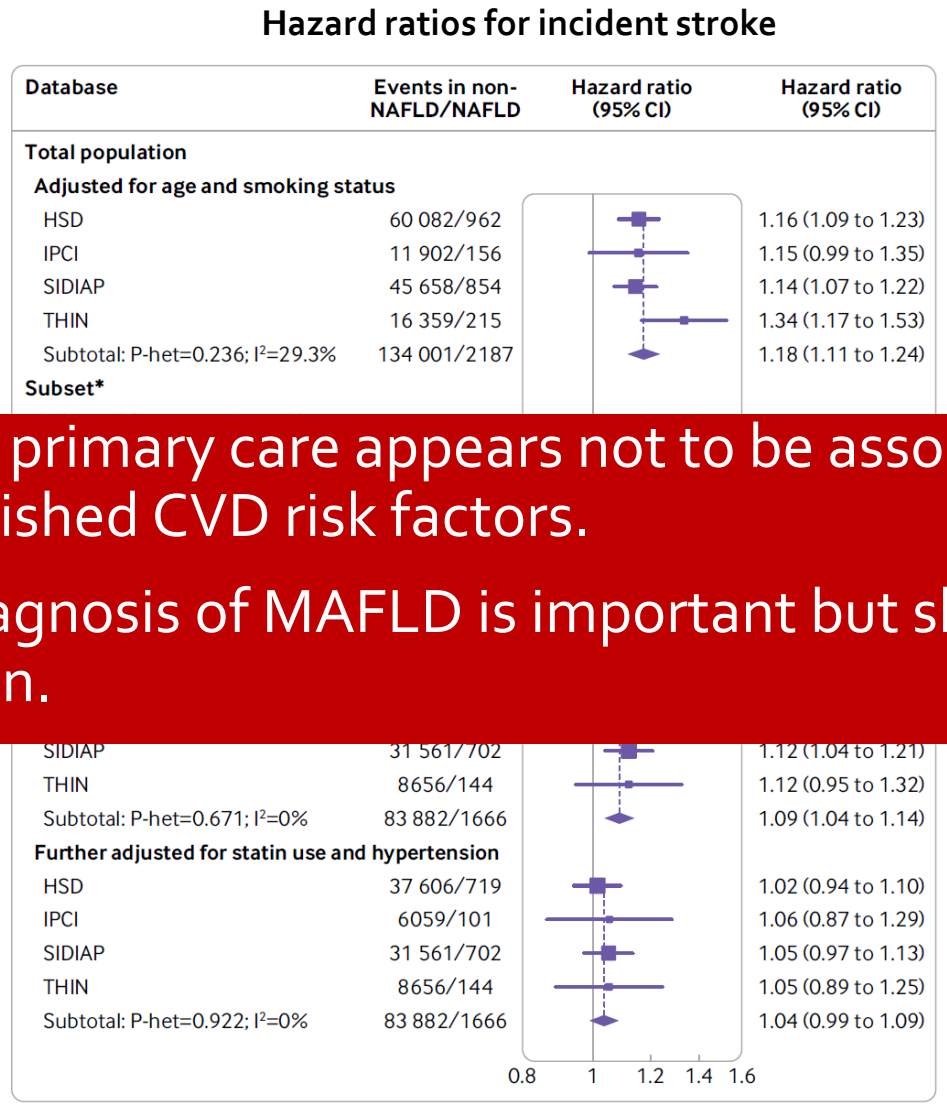
In four large European databases, the adjusted hazard ratios for incident AMI or stroke diagnoses in adults with NAFLD were modest and not significantly greater than those in age, sex, and general practice matched participants without NAFLD

the bmj | *BMJ* 2019;367:l5367 | doi: 10.1136/bmj.l5367

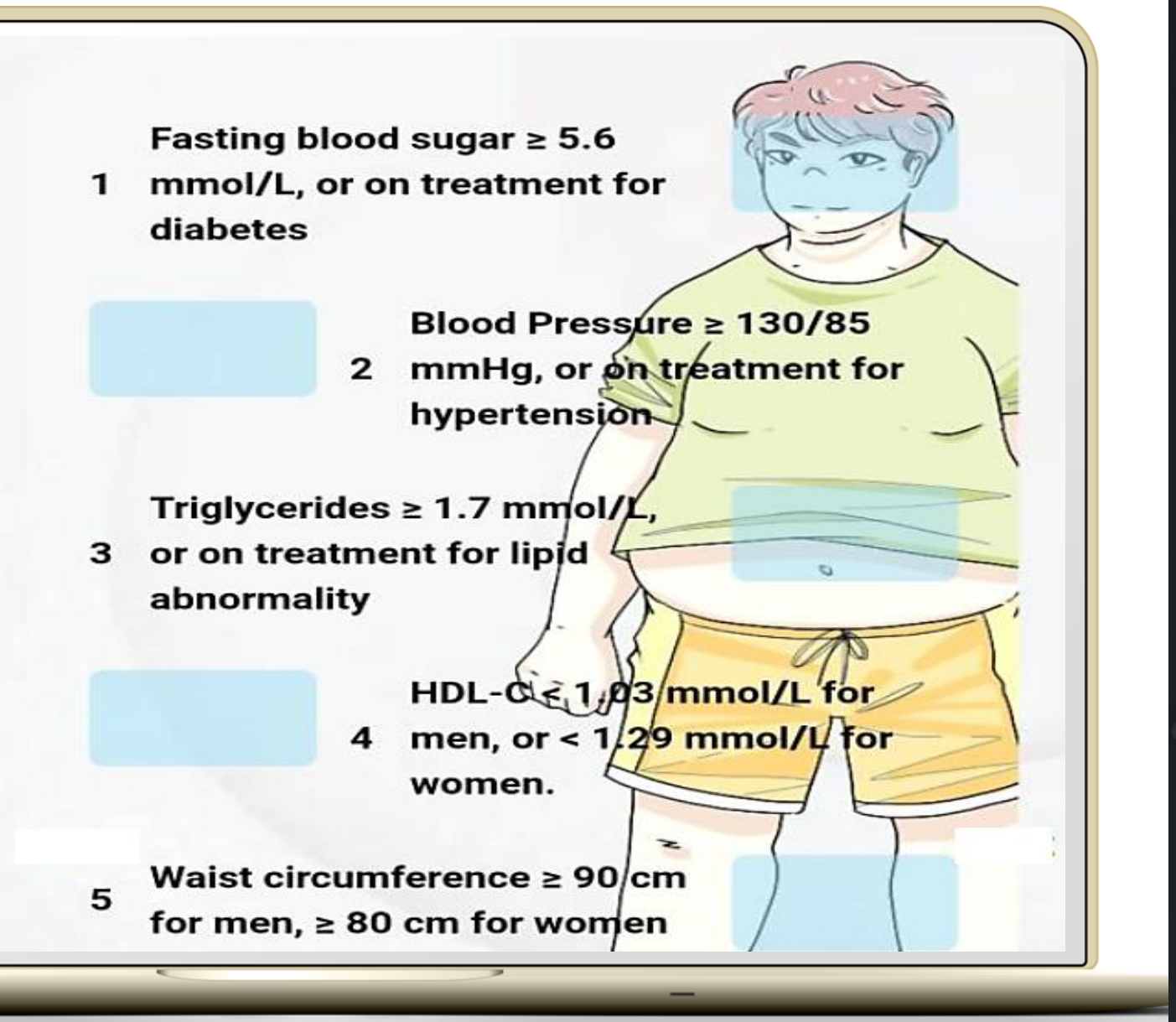
- **Design:** Matched cohort study.
- **Setting:** Population based, electronic primary healthcare databases from four European countries: Italy, Netherlands, Spain and UK.
- **Participants:** 120 795 adults with a recorded diagnosis of MAFLD or MASH, matched by age, gender, practice site and visit, with patients without MAFLD or MASH in the same database.
- Mean follow-up: 2.1-5.5 years.

IMPACT OF MAFLD ON CVD MORBIDITY AND MORTALITY





- The diagnosis of MAFLD in 17.7 million patients in primary care appears not to be associated with AMI or stroke risk after adjustment for established CVD risk factors.
- Cardiovascular risk assessment in adults with a diagnosis of MAFLD is important but should be done in the same way as for the general population.



Who's at Risk? Prevalence of Metabolic Syndrome in Malaysia

Hindawi Publishing Corporation
BioMed Research International
Volume 2013, Article ID 760963, 10 pages
http://dx.doi.org/10.1155/2013/760963

Research Article

JIS Definition Identified More Malaysian Adults with Metabolic Syndrome Compared to the NCEP-ATP III and IDF Criteria

Anis Safura Ramli,[1,2] Aqil Mohammad Daher,[2,3] Mohamed Noor Khan Nor-Ashikin,[2,4] Nafiza Mat-Nasir,[1,2] Kien Keat Ng,[1,2] Maizatullifah Miskan,[1,2] Krishnapillai S. Ambigga,[1,2] Farnaza Ariffin,[1,2] Md Yasin Mazapuspavina,[1,2] Suraya Abdul-Razak,[1,2] Hasidah Abdul-Hamid,[1,2] Fadhlina Abd-Majid,[2] Najmin Abu-Bakar,[2] Hapizah Nawawi,[2,5] and Khalid Yusoff[2,6]

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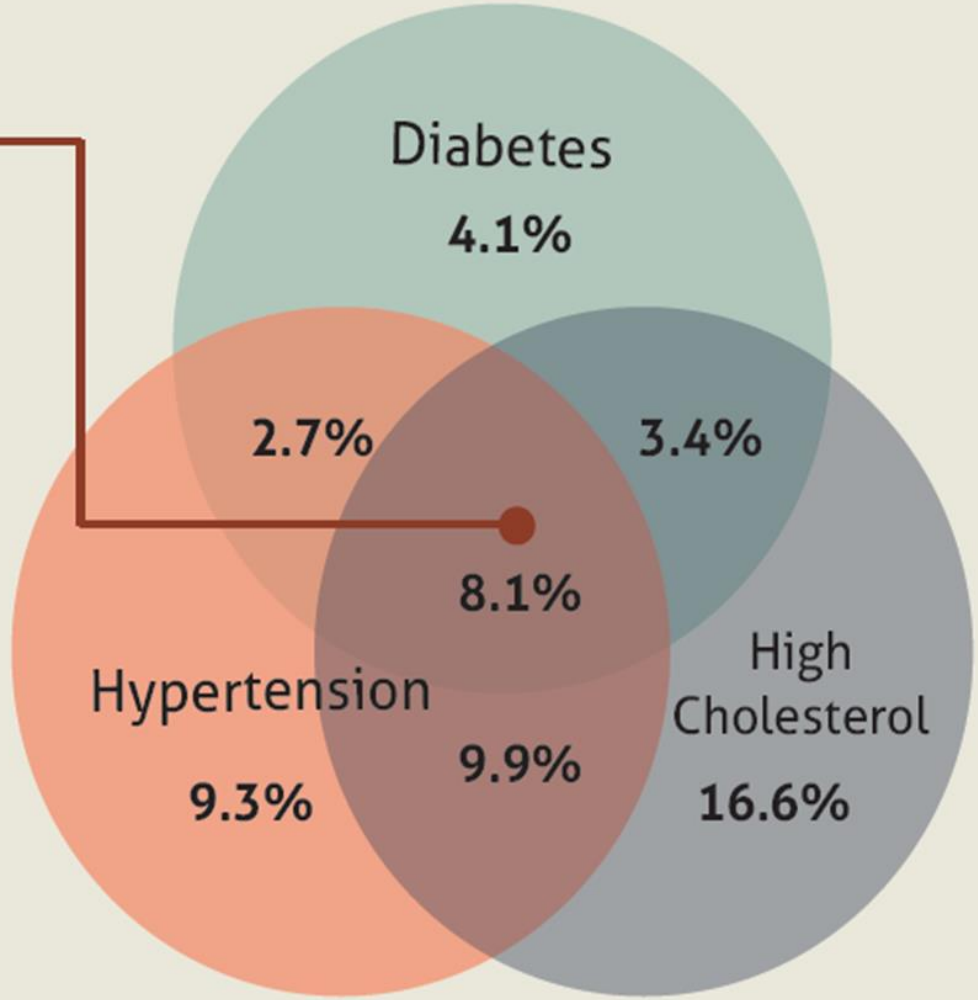
[6] *Cardiology Discipline, Faculty of Medicine, Universiti Teknologi MARA, 47000 Sungai Buloh, Selangor, Malaysia*

