CARDIAC RISK FACTORS: AN UPDATE

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Outline of Talk

- Overview of the traditional cardiovascular risk factors
  - Hypertension
  - High cholesterol
  - Diabetes
- Dietary considerations
- Role of exercise

Non-modifiable risk factors

- Age
- Gender
  - Several large observational studies show that males have at least 20% higher risk of CVD independent of differences in risk factors
- Family history
  - Especially if there is a family history of premature disease
    - M 55, F 65

Non-modifiable risk factors

Table 7 Correction factors for the Systemic COronary Risk Evaluation (SCORE) cardiovascular risk estimates in first-generation immigrants to Europe[35]

Region of origin	Multiplication factor
Southern Asia	1.4
Sub-Saharan Africa	1.3
Caribbean	1.3
Western Asia	1.2
Northern Africa	0.9
Eastern Asia	0.7
Southern America	0.7

Hypertension – What's New?

- ESC and ACC/AHA have published updated guidelines on management of Hypertension in 2017/8
- ACC/AHA provide new definition of hypertension >130/80 for everyone, ESC retains 140/90 as cut-off
  - MOH 2017 guidelines still use established definition as per ESC
- On therapy, aim for target BP <130/80
  - ACC/AHA also include elderly >65
  - ESC advocate for <140/80 first for >65 and lower if tolerated

Hypertension

- Low salt diet is crucial
  - Failure to adhere to low salt diet (<6g/day) is a significant cause of resistant hypertension
  - Can lower BP by up to 5/3mmHg
- Tips to reduce salt intake
  - Cook with less salt, sauces, stock cubes and seasoning powders
  - Enhance the taste of food with natural herbs (onion, ginger, garlic, chilli, parsley etc)
  - Avoid use of salted and preserved food – e.g. ikan bilis, salted fish, salted eggs, sausages
  - Avoid drinking up the soup stocks and sauces
- Moderation of alcohol intake (if high) helps

Dyslipidemia – What's New?

- ESC/EAS published new guidelines in 2019
  - Very high risk: target LDL "bad cholesterol" <1.4mmol/L
  - High risk target <1.8mmol/L
  - Moderate risk target <2.6mmol/L
  - Low risk target <3.0mmol/L

Very-high-risk	People with any of the following: Documented ASCVD, either clinical or unequivocal on imaging. Documented ASCVD includes previous ACS (MI or unstable angina), stable angina, coronary revascularization (PCI, CABG, and other arterial revascularization procedures), stroke and TIA, and peripheral arterial disease. Unequivocally documented ASCVD on imaging includes those findings that are known to be predictive of clinical events, such as significant plaque on coronary angiography or CT scan (multivessel coronary disease with two major epicardial arteries having >50% stenosis), or on carotid ultrasound. DM with target organ damage,[a] or at least three major risk factors, or early onset of T1DM of long duration (>20 years). Severe CKD (eGFR <30 mL/min/1.73 m^2). A calculated SCORE ≥10% for 10-year risk of fatal CVD. FH with ASCVD or with another major risk factor.

Coronary Artery Calcium Scoring

- CT scan (1mSv similar to screening mammogram) that measures calcium levels in coronary arteries
- Score > 100 associated with increased rates of coronary heart disease and is significant
- Endorsed by guidelines in
  - Asymptomatic patients (no CVD)
  - Low or moderate risk
  - Not meeting LDL targets with lifestyle modification
- If CAC score high advise cholesterol-lowering medicine
- Cost effective
- Improves adherence to treatment
- Score is increased following treatment - not as useful

Healthy Diet

- Most important dietary factor associated with poor health outcomes is overnutrition – maintain caloric balance
  - Based on age, sex, weight and activity level (2000-3000 Calories)
- Carbohydrates 45-65%
  - Ideally low GI
    - Fruits, vegetables, brown rice, wholemeal bread, whole wheat biscuits, oats
    - Limit added sugars
- Protein 10-35%
  - Fish, lean meat, poultry without skin, eggs, beans, soy, unsalted nuts and seeds
- Fats 20-35%
  - Ideally poly- or mono-unsaturated rather than trans/saturated (<10%)
    - Steam, grill, bake, roast, boil or pan fry with less oil
  - Fish oil supplementation may reduce risk of MI and cardiovascular death but further studies are needed
    - Oily fish 2 times/week

Sources and main effects of dietary fat

Type of fat	Chief food sources	Leading food contributors in diets of adults in the United States*	Effects on cholesterol	Effects on coronary heart disease
Trans fatty acids, from partially hydrogenated vegetable oils	Stick and full-fat margarine; commercial baked goods; deep-fried foods	Fast food; margarines; commercial baked goods (sweet rolls, cookies, donuts)	Increases LDL cholesterol, lowers HDL cholesterol	Increases risk of coronary heart disease
Saturated fatty acids	Dairy foods; red meat; some plant oils (coconut, palm)	Dairy foods, especially cheese, milk, ice cream; red meat	Increases total cholesterol	May increase risk of coronary heart disease
Monounsaturated fatty acids	Vegetable sources (canola, olive oil); also from meat, dairy	Beef; margarines; chicken; olive oil	Lowers LDL cholesterol and triglycerides, maintains HDL cholesterol	Probably has no association
Polyunsaturated fatty acids; n-6	Safflower, sunflower, and corn oils	Mayonnaise; margarines; salad dressing; nuts; chicken; peanut butter	Lowers LDL cholesterol and triglycerides, increases HDL	May reduce risk of coronary heart disease
Polyunsaturated fatty acids; n-3	Canola, soybean, flaxseed, walnut oil, wheat germ, vegetables of cabbage family For longer-chain n-3 fatty acids: seafood, especially fatty fish	Alpha-linolenic acid (18:3): mayonnaise, salad dressing, margarines, beef; longer-chain n-3: tuna, other dark fish, shrimp	Lowers LDL cholesterol and triglycerides, maintains HDL cholesterol	May reduce risk of coronary heart disease

Leading food contributors combines the fatty acid content of the food with the frequency with which individuals eat that food.

LDL: low-density lipoprotein; HDL: high-density lipoprotein.
* Data from participants in the ongoing Nurses' Health Study (women) and Health Professionals' Follow-up Study (men).

CENTRAL ILLUSTRATION: Evidence for Cardiovascular Health Impact of Foods Reviewed

Summary of heart-harmful and heart-healthy foods/diets

Evidence of harm; limit or avoid

- **Coconut oil** and **palm oil** are high in saturated fatty acids and raise cholesterol
- **Eggs** have a serum cholesterol-raising effect
- **Juicing** of fruits/vegetables with pulp removal increases caloric concentration*
- **Southern diets** (added fats and oils, fried foods, eggs, organ and processed meats, sugar-sweetened drinks)

Inconclusive evidence; for harm or benefit

- **Sunflower oil and other liquid vegetable oils**
- High-dose antioxidant **supplements**
- **Juicing** of fruits/vegetables without pulp removal*
- **Gluten-containing foods** (for people without gluten-related disease)

Evidence of benefit; recommended

- **Extra-virgin olive oil** reduces some CVD outcomes when consumed in moderate quantities
- **Blueberries** and **strawberries** (>3 servings/week) induce protective antioxidants
- 30 g serving of **nuts**/day. Portion control is necessary to avoid weight gain.†
- **Green leafy vegetables** have significant cardio-protective properties when consumed daily
- **Plant-based proteins** are significantly more heart-healthy compared to animal proteins

Freeman, A.M. et al. J Am Coll Cardiol. 2017;69(9):1172-87.