43.4% OF MALAYSIAN ADULTS ≥ 30 YEARS OF AGE HAVE METABOLIC SYNDROME

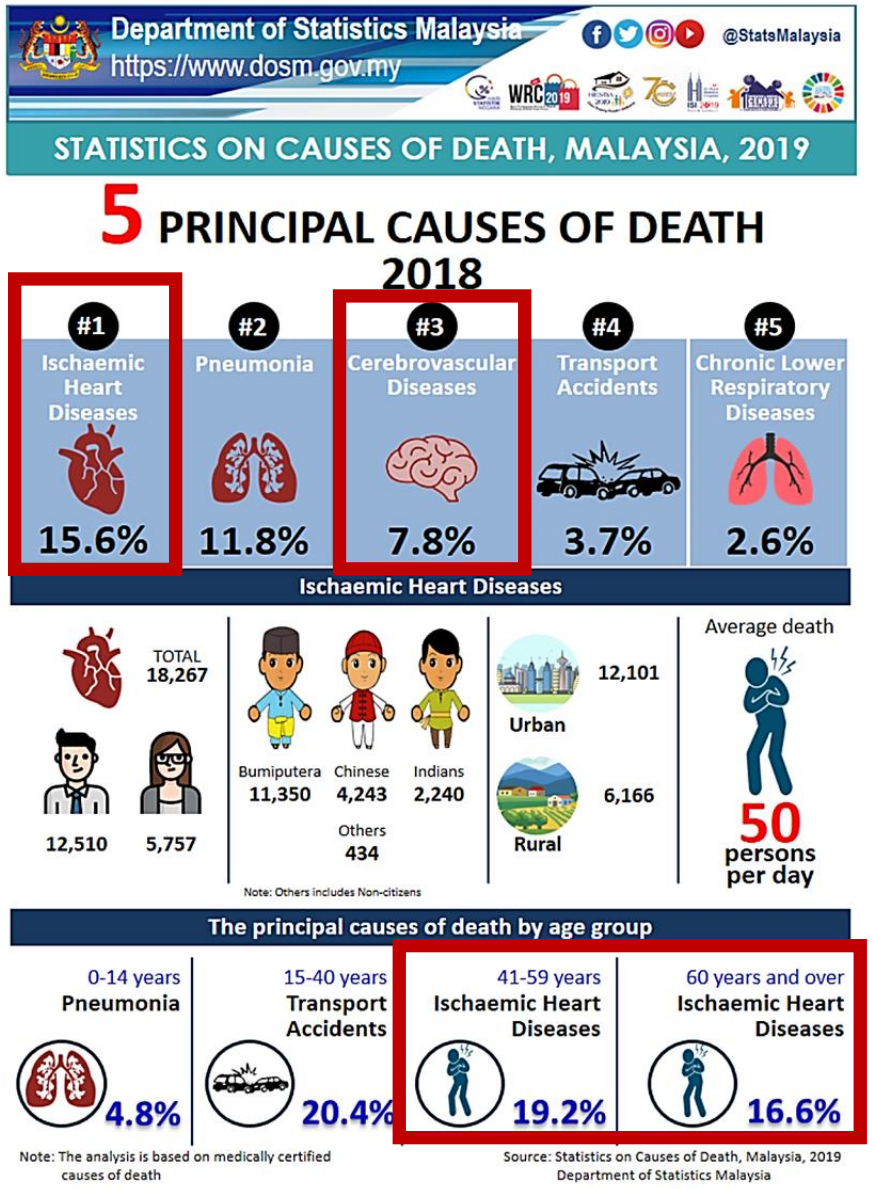
NHMS 2019: CLUSTERING OF RISK FACTORS

1.7 million people in Malaysia currently live with **three major risk factors**

3.4 million people in Malaysia currently live with **two major risk factors**



CVD: PRINCIPAL CAUSE OF DEATH IN MALAYSIA



THE Star ONLINE

Heart attack leading cause of deat

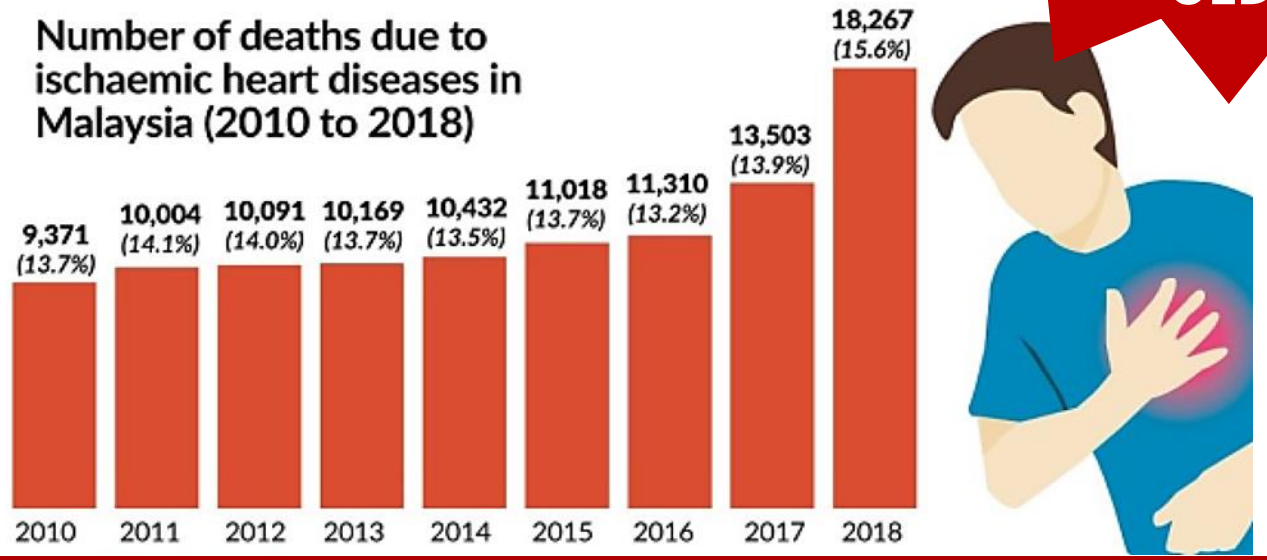
NATION

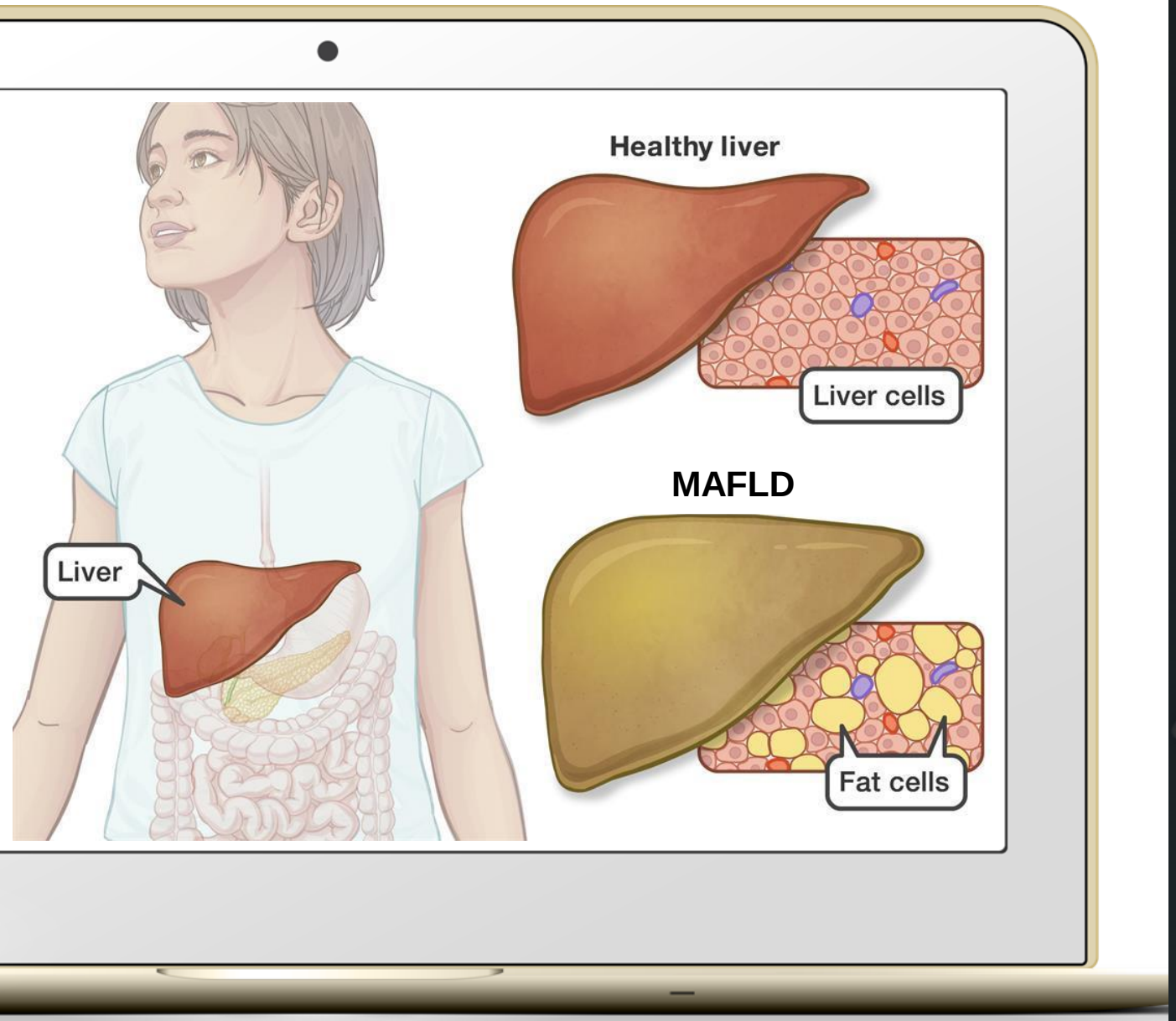
Thursday, 31 Oct 2019

By LOH FOON FONG

KUALA LUMPUR: Heart attack remains the leading cause of death in Mala

AVERAGE AGE OF HEART ATTACK IN MALAYSIA IS 58 YEARS OLD!





How Common is MAFLD in Primary Care?

PREVALENCE OF MAFLD IN PRIMARY CARE

Miptah *et al. BMC Family Practice* (2020) 21:238
https://doi.org/10.1186/s12875-020-01306-7

BMC Family Practice

RESEARCH ARTICLE Open Access

Non-alcoholic fatty liver disease (NAFLD) and the cardiovascular disease (CVD) risk categories in primary care: is there an association?

Hayatul Najaa Miptah[1], Anis Safura Ramli[1,2*], Mariam Mohamad[3], Hilwati Hashim[4] and Zahirah Tharek[1]

Abstract

Background: Non-alcoholic fatty liver disease (NAFLD) is an emerging novel cardiovascular disease (CVD) risk factor. It's prevalence is increasing globally. However, there is paucity in the evidence showing the association between NAFLD and CVD risk in primary care setting. Therefore, the objectives of this study were to determine the prevalence and factors associated with NAFLD among patients with ≥1 risk factor for NAFLD or CVD attending primary care clinics.

Methodology: A cross sectional study was conducted in two clinics at a university primary care centre. Patients aged ≥18 years with ≥1 risk factor for NAFLD or CVD were recruited. Participants with history of established liver disease or chronic alcohol use were excluded. Socio-demographics, clinical related data, anthropometric measurements and blood investigation results were recorded in a proforma. Diagnosis of NAFLD was made using abdominal ultrasound. The 10-year CVD risk was calculated using the general Framingham Risk Score (FRS). Multiple logistic regression (MLogR) was performed to identify independent factors associated with NAFLD.

Results: A total of 263 participants were recruited. The mean age was 52.3 ± 14.7 years old. Male and female were equally distributed. Majority of the participants were Malays (79.8%). The overall prevalence of NAFLD was 54.4% (95%CI 48,60%). Participants in the high FRS category have higher prevalence of NAFLD (65.5%), followed by those in the moderate category (55.4%) and the low category (46.3%), $p = 0.025$. From MLogR, independent factors associated with NAFLD were being employed (OR = 2.44, 95%CI 1.26,4.70, $p = 0.008$), obesity with BMI ≥27.5 (OR = 2.89, 95%CI 1.21,6.91, $p = 0.017$), elevated fasting glucose ≥5.6 mmol/L (OR = 2.79, 95%CI 1.44,5.43, $p = 0.002$), ALT ≥34 U/L (OR = 3.70, 95%CI 1.85,7.44, $p < 0.001$) and high FRS category (OR = 2.82, 95%CI 1.28,6.23, $p = 0.010$).

(Continued on next page)

BMC FAMILY PRACTICE

Impact Factor

2.022	2.469
2019	*5 year*

JCR® Category	*Rank in Category*	*Quartile in Category*
MEDICINE, GENERAL & INTERNAL	66 of 165	Q2

WoS Q2

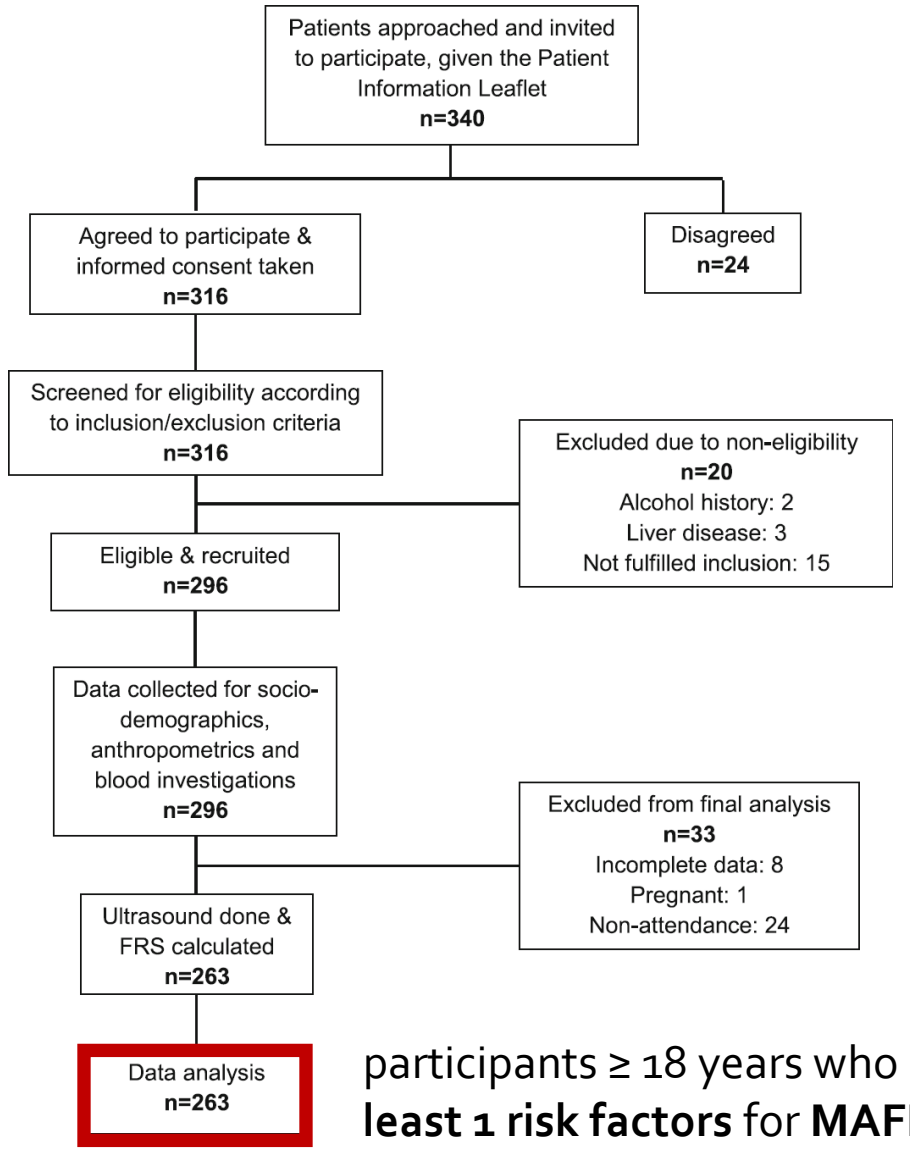


Fig. 1 Flow chart of conduct of the study

participants ≥ 18 years who have **at least 1 risk factors** for **MAFLD** or **CVD**