Specific beneficial diets - Mediterranean

- High level of monounsaturated fat (olive oil)
- Moderate consumption of alcohol
- Vegetables, fruits, legumes, grains
- Moderate milk and dairy (cheese)
- Low intake of meat
- Lower cardiovascular mortality in observational studies, improved glycaemic control in diabetic patients

DASH Diet

- 4-5 servings of fruits, vegetables and 2-3 servings of low-fat dairy
- <25% dietary intake from fat
- BP improvement up to 11/5 in hypertensive patients
- Associated weight loss, improvement in LDL
- Omniheart study recently showed that partial replacement of carbohydrates with protein or unsaturated fat even better

ARTICLE

Jump to

Plant-Based Diets Are Associated With a Lower Risk of Incident Cardiovascular Disease, Cardiovascular Disease Mortality, and All-Cause Mortality in a General Population of Middle-Aged Adults

Hyunju Kim, Laura E. Caulfield, Vanessa Garcia-Larsen, Lyn M. Steffen, Josef Coresh, and Casey M. Rebholz

Originally published 7 Aug 2019 | https://doi.org/10.1161/JAHA.119.012865 | Journal of the American Heart Association. 2019;8:e012865

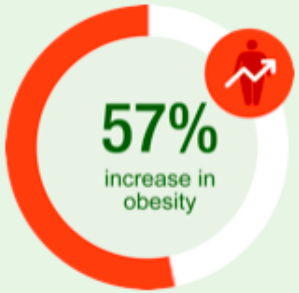
Plant-based diet

- Observational study of over 12000 US subjects between 1987 to 2016 (ARIC cohort)
- Diets were graded according to degree plant-based
- The diets that were most plant-based:
  - 16% lower risk of CVD
  - 32% lower risk of CV mortality
  - 25% lower risk of all-cause mortality

MY HEALTHY PLATE

With all the food to choose from daily, it helps when we make the right choices to stay well-nourished. After all, no single food can provide all the nutrients your body needs – you require a wide variety of food, taken in moderation, in the right balance, daily.

WHAT IS WRONG WITH OUR EATING HABITS?



The National Health Survey 2010 showed that 1 in 9 Singaporeans aged 18 to 69 is obese; a 57% increase from 2004.

Singaporeans are facing an increased risk of chronic ailments such as heart disease, diabetes, and certain types of cancer.

With a diet containing mostly refined carbohydrates and bad fats and oils with few fruit and vegetables, Singaporeans need to eat more healthily and reduce calorie intake to enjoy a better quality of life. My Healthy Plate is intended to help Singaporeans all take a step in this direction.

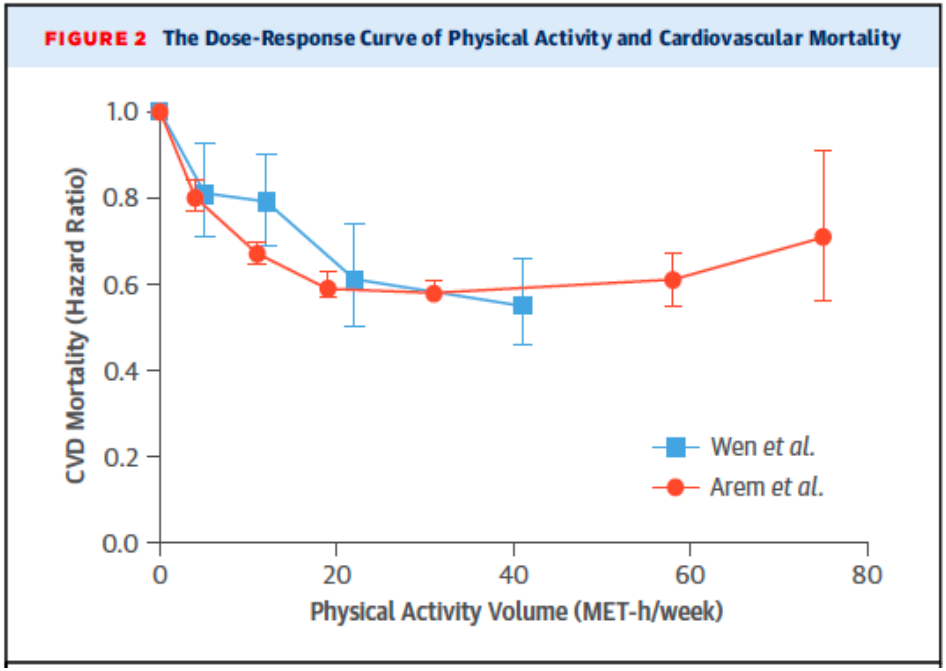
Role of exercise

- Guidelines recommend 150min/week moderate-intensity or 75min/week vigorous-intensity aerobic exercise
- Benefits start even with minimal activity
  - Standing >2hr/day - 10% reduction in mortality
  - Dose-response relationship