PREVALENCE OF MAFLD IN PRIMARY CARE

OUT OF 263 PARTICIPANTS, 143 (54.4%) WAS FOUND TO HAVE MAFLD

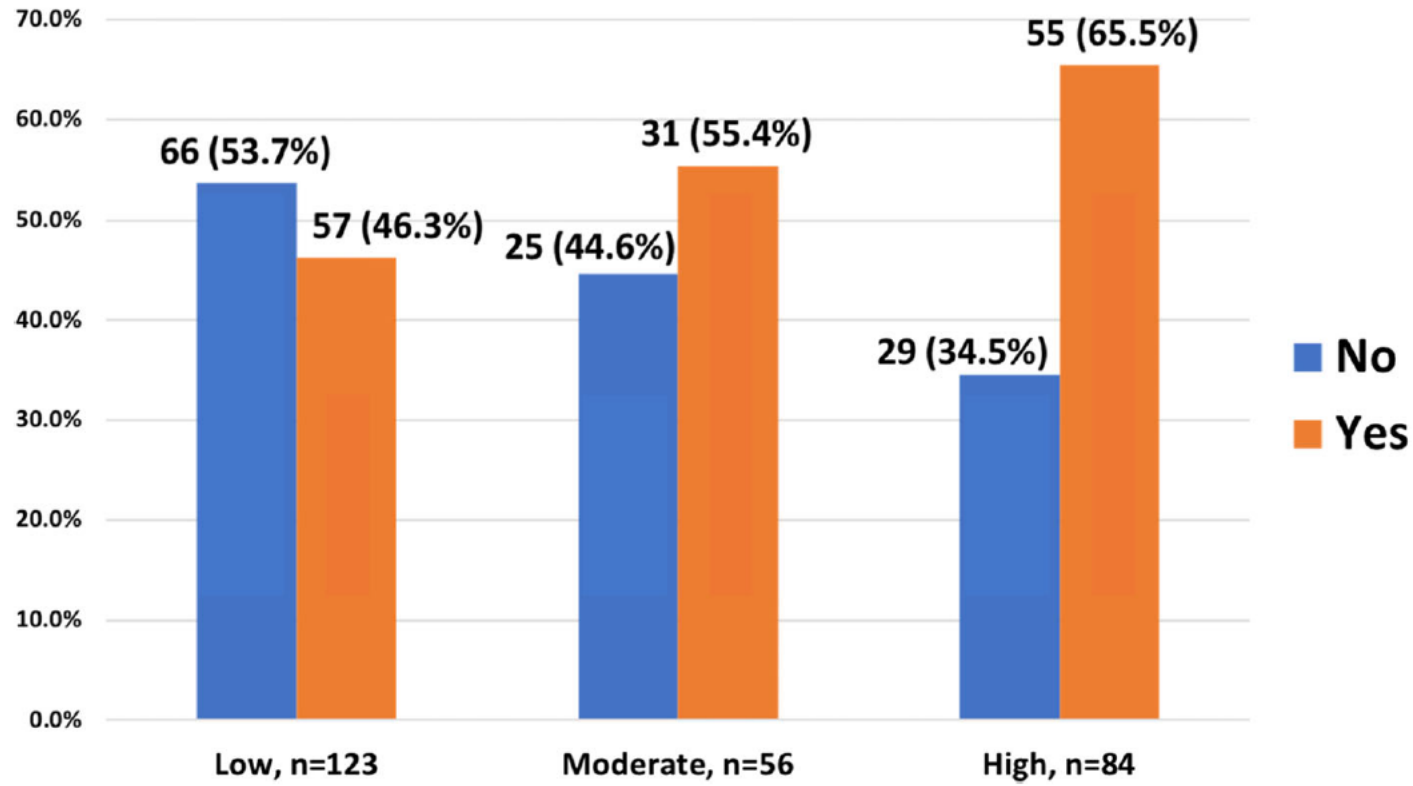


Fig. 2 Prevalence of NAFLD according to the FRS category

- Participants with **high FRS category** had a **greater prevalence of MAFLD** (p = 0.025)
- The **mean FRS score** was **significantly higher** in individuals with MAFLD compared to those without MAFLD (**17.38** ± 12.35 vs. **12.35** ±12.89, p = 0.003)

FACTORS ASSOCIATED WITH MAFLD

Table 2 Factors independently associated with NAFLD (MLogR)

Variables	Adj Beta (SE)	Wald (df)	Adj. OR (95%CI)	*P*-value
Occupational sector:		–	–	–
Not working	REF		1.00	
Working	0.89 (0.335)	7.071 (1)	2.44 (1.26,4.70)	**0.008**
BMI:				
Not-obese	REF		1.00	
Obese	1.060 (0.445)	5.679 (1)	2.89 (1.21,6.91)	**0.017**
FPG				
< 5.6 mmol/L	REF		1.00	
≥ 5.6 mmol/L	1.027 (0.339)	9.169 (1)	2.79 (1.44,5.43)	**0.002**
ALT				
≤ 34 U/L	REF		1.00	
> 34 U/L	1.310 (0.355)	13.587 (1)	3.70 (1.85, 7.44)	**< 0.001**
FRS category				
Low	REF		1.00	
Moderate	0.388 (0.413)	0.884 (1)	1.47 (0.66,3.31)	0.347
High	1.038 (0.403)	6.620 (1)	2.82 (1.28,6.23)	**0.010**

Notes:
OR Odds Ratio, *CI* Confidence interval, *df* Degree of freedom, *REF* Reference group
The model reasonably fits well (Hosmer-Lemeshow test: $p = 0.168$)
Model assumptions were met
No significant interactions and multicollinearity problem
Model explained between 23.1% (Cox and Snell R Square) and 30.8% (Nagelkerke R Square) of the variance in NAFLD group and correctly classified 73.4% of cases

SUMMARY OF MAIN FINDINGS AND IMPLICATIONS FOR CLINICAL PRACTICE

- MAFLD is **highly prevalent (54.4%)** in patients with **at least one risk factor** in our primary care setting.
- Patients with at least one CVD or MAFLD risk factor should be **risk stratified using the 10-year general CVD FRS**.
- If they are found to have **high FRS**, or **obese** or have **elevated FPG** or **elevated ALT**, they are recommended to have a **liver ultrasound to screen for MAFLD**.
- If they are found to have MAFLD, then the **severity** of the condition should be assessed using scoring such as NFS or **FIB-4** to identify those who need **referral to the hepatologist**.
- Regardless of their MAFLD status, these patients should be targeted for **aggressive lifestyle intervention** and **risk factor management**.

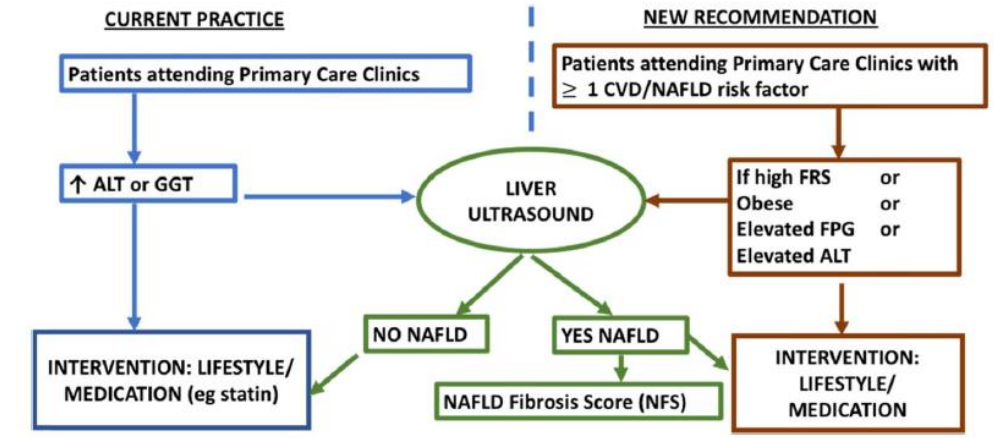


Fig. 3 Proposed algorithm for screening of NAFLD in the target groups in Primary Care

Miptah HN, Ramli AS, et al. Non-alcoholic fatty liver disease (NAFLD) and the cardiovascular disease (CVD) risk categories in primary care: is there an association? BMC Family Practice. 2020; 21:238 https://doi.org/10.1186/s12875-020-01306-7

Who Should Be Screened for MAFLD?

RECOMMENDATIONS BY THE APASL GUIDELINE

Hepatology International (2020) 14:889–919
https://doi.org/10.1007/s12072-020-10094-2

GUIDELINES

The Asian Pacific Association for the Study of the Liver clinical practice guidelines for the diagnosis and management of metabolic associated fatty liver disease

Mohammed Eslam[1] · Shiv K. Sarin[2] · Vincent Wai-Sun Wong[3] · Jian-Gao Fan[4] · Takumi Kawaguchi[5] · Sang Hoon Ahn[6] · Ming-Hua Zheng[7,8] · Gamal Shiha[9,10] · Yusuf Yilmaz[11,12] · Rino Gani[13] · Shahinul Alam[14] · Yock Young Dan[15] · Jia-Horng Kao[16,17,18,19] · Saeed Hamid[20] · Ian Homer Cua[21] · Wah-Kheong Chan[22] · Diana Payawal[23] · Soek-Siam Tan[24] · Tawesak Tanwandee[25] · Leon A. Adams[26] · Manoj Kumar[2] · Masao Omata[27,28] · Jacob George[1]

Received: 8 July 2020 / Accepted: 6 September 2020 / Published online: 1 October 2020

Abstract
Metabolic associated fatty liver disease (MAFLD) is the principal worldwide cause of liver disease and affects nearly a quarter of the global population. The objective of this work was to present the clinical practice guidelines of the Asian Pacific Association for the Study of the Liver (APASL) on MAFLD. The guidelines cover various aspects of MAFLD including its

Electronic supplementary material The online version of this article (https://doi.org/10.1007/s12072-020-10094-2) contains supplementary material, which is available to authorized users.

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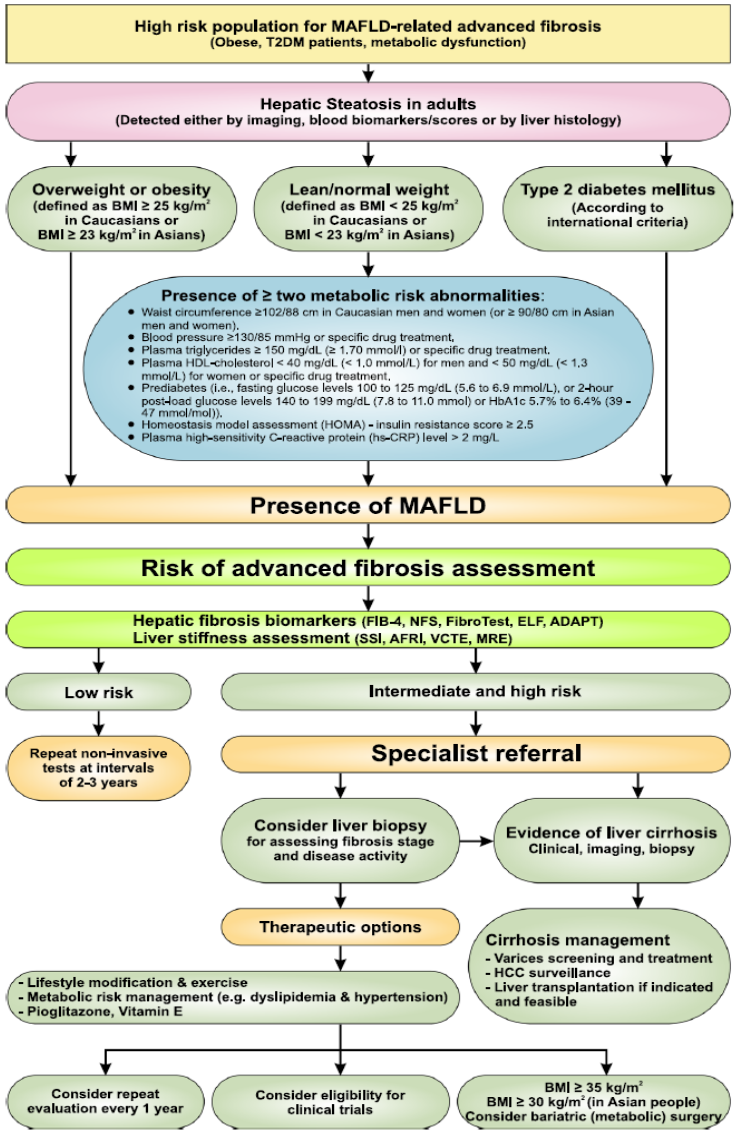
Should the high-risk population be screened for MAFLD?

Recommendations

- Screening for MAFLD by ultrasonography should be considered in at-risk populations such as patients with overweight/obesity, T2DM and metabolic syndrome (A1).
- Patients with MAFLD should be assessed for other components of metabolic syndrome and be treated accordingly (A1).
- Patients with MAFLD should receive advice and support for lifestyle interventions to reduce the risk of events from metabolic and cardiovascular disease, and to resolve fatty liver disease (A1).

- Screening for MAFLD in the population at risk should be in the context of the **available resources**, considering the **burden for the national health care systems**

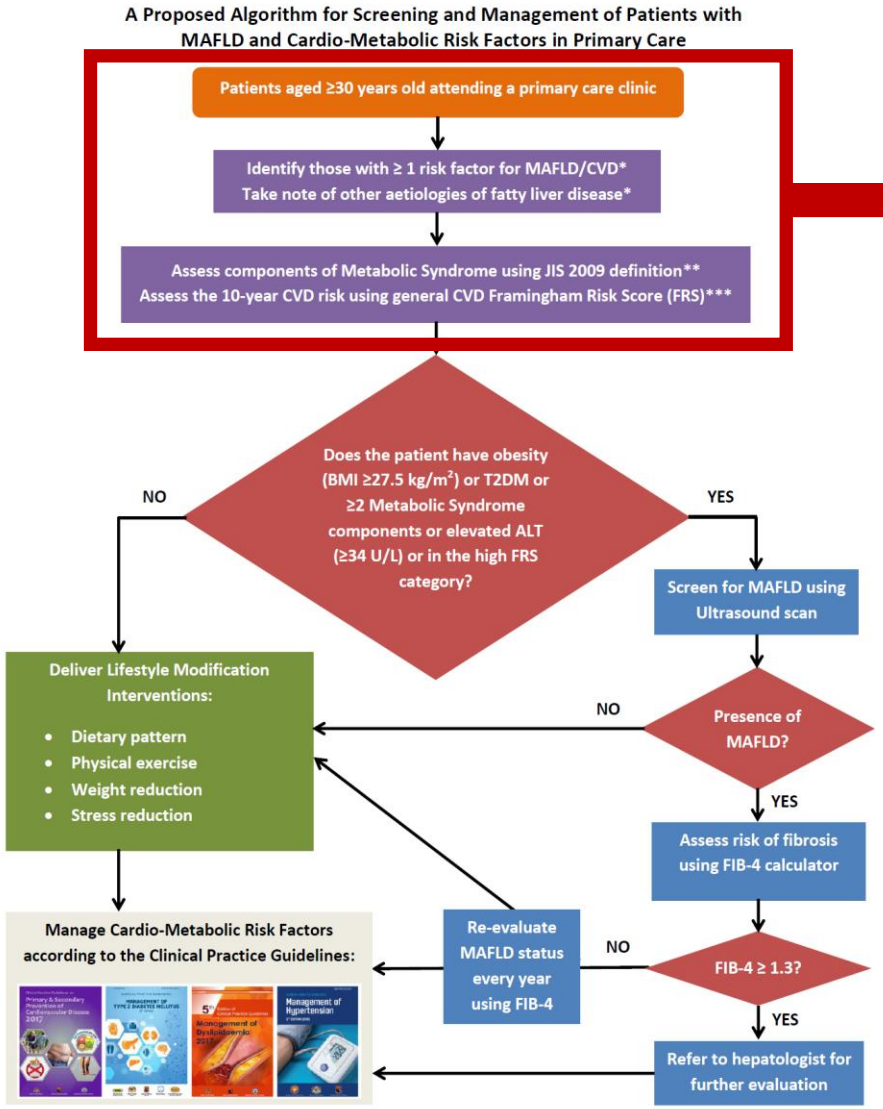
RECOMMENDATIONS BY THE APASL GUIDELINE



Targeted screening of high risk patients who **fulfil at least one** of these criteria:

- ❑ Overweight & Obese
- ❑ T2DM
- ❑ Presence of **≥ 2 Metabolic Syndrome** components:
  - WC ≥ 90cm (men), ≥ 80cm (women)
  - BP ≥ 130/85 mmHg or on treatment
  - TG ≥ 1.7 mmol/L or on treatment
  - HDL ≤ 1.0 mmol/L (men), ≤ 1.3 mmol/L (women) or on treatment
  - FBS 5.6 – 6.9 mmol/L

PROPOSED ALGORITHM FOR SCREENING AND MANAGEMENT OF MAFLD IN MALAYSIAN PRIMARY CARE

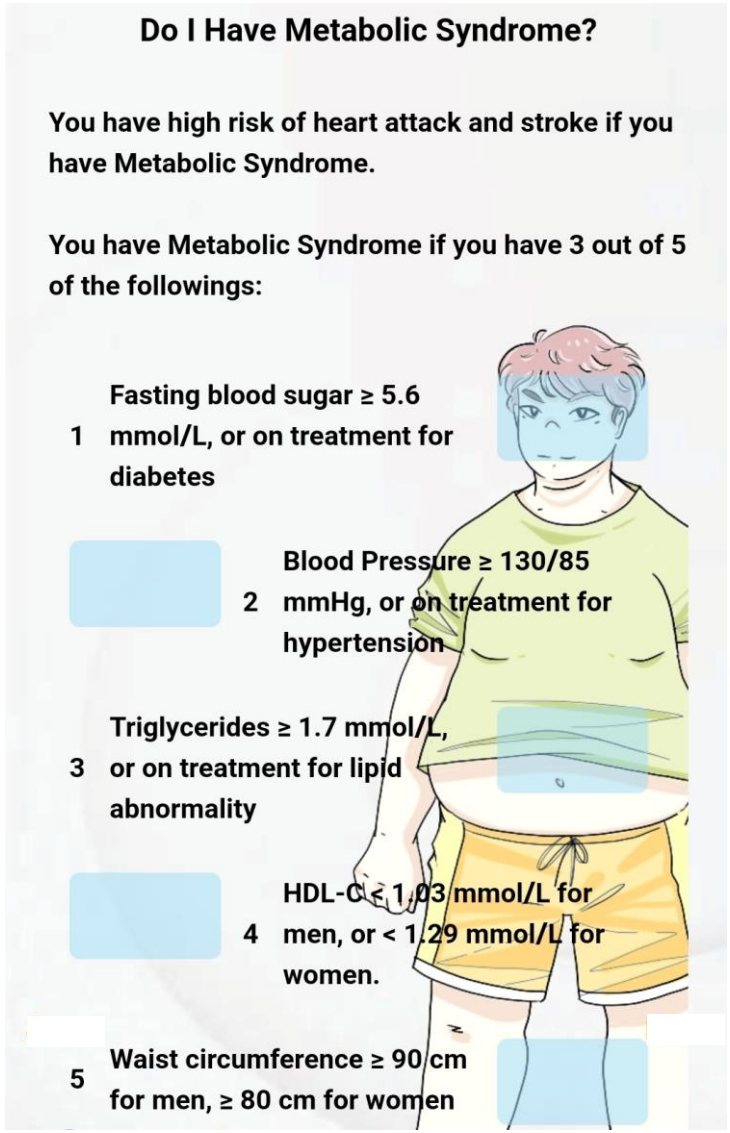


Screen for *risk factors in patients ≥30 years old:

- abnormal waist circumference (WC) ≥80 cm in women or ≥90 cm in men
- elevated blood pressure (BP) ≥130/85mmHg or on treatment for hypertension
- impaired fasting glucose (IFG) ≥5.6 mmol/L or random glucose ≥7.8 mmol/L or elevated HbA1c ≥7.0% or on treatment for elevated glucose or known Type 2 Diabetes Mellitus (T2DM)
- dyslipidaemia (TC ≥5.0 mmol/L, LDL-C ≥2.6, TG ≥1.7 mmol/L, HDL-C <1.0 mmol/L in men or HDL-C <1.3 mmol/L in women)
- abnormalities of liver enzymes (ALT ≥34 U/L or GGT >60 U/L)

Identification of these patients has the potential to detect those at **high cardio-metabolic risk** who are candidates for therapeutic interventions aimed at **prevention of MAFLD progression** as well as **ASCVD**

SCREENING FOR PATIENTS WITH METABOLIC SYNDROME IN MALAYSIAN PRIMARY CARE



Patients **aged ≥30 years** old attending a primary care clinic should be assessed for the presence of **Metabolic Syndrome** components using **JIS 2009 definition**

Alberti KGMM, Eckel RH, Grundy SM, Zimmet PZ, Cleeman JI, Donato KA, et al. Harmonizing the metabolic syndrome: a joint interim statement of the International Diabetes Federation Task Force on Epidemiology and Prevention; National Heart, Lung, and Blood Institute; American Heart Association; World Heart Federation; International Atherosclerosis Society; and International Association for the Study of Obesity. Circulation. 2009; 120:1640–5

Ramli AS, Daher AM, Nor-Ashikin MN, et al. JIS Definition Identified More Malaysian Adults with Metabolic Syndrome Compared to the NCEP-ATP III and IDF Criteria. Biomed Res Int. 2013; 760963. https://doi.org/10.1155/2013/760963

CVD RISK STRATIFICATION FOR PATIENTS AGED ≥30 YEARS IN MALAYSIAN PRIMARY CARE

10-YEAR GENERAL CVD FRAMINGHAM RISK SCORE

Very High Risk
- 10-year CVD risk of **> 30%**
- Established CVD
- Diabetes mellitus with proteinuria
- Stage 4 & 5 chronic kidney disease

High Risk
- 10-year CVD risk of **21-29%**
- Diabetes mellitus without target of damage
- Stage 3 chronic kidney disease
- Very high levels of individual risk factors (LDL-C > 4.9 mmol/L, BP > 180/110 mmHg)

Intermediate (Moderate) Risk
- 10-year CVD risk of **10-20%**

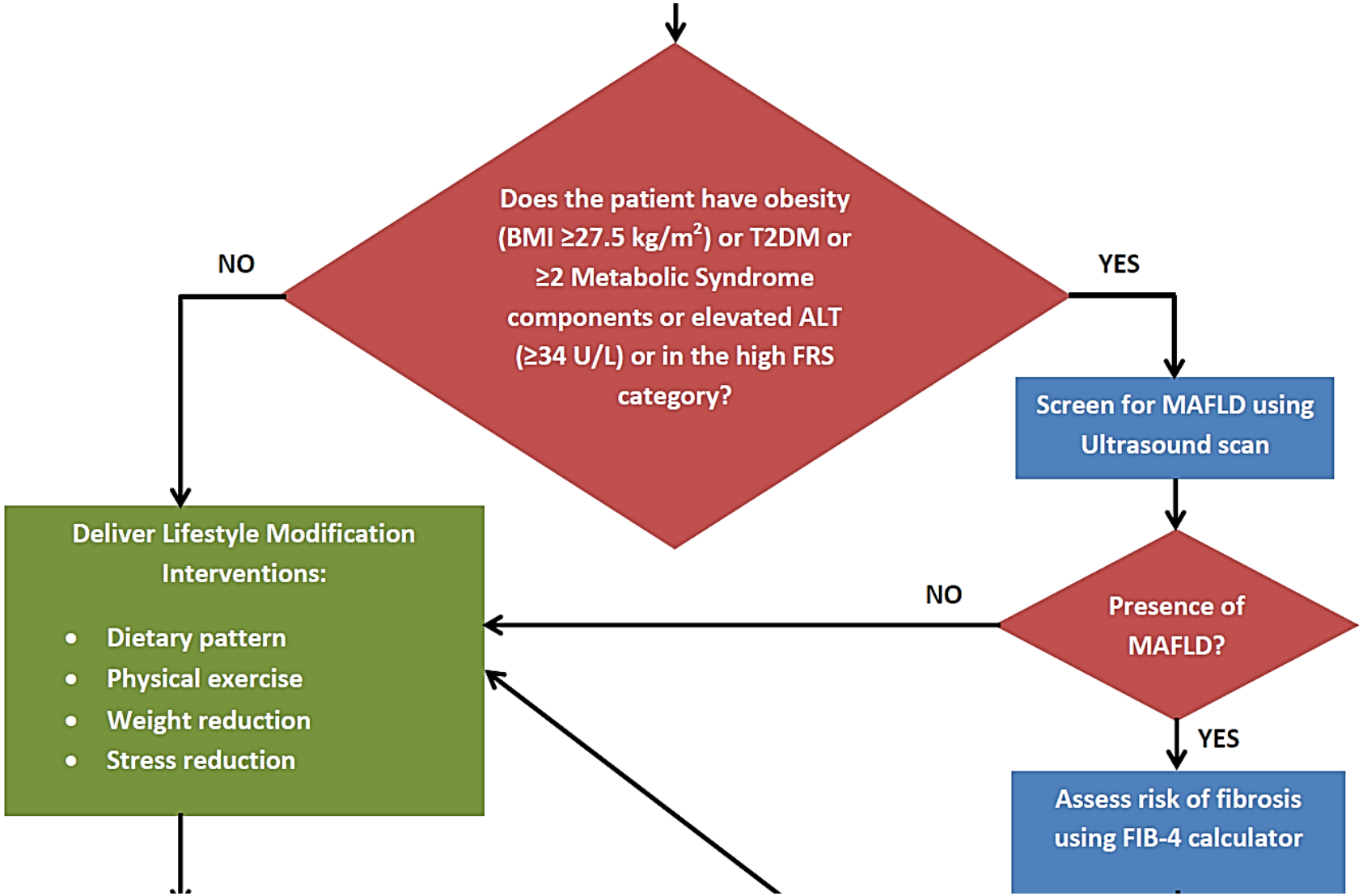
Low Risk
- 10-year CVD risk of **< 10%**