TABLE 1 Examples of Moderate- and Vigorous-Intensity Activities to Achieve 2008 Exercise Guideline Recommendations

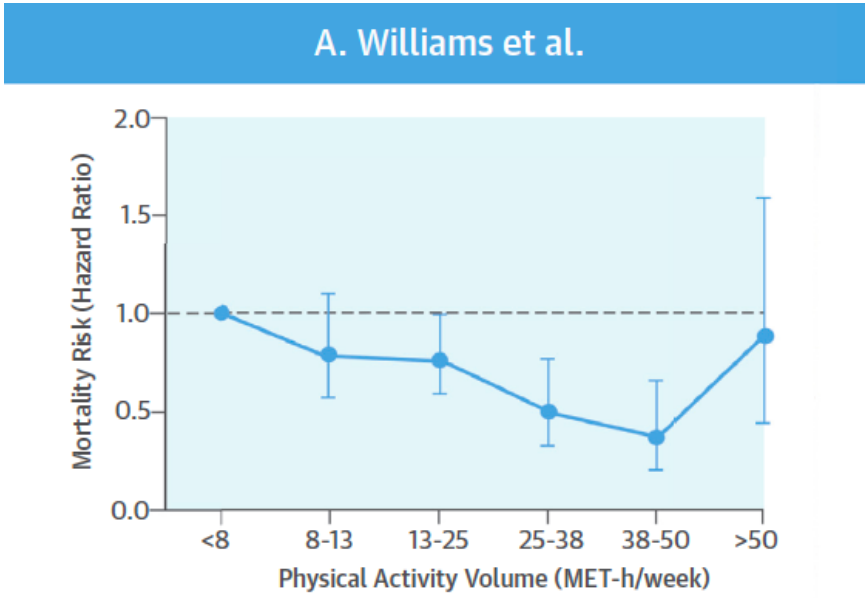
Moderate-Intensity Aerobic Activities >150 min/week	Vigorous-Intensity Aerobic Activities >75 min/week
Brisk walking (>3 miles/h)	Uphill walking or race walking
Bicycling (<10 miles/h)	Bicycling (>10 miles/h)
Water aerobics	Running or jogging
Tennis (doubles)	Tennis (singles)
Ballroom dancing	Aerobic dancing
General gardening	Heavy gardening (digging/hoeing)

From the Centers for Disease Control and Prevention guidelines (12).