- Patients **aged ≥30 years** old attending a primary care clinic should be risk stratified using the **10-year general CVD Framingham Risk Score (FRS)**
- The cut-off age of ≥30 years is recommended as the prevalence of **cardio-metabolic risk factors rise exponentially** in **Malaysian adults aged ≥30 years**

Clinical Practice Guidelines on the Primary & Secondary Prevention of Cardiovascular Disease 2017. Putrajaya: Ministry of Health Malaysia, 2017. https://www.moh.gov.my/moh/resources/Penerbitan/CPG/CARDIOVASCULAR/3.pdf

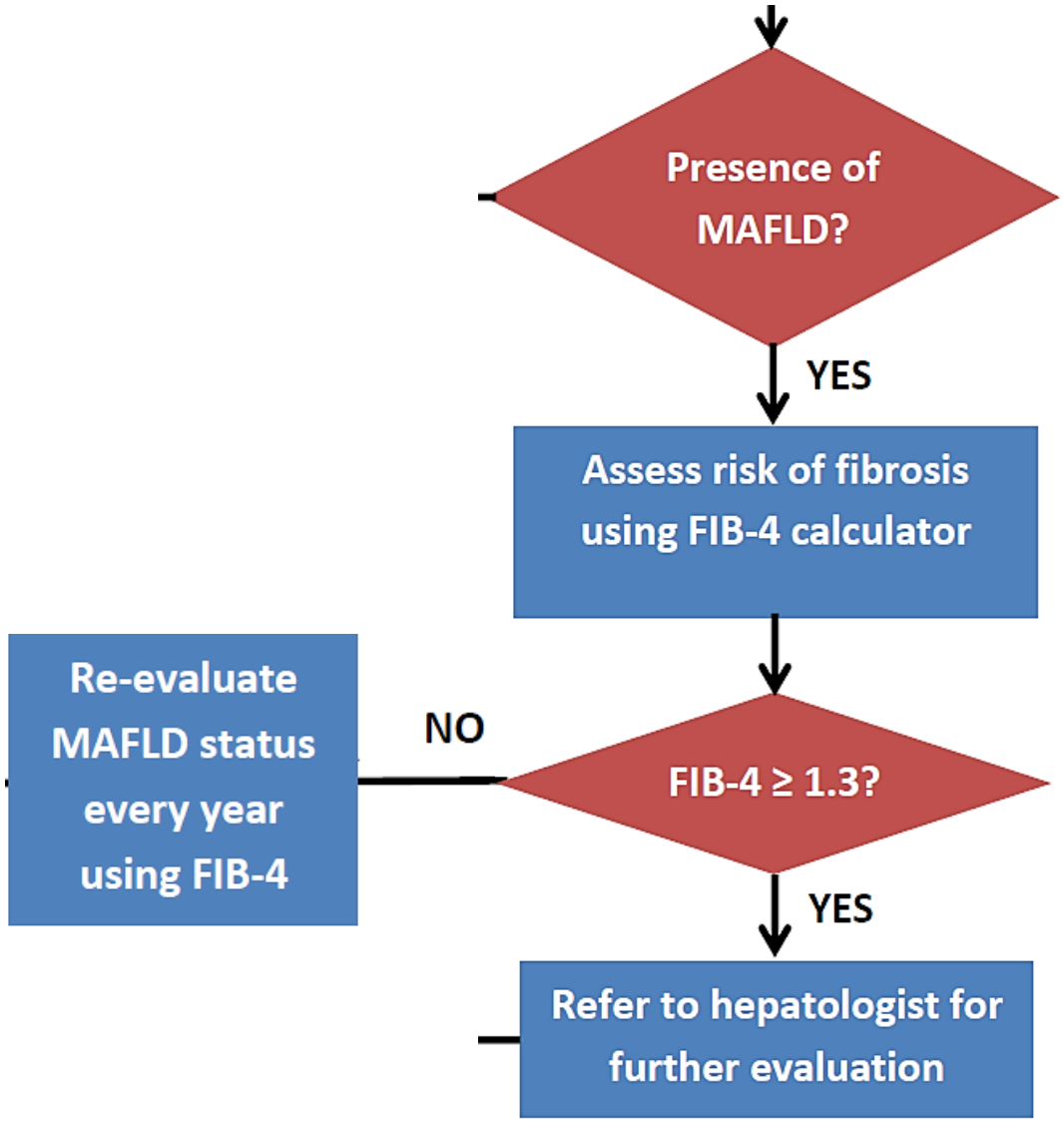
D'Agostino RB Sr, Vasan RS, Pencina MJ, Wolf PA, Cobain M, Massaro JM, et al. General cardiovascular risk profile for use in primary care: the Framingham Heart Study. Circulation. 2008; 117:743–53

PROPOSED ALGORITHM FOR SCREENING OF MAFLD IN MALAYSIAN PRIMARY CARE



If they are found to have **obesity** (BMI ≥27.5 kg/m2) or **T2DM** or **≥2 Metabolic Syndrome components** or **elevated ALT** (≥34 U/L) or in the **high FRS category**, they are recommended to have a **liver ultrasound to screen for MAFLD**

PROPOSED ALGORITHM FOR ASSESSING MAFLD SEVERITY IN MALAYSIAN PRIMARY CARE



- If they are found to have **MAFLD**, then the severity of the condition should be assessed using **FIB-4 scoring**

$$\text{FIB-4} = \frac{\text{Age (years)} \times \text{AST Level (U/L)}}{\text{Platelet Count } (10^9/L) \times \sqrt{\text{ALT (U/L)}}} =$$

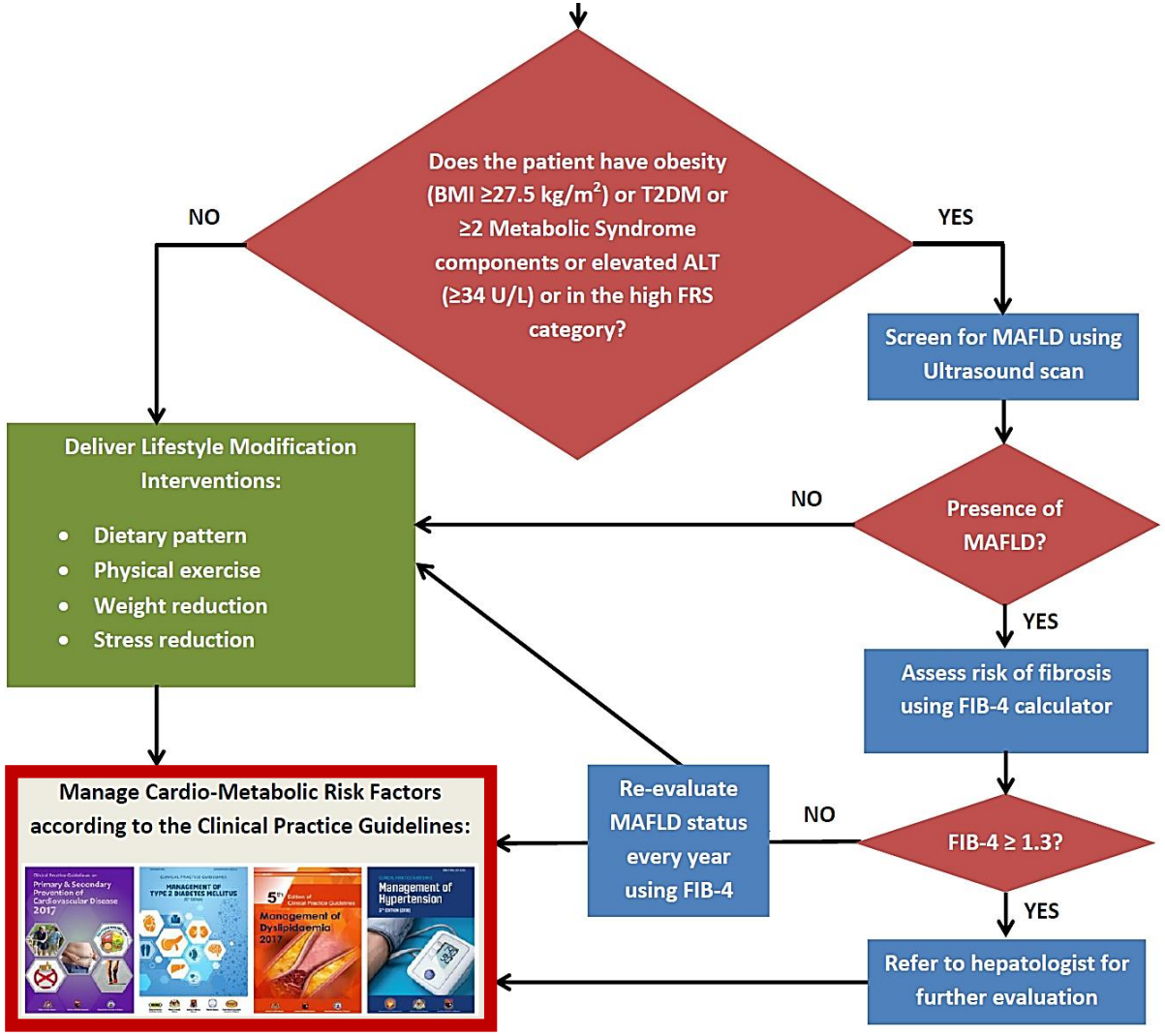
- Those with **FIB-4 of ≥ 1.3** should be referred to **hepatologist for further evaluation**

- Those with **FIB-4 of < 1.3** should be **re-evaluated annually**

Chan WK, Treeprasertsuk S, Goh GB, et al. Optimizing Use of Nonalcoholic Fatty Liver Disease Fibrosis Score, Fibrosis-4 Score, and Liver Stiffness Measurement to Identify Patients with Advanced Fibrosis. Clin Gastroenterol Hepatol. 2019; 17(12):2570-2580.e37. https://doi.org/10.1016/j.cgh.2019.03.006

How do we improve cardiovascular outcomes of patients with MAFLD?

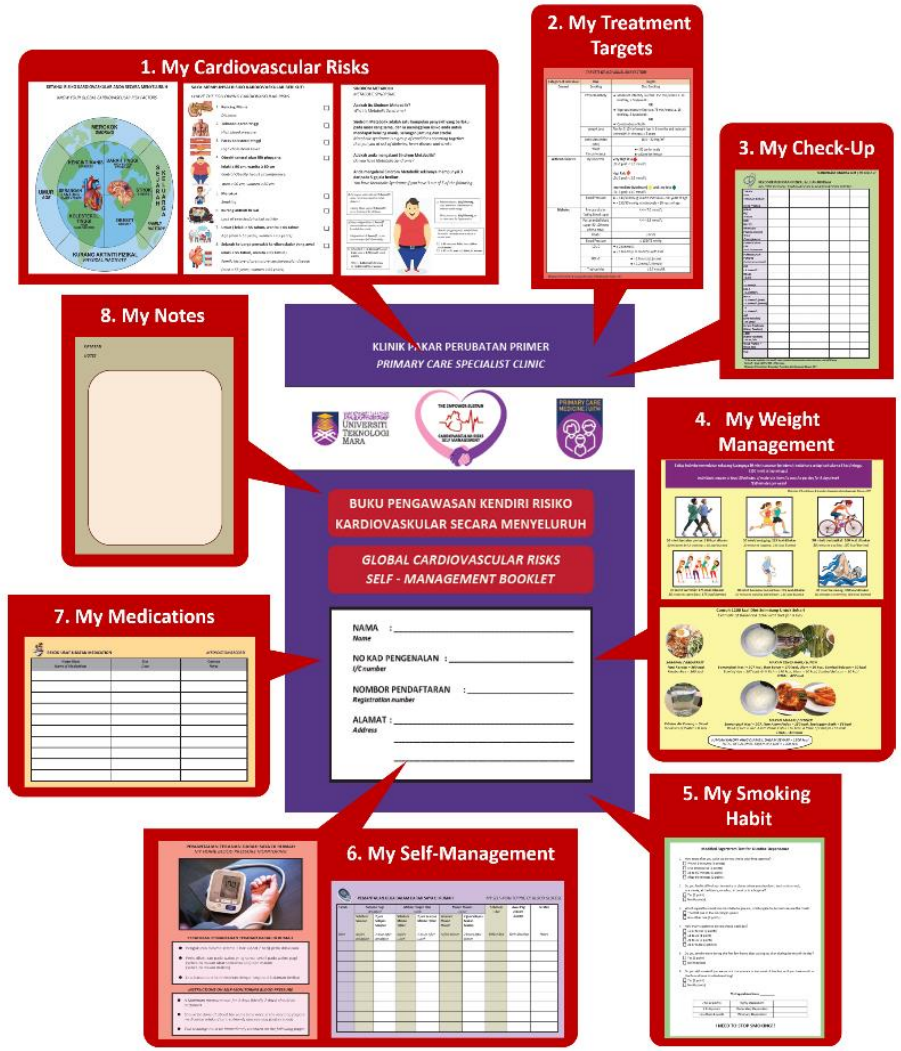
MANAGEMENT OF PATIENTS WITH MAFLD TO IMPROVE THEIR CARDIOVASCULAR OUTCOMES



- Patients with **MAFLD** and the co-existing **cardio-metabolic risk factors** should be targeted for **aggressive lifestyle intervention** and **risk factor management** in accordance with the relevant **Clinical Practice Guidelines**

- The ultimate **management goals** for these patients are to **prevent the progression of MAFLD** and to **prevent cardio-metabolic complications**

MANAGEMENT OF PATIENTS WITH MULTIPLE CARDIO-METABOLIC RISK FACTORS – PRACTICAL TIPS



MANAGEMENT OF PATIENTS WITH MULTIPLE CARDIO-METABOLIC RISK FACTORS – PRACTICAL TIPS

SAYA MEMPUNYAI RISIKO KARDIOVASKULAR BERIKUT:

I HAVE THE FOLLOWING CARDIOVASCULAR RISKS

1. **Kencing Manis** ☑
   Diabetes

2. **Tekanan darah tinggi** ☐
   High blood pressure

3. **Paras kolesterol tinggi** ☑
   High cholesterol Level

4. **Obesiti sentral ukur lilit pinggang:** ☑
   lelaki ≥ 90 cm, wanita ≥ 80 cm
   Central Obesity (waist circumference:
   men ≥ 90 cm, women ≥ 80 cm

5. **Merokok** ☐
   Smoking

6. **Kurang aktiviti fizikal** ☑
   Lack of exercise/physical activity

7. **Umur (lelaki > 55 tahun, wanita > 65 tahun** ☐
   Age (men > 55 years, women > 65 years)

8. **Sejarah keluarga penyakit kardiovaskular yang awal** ☐
   lelaki < 55 tahun, wanita < 65 tahun)
   Family history of premature cardiovascular disease
   (men < 55 years, women < 65 years)

RISIKO KARDIOVASKULAR SAYA | *MY CARDIOVASCULAR RISKS*

SINDROM METABOLIK
METABOLIC SYNDROME

Apakah itu Sindrom Metabolik?
What is Metabolic Syndrome?

Sindrom Metabolik adalah satu kumpulan penyakit yang berlaku pada masa yang sama, dan ia meninggikan risiko anda untuk mendapat kencing manis, serangan jantung dan stroke
Metabolic syndrome is a group of conditions occurring together that put you at risk of diabetes, heart disease and stroke

Adakah anda mengalami Sindrom Metabolik?
Do you have Metabolic Syndrome?

Anda mengalami Sindrom Metabolik sekiranya mempunyai 3 daripada 5 gejala berikut:
You have Metabolic Syndrome if you have 3 out of 5 of the following:

☑ *Paras gula dalam darah ≥ **5.6mmol/L**, atau menerima rawatan untuk diabetes*

*Fasting blood sugar ≥ **5.6mmol/L**, or on treatment for diabetes*

☑ *Tahap triglycerides ≥ **1.7mmol/L** , atau menerima rawatan untuk lemak dalam darah*

*Triglycerides ≥ **1.7mmol/L**, or on treatment for lipid abnormality*

☐ *Tahap HDL-C < **1.03mmol/L** untuk **lelaki**, atau < **1.29mmol/L** untuk **wanita***

*HDL-C < **1.03mmol/L** for **men**, or < **1.29mmol/L** for **women***

☐ *Tekanan darah ≥ **130/85mmHg**, atau menerima rawatan untuk tekanan darah tinggi*

*Blood pressure ≥ **130/85mmHg**, or on treatment for hypertension*

Ukur lilit pinggang anda melebihi had:
Your waist circumference is above a certain level:

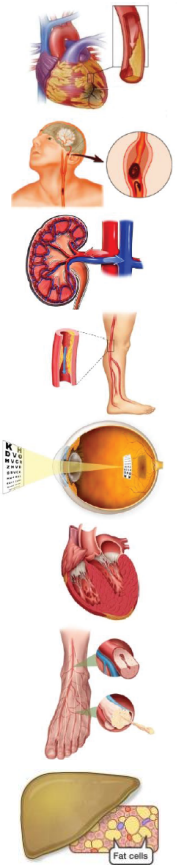
☑ *≥ **90 cm** untuk **lelaki** atau ≥ **80cm** untuk **wanita***
☑ *≥ **90** cm for **men** or ≥ **80cm** for **women***

K. G. M. M. Alberti, R. H. Eckel, S. M. Grundy et al., "Harmonizing the metabolic syndrome: a joint interim statement of the international diabetes federation task force on epidemiology and prevention; National Heart, Lung, and Blood Institute; American Heart Association; World Heart Federation; International Atherosclerosis Society; and International Association for the Study of Obesity," Circulation, vol. 120, no. 16, pp. 1640–1645, 2009

MANAGEMENT OF PATIENTS WITH MULTIPLE CARDIO-METABOLIC RISK FACTORS – PRACTICAL TIPS

SAYA MEMPUNYAI KOMPLIKASI BERIKUT :

I HAVE THE FOLLOWING COMPLICATIONS



1. **Serangan jantung/ penyakit jantung koronari** ☐
   Heart attack/ coronary heart disease
2. **Strok/ angin ahmar** ☐
   Stroke
3. **Kerosakan buah pinggang** ☐
   Kidney damage
4. **Penyakit vaskular periferi** ☐
   Peripheral vascular disease
5. **Masalah penglihatan** ☐
   Visual disturbances/ blindness
6. **Hipertrofi ventrikal kiri** ☐
   Left ventricular hypertrophy
7. **Gangguan saraf periferi** ☐
   Peripheral neuropathy
8. **Hati berlemak** ☑
   Fatty liver

RISIKO KARDIOVASKULAR SAYA | *MY CARDIOVASCULAR RISKS*

SKOR RISIKO FRAMINGHAM

	Skor Risiko Framingham Saya (%)
Risiko Yang Sangat Tinggi ■ Risiko penyakit Kardiovaskular dalam 10 tahun **> 30%** ■ Disahkan mempunyai penyakit Kardiovaskular ■ Kencing manis dan protein dalam urin ■ Penyakit buah pinggang kronik tahap 4 & 5	
Risiko Tinggi ■ Risiko penyakit Kardiovaskular dalam 10 tahun antara **21-29%** ■ Kencing manis tanpa kerosakan organ ■ Penyakit buah pinggang kronik tahap 3 ■ Tahap faktor risiko yang sangat tinggi (LDL-C > 4.9 mmol/L, BP > 180/110 mmHg)	✓ 25%
Risiko Sederhana ■ Risiko penyakit Kardiovaskular dalam 10 tahun antara **10-20%**	
Risiko Rendah ■ Risiko penyakit Kardiovaskular dalam 10 tahun **< 10%**	

**D'Agostino RB Sr, Vasan RS, Pencina MJ, Wolf PA, Cobain M, Massaro JM, Kannel WB: General cardiovascular risk profile for use in primary care:the Framingham Heart Study. Circulation. 2008; 117(6):743*

MANAGEMENT OF PATIENTS WITH MULTIPLE CARDIO-METABOLIC RISK FACTORS – PRACTICAL TIPS

SASARAN RAWATAN SAYA | *MY TREATMENT TARGETS*

KETAHUI SASARAN RAWATAN ANDA

Kategori Individu	Risiko	Sasaran
Umum	Merokok	Berhenti Merokok
	Aktiviti Fizikal	• Aktiviti fizikal sederhana: 150 minit/ minggu iaitu 30 minit/hari, 5 hari/seminggu **ATAU** • Aktiviti fizikal berat: 75 minit/minggu iaitu 15 minit/hari, 5 hari/seminggu **ATAU** • Gabungan kedua-duanya
	Penurunan Berat Badan	Sasarkan untuk menurunkan 5-10% berat badan dalam tempoh 6 bulan dan mengekalkan berat badan 1-2 tahun akan datang
	Indeks Jisim Tubuh (BMI)	18.5 – 22.9kg/m^2
	Ukur lilit Pinggang	• < 90 cm untuk lelaki • < 80cm untuk wanita
Tanpa Kencing Manis	Dislipidemia	**Risiko Yang Sangat Tinggi** ◆ Sasaran LDL-C: < 1.8mmol/L **Risiko Tinggi** ◆ Sasaran LDL-C: < 2.6mmol/L **Pertengahan (Sederhana)** ◆ **dan Risiko Rendah** ◆ Sasaran LDL-C: < 3.0mmol/L
	Tekanan Darah	• < 140/90mmHg untuk kebanyakan individu < 80 tahun • < 150/90mmHg untuk individu > 80 tahun
Kencing Manis	Paras gula dalam darah sebelum makan atau semasa berpuasa	4.4 – 7.0 mmol/L
	Paras gula dalam darah selepas makan (90-120 minit selepas makan)	4.4 – 8.5 mmol/L
	HbA1c	≤ 6.5%
	Tekanan Darah	≤ 135/75 mmHg
	LDL-C	• ≤ 2.6 mmol/L • < 1.8 mmol/L untuk pesakit yang mempunyai komplikasi kardiovaskular
	HDL-C	• > 1.0 mmol/L (lelaki) • > 1.2 mmo/L (wanita)
	Triglycerides	≤ 1.7 mmol/L

Malaysian CPG on Primary & Secondary Prevention of Cardiovascular Disease, 2017

PEMERIKSAAN RAWATAN SAYA | *MY CHECK-UP*

REKOD PEMERIKSAAN FIZIKAL & UJIAN BERKALA
ROUTINE PHYSICAL EXAMINATIONS & INVESTIGATIONS RECORD

TARIKH *Date*					
TEKANAN DARAH *Blood Pressure*					
BERAT (kg) *Weight*					
BMI (kg/m^2)					
UKUR LILIT PINGGANG (cm) *Waist Circumference*					
PEMERIKSAAN KAKI *Foot Assessment*					
PEMERIKSAAN FUNDUS *Fundus Assessment*					
FBS < 6.1 mmol/L					
HbA1c < 6.5 %					
TC < 5 mmol/L					
LDL-C < 2.6 mmol/L					
HDL-C > 1.0 mmol/L (male) > 1.2 mmol/L (female)					
TG < 1.7 mmol/L					
ALT (Liver Function) < 40 µmol/l					
Serum Creatinine (Kidney Function)					
eGFR (Kidney Function) > 90 mL/min					
Urine Protein / Urine ACR					
ECG					

**If the serum creatinine ≥100 µmol/l, please calculate the estimated creatinine clearance rate (eGFR) using Cockcroft - Gault, MDRD or CKD - EPI formulas.*

Malaysian CPG on Primary & Secondary Prevention of Cardiovascular Disease, 2017

MANAGEMENT OF PATIENTS WITH MULTIPLE CARDIO-METABOLIC RISK FACTORS – PRACTICAL TIPS

INDEKS JISIM TUBUH SAYA
MY BODY MASS INDEX

■ **FORMULA INDEKS JISIM (BMI) TUBUH**
BODY MASS INDEX (BMI) FORMULA

■ **BERAT(kg)÷TINGGI²(meter²)**
WEIGHT(kg)÷HEIGHT²(meter²)

KLASIFIKASI *CLASSIFICATION*	BMI (kg/meter²)
Kurang Berat Badan *Underweight*	< 18.5
Normal	18.5 – 22.9
Pre-Obese	23 – 27.4
Obese I	27.5 – 34.9
Obese II	35 – 39.9
Obese III	≥ 40

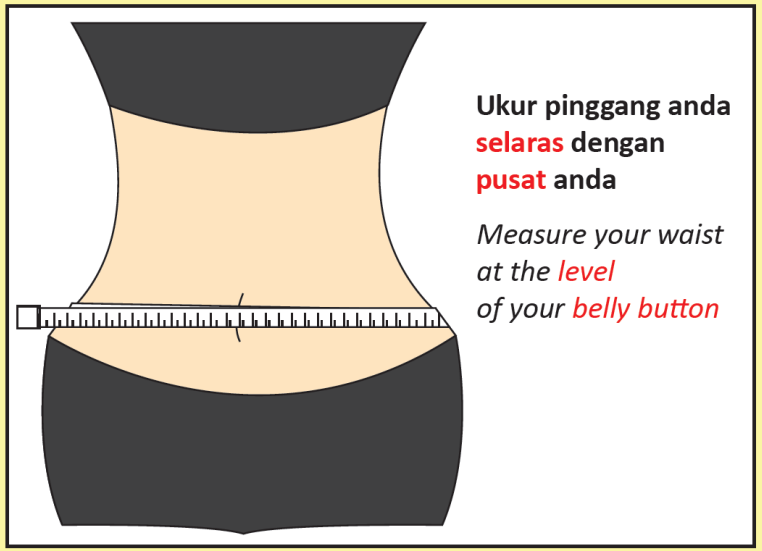
Malaysian CPG on Management of Obesity 2004

BERAT BADAN SAYA 85 **kg**
MY WEIGHT

BMI SAYA 33 **kg/m²**
MY BMI

PENGURUSAN BERAT BADAN SAYA | *MY WEIGHT MANAGEMENT*

UKUR LILIT PINGGANG SAYA
MY WAIST CIRCUMFERENCE



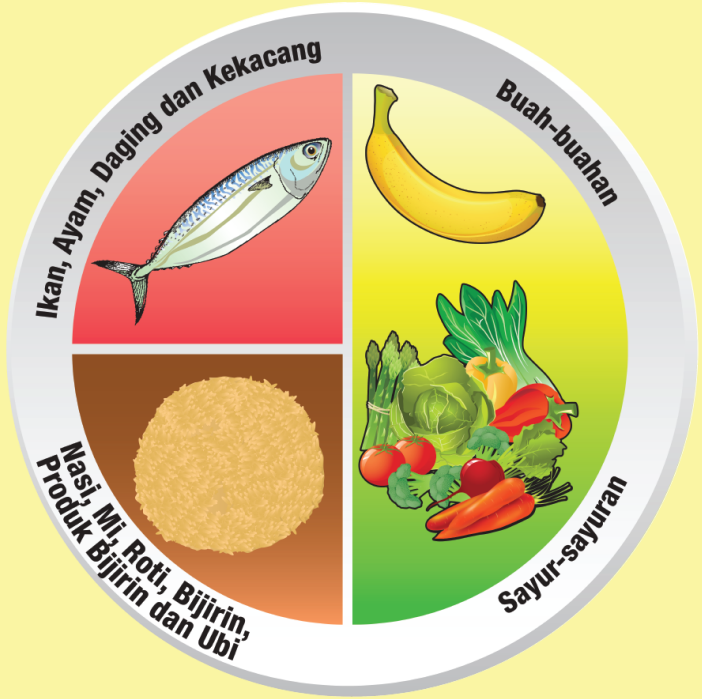
- *< 90 cm untuk lelaki atau < 80 cm untuk wanita*
- *< 90 cm for men or < 80 cm for women*