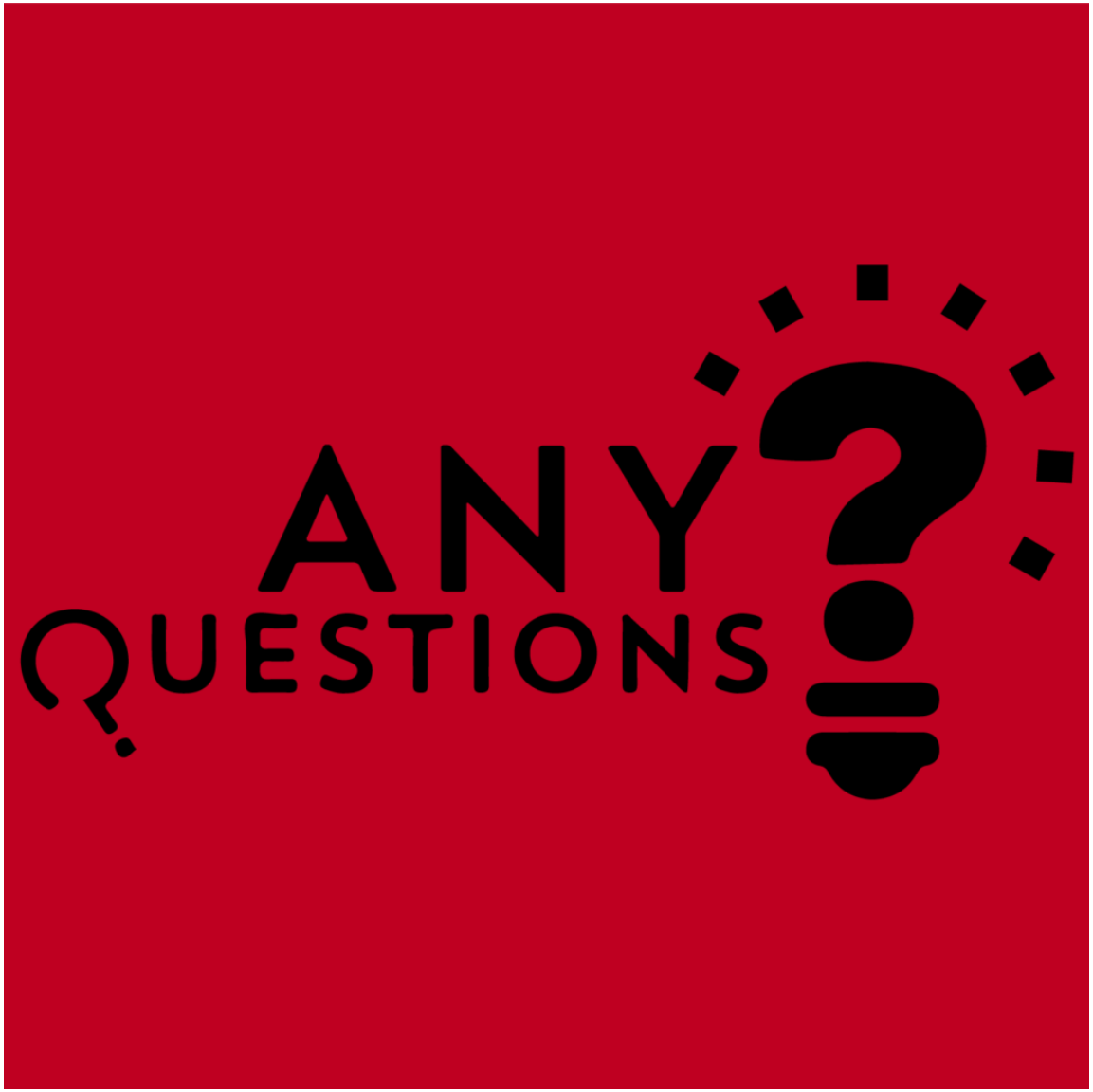
Role of exercise

- Vigorous activity demonstrates a larger reduction in CVD events compared to moderate intensity activity
- Similar recommendations in heart patients
  - Cardiac rehabilitation improves most CV outcomes
- Resistance training probably just as beneficial
- Benefits exist across all ages



Summary

- Keys to reducing your cardiac risk
  - Balanced healthy diet is important
  - Keep active!
  - Control modifiable risk factors including hypertension, high cholesterol, diabetes
  - No smoking


ANY
QUESTIONS

References

- Wilson, PWF. (2019). Overview of established risk factors for cardiovascular disease. *Uptodate*.
- Williams et al. (2018). ESC/ESH Guidelines for the management of arterial hypertension. *EHJ*. 39:3021-3104.
- Mach et al. (2019). 2019 ESC/EAS Guidelines for the management of dyslipidaemias. *EH*J. 41:111-188.
- Eijsvogels et al. 2016. Exercise at the Extremes. *JACC*. 67:316-29.
- MOH Singapore. My Healthy Plate: https://www.healthhub.sg/programmes/55/my-healthy-plate . Last accessed: 25/01/2020.