UKUR LILIT PINGGANG SAYA 98 **cm**
MY WAIST CIRCUMFERENCE

MANAGEMENT OF PATIENTS WITH MULTIPLE CARDIO-METABOLIC RISK FACTORS – PRACTICAL TIPS

PENGURUSAN BERAT BADAN SAYA | *MY WEIGHT MANAGEMENT*

Pinggan Suku Suku Separuh
Quarter Quarter Half Plate



- Makan 3 kali seh
  3 regular meals
- Hidangan tanpa
  Non-fried and so
- Makan malam s
  Have dinner bef
- 1-2 hidangan sn
  1-2 servings of h
- Makan makanar
  Have home cook
- Minum 8 gelas a
  Drink 8 glasses

Malaysian CPG on Primary & Second

PENGURUSAN BERAT BADAN SAYA | *MY WEIGHT MANAGEMENT*

Setiap individu memerlukan sekurang-kurangnya 30 minit senaman berintensiti sederhana setiap hari selama 5 hari/minggu (150 minit setiap minggu)

Individuals require at least 30 minutes of moderate intensity exercise per day for 5 days/week (150 minutes per week)

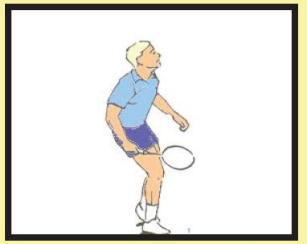
Malaysian CPG on Primary & Secondary Prevention of Cardiovascular Disease, 2017

30 minit berjalan pantas: 130 kcal dibakar
30 minutes brisk walking: 130 kcal burned

30 minit berjoging: 215 kcal dibakar
30 minutes jogging: 215 kcal burned

30 minit berbasikal: 160 kcal dibakar
30 minutes cycling: 160 kcal burned

30 minit aerobik: 175 kcal dibakar
30 minutes aerobics: 175 kcal burned



30 minit bermain badminton: 135 kcal dibakar
30 minutes playing badminton: 135 kcal burned

30 minit berenang: 300 kcal dibakar
30 minutes swimming: 300 kcal burned

MANAGEMENT OF PATIENTS WITH MULTIPLE CARDIO-METABOLIC RISK FACTORS – PRACTICAL TIPS

PEMANTAUAN TEKANAN DARAH SAYA DI RUMAH
MY HOME BLOOD PRESSURE MONITORING

PENJAGAAN KENDIRI SAYA | *MY SELF - MANAGEMENT*

PEMANTAUAN TEKANAN DARAH SAYA DI RUMAH *MY HOME BP MONITORING*

Tarikh *Date*	Tekanan Darah *Blood Pressure*	Catatan *Notes*	Tarikh *Date*	Tekanan Darah *Blood Pressure*	Catatan *Notes*

PENJAGAAN KENDIRI SAYA | *MY SELF - MANAGEMENT*

PERATURAN PEMANTAUAN GULA DALAM DARAH DI RUMAH

✓ Sila pantau mengikut peraturan yang telah ditanda "✓" oleh doctor anda.

Sasaran gula dalam darah	
Tahap gula sebelum makan	4 – 6 mmol/L *4 – 8 mmol/L untuk warga emas dan pesakit yang mempunyai risiko 'hypoglycaemia' yang tinggi
Tahap gula selepas makan & sebelum tidur	4 – 8 mmol/L
Pemantauan	
Insulin 'basal' sebelum tidur	Pantau tahap gula sebelum sarapan esok harinya.

PENJAGAAN KENDIRI SAYA | *MY SELF - MANAGEMENT*

PEMANTAUAN GULA DALAM DARAH SAYA DI RUMAH *MY SELF-MONITORING OF BLOOD GLUCOSE*

Tarikh	Sarapan Pagi *Breakfast*		Makan Tengah Hari *Lunch*		Makan Malam *Dinner*		Sebelum Tidur	Awal Pagi 2.00am-3.00am	Catatan
	Sebelum Sarapan	2 jam Selepas Sarapan	Sebelum Makan T/Hari	2 jam Selepas Makan T/Hari	Sebelum Makan Malam	2 jam Selepas Makan Malam			
Date	*Before Breakfast*	*2 hour After Breakfast*	*Before Lunch*	*2 hours After Lunch*	*Before Dinner*	*2 hours After Dinner*	*Before Bed*	*Early Morning*	*Notes*

EVIDENCE SUPPORTING THE USE OF SELF-MANAGEMENT BOOKLET IN PRIMARY CARE

Ramli *et al. BMC Family Practice* (2016) 17:157
DOI 10.1186/s12875-016-0557-1

BMC Family Practice

RESEARCH ARTICLE Open Access

Effectiveness of the EMPOWER-PAR Intervention in Improving Clinical Outcomes of Type 2 Diabetes Mellitus in Primary Care: A Pragmatic Cluster Randomised Controlled Trial

Anis Safura Ramli[1,2*], Sharmini Selvarajah[3], Maryam Hannah Daud[1,2], Jamaiyah Haniff[4], Suraya Abdul-Razak[1,2], Tg Mohd Ikhwan Tg-Abu-Bakar-Sidik[4], Mohamad Adam Bujang[4], Boon How Chew[5], Thuhairah Rahman[2], Seng Fah Tong[6], Asrul Akmal Shafie[7], Verna K. M. Lee[8], Kien Keat Ng[9], Farnaza Ariffin[1], Hasidah Abdul-Hamid[1], Md Yasin Mazapuspavina[1], Nafiza Mat-Nasir[1], Chun W. Chan[8], Abdul Rahman Yong-Rafidah[10], Mastura Ismail[11], Sharmila Lakshmanan[4], Wilson H. H. Low[12] and for the EMPOWER-PAR Investigators

were designed based on four elements of the chronic care model i.e. healthcare organisation, delivery system design, self-management support and decision support. The primary outcome was the change in the proportion of patients achieving HbA1c < 6.5%. Secondary outcomes were the change in proportion of patients achieving targets for blood pressure, lipid profile, body mass index and waist circumference. Intention to treat analysis was performed for all outcome measures. A generalised estimating equation method was used to account for baseline differences and clustering effect.
(Continued on next page)

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eISSN: 1857-9655
Category: *B - Clinical Sciences*
Section: *Endocrinology*

Effectiveness of the EMPOWER-PAR Intervention on Primary Care Providers' Adherence to Clinical Practice Guideline on the Management of Type 2 Diabetes Mellitus: A Pragmatic Cluster Randomised Controlled Trial

Maryam Hannah Daud[1,2], Anis Safura Ramli[1,2]*, Suraya Abdul-Razak[1,2], Jamaiyah Haniff[3], Tg Mohd Ikhwan Tg Abu Bakar Sidik[3], Nur Khairul Bariyyah Mohd Hatta[3], Sarimah Mahmood[1], Sharmila Lakshmanan[3]

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Edited by: Slavica Hristomanova-Mitkovska
Citation: Daud MH, Ramli AS, Abdul-Razak S, Haniff J, Tg-Abu-Bakar-Sidik TMI, Mohd-Hatta NKB, Mahmood S, Lakshmanan S. Effectiveness of the EMPOWER-PAR

Abstract

AIM: The objective of this study was to evaluate the effectiveness of the EMPOWER- PAR intervention, a multifaceted strategy based on the chronic care model (CCM) on primary care providers' (PCP) adherence to type 2 diabetes mellitus (T2DM) clinical practice guideline (CPG) in the Malaysian primary care setting.

Hatta, Sanmah Mahmood, Sharmila Lakshmanan
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Competing Interests: The authors have declared that no competing interests exist.

(2.4% vs. 0.6%, p<0.001); performing funduscopy/fundus photography (1.5% vs. 0.3%, p<0.001); monitoring renal profile (0.9% vs. −0.6%, p=0.001); measuring urine protein (1.2% vs. 0.6%, p<0.001), and giving lifestyle modification and self-management advice (1.2% vs. −0.3%, p<0.001) in the intervention versus control groups, respectively.

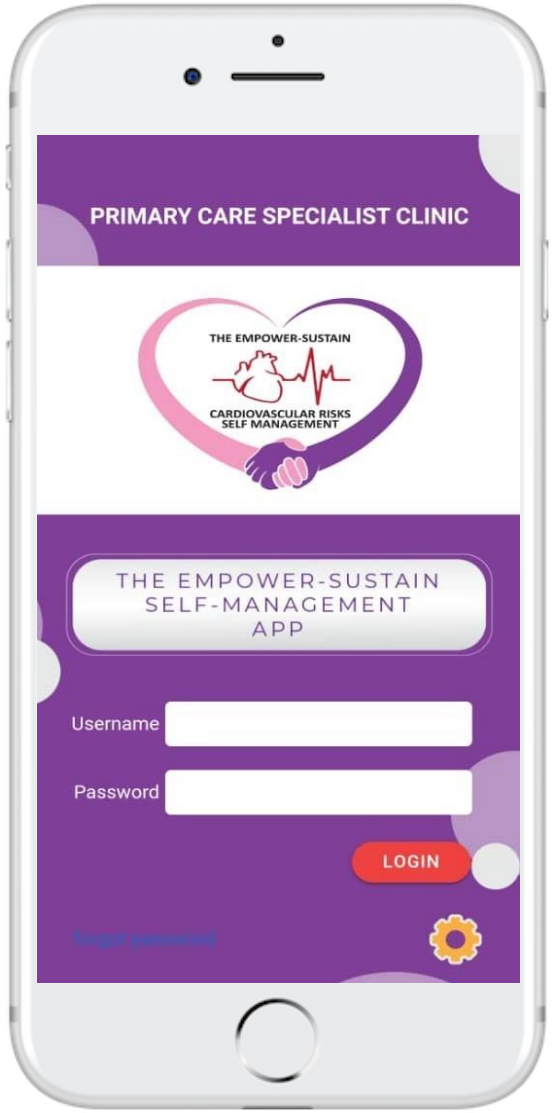
CONCLUSION: The EMPOWER-PAR intervention has been proven to be effective in improving the PCPs' adherence to T2DM CPG in several indicators of care. Findings from this study provided objective evidence of the effectiveness of multifaceted intervention based on the CCM in the Malaysian public primary care setting.

TRIAL REGISTRATION: Registered with: ClinicalTrials.gov: NCT01545401. Date of registration: 1st March 2012.

Utilisation of the booklet as part of the multifaceted intervention has been shown to be effective in improving glycaemic control in patients with diabetes and in improving adherence to CPG among primary care providers in Malaysia

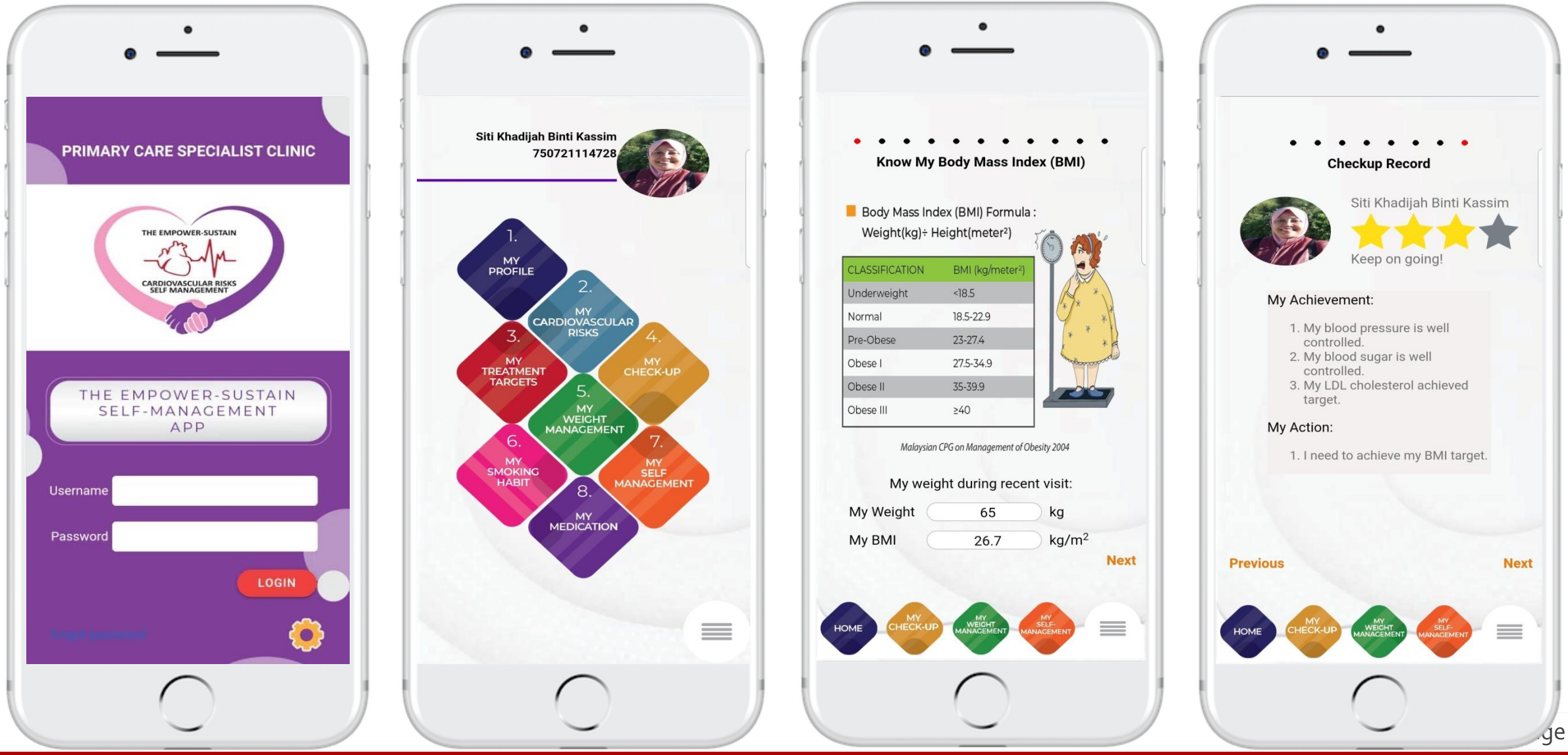
THE EMPOWER-SUSTAIN E-HEALTH INTERVENTION PROJECT

PRGS/MOHE 600-IRMI/PRGS 5/3 (003/2019)



https://coder.uitm.edu.my/empowerWeb/index.php

THE EMPOWER-SUSTAIN MOBILE APP



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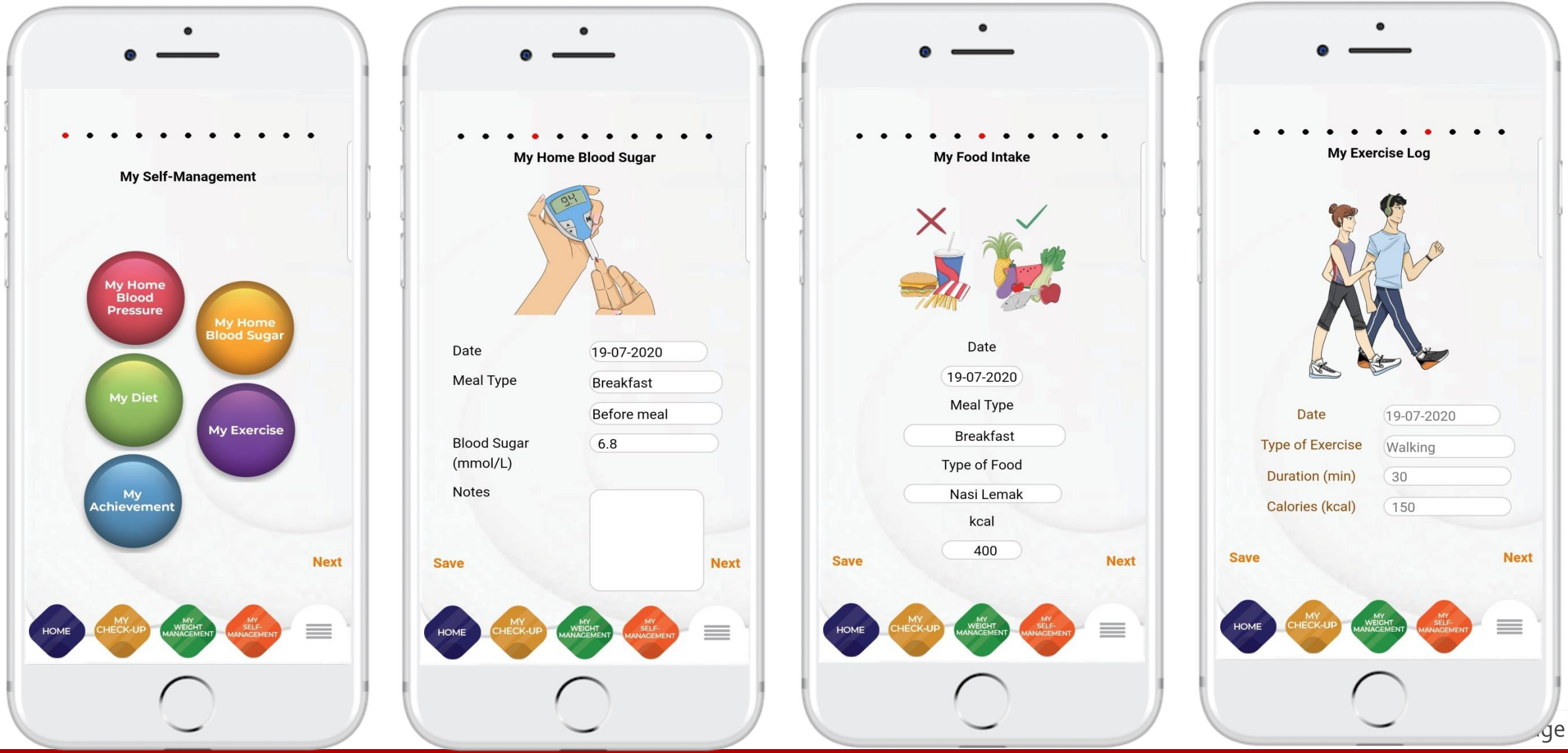
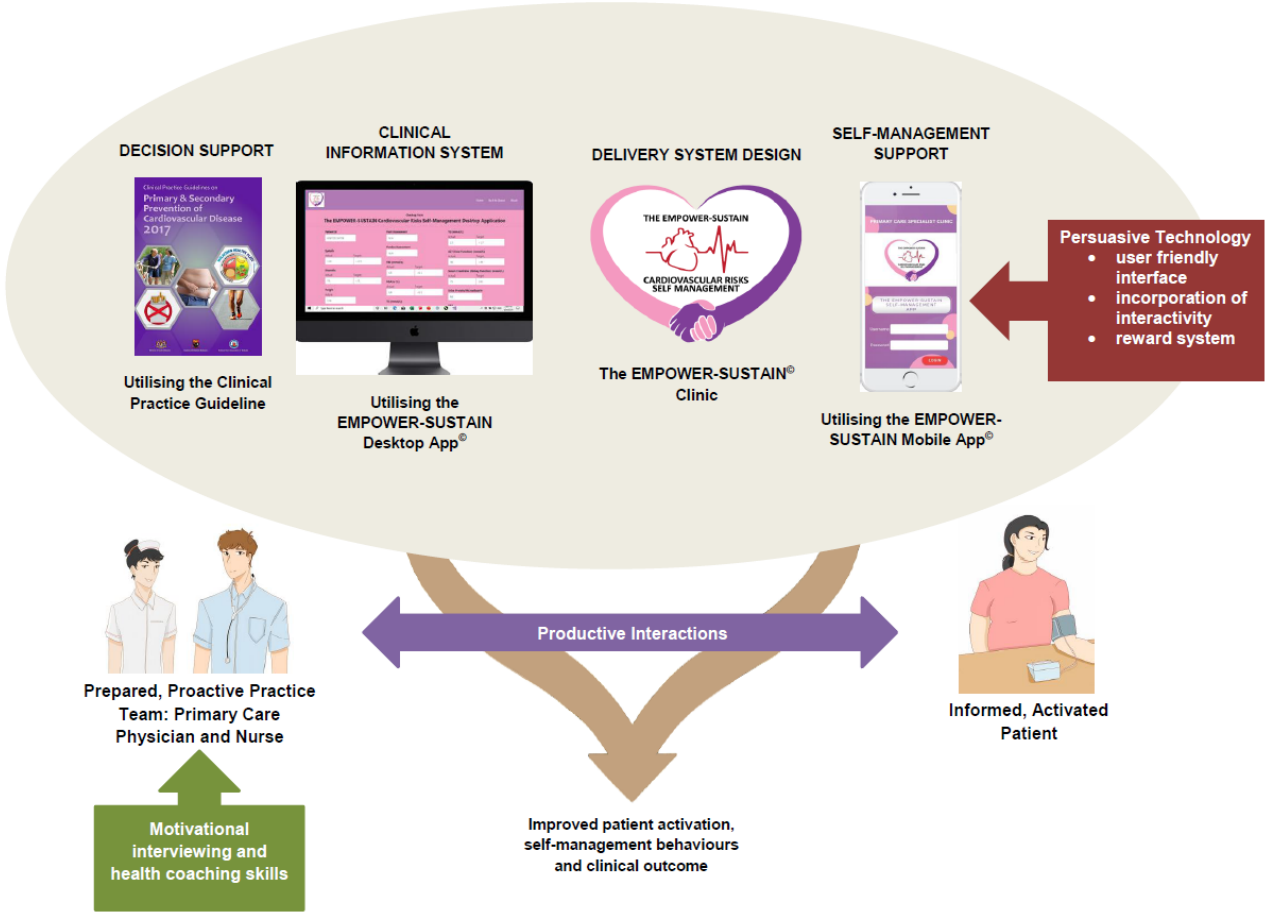


THE EMPOWER-SUSTAIN E-HEALTH INTERVENTION PROTOCOL PAPER



https://trialsjournal.biomedcentral.com/articles/10.1186/s13063-020-04237-x

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Trials

STUDY PROTOCOL Open Access

The EMPOWER-SUSTAIN e-Health Intervention to improve patient activation and self-management behaviours among individuals with Metabolic Syndrome in primary care: study protocol for a pilot randomised controlled trial

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Abstract

Background: Epidemiological studies conducted in various parts of the world have clearly demonstrated that metabolic syndrome (MetS) is an increasing global health problem, not only in Western societies but also in Asian populations. Web-based and mobile phone-based self-management applications have been proven to be effective in improving self-management behaviour of patients with MetS components (i.e., diabetes or hypertension). However, evidence is lacking in terms of their effectiveness specifically for patients with MetS. The aim of this pilot study is to evaluate the feasibility and potential effectiveness of the EMPOWER-SUSTAIN Self-Management e-Health Intervention in improving activation and self-management behaviours among patients with MetS. This paper presents the study protocol.

(Continued on next page)

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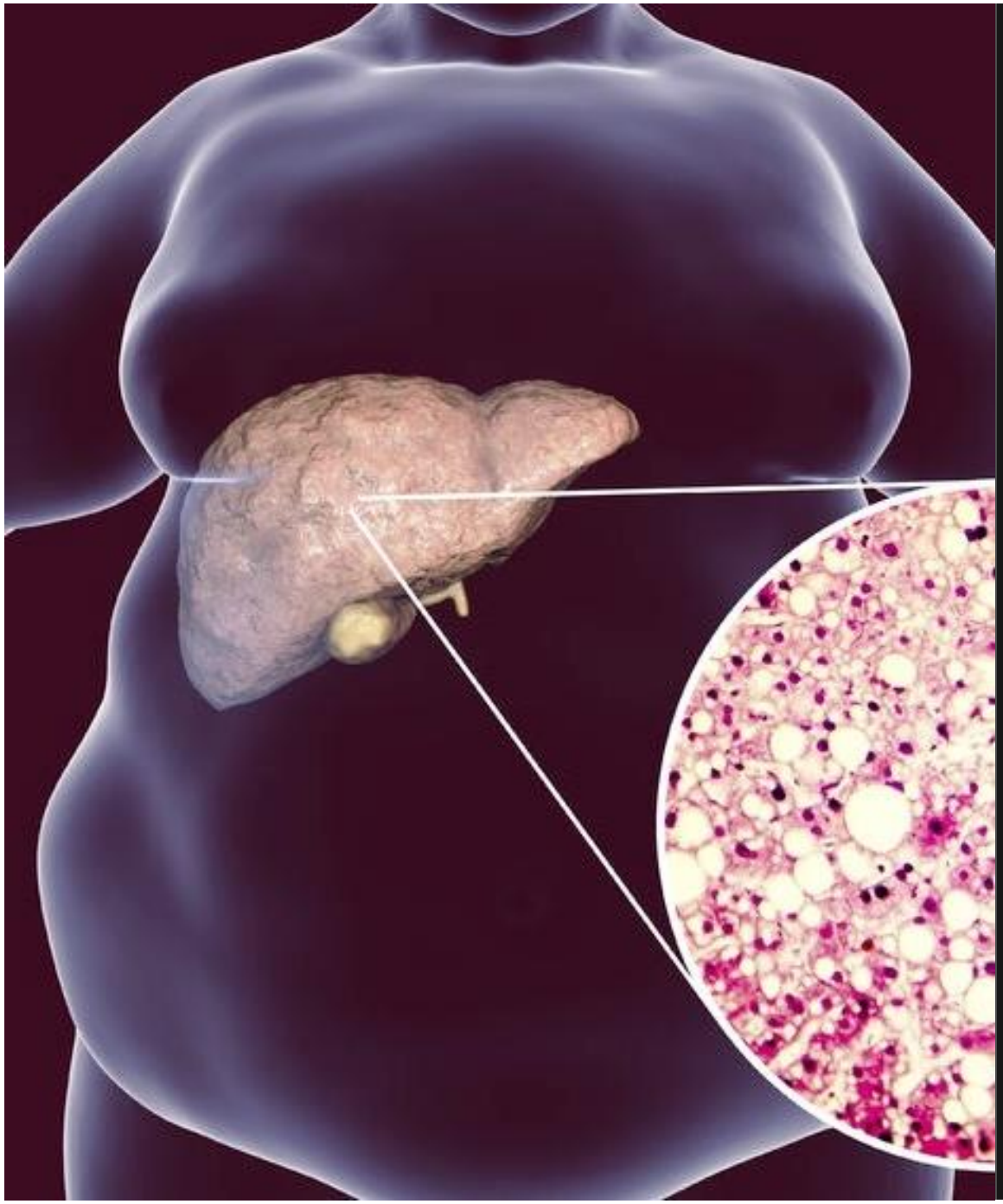
TAKE HOME MESSAGE

01 MAFLD and CVD are both manifestations of end-organ damage of the Metabolic Syndrome

02 MAFLD is highly prevalent in Malaysian primary care

03 MAFLD should be screened in patients aged ≥30 years old who have cardio-metabolic risk factors

04 The goal of management is to prevent cardio-metabolic complications and progression to liver fibrosis



Thank You

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