

## A SELECTION OF TEN READINGS ON TOPICS RELATED TO LIFESTYLE MEDICINE: PRESCRIPTIONS FOR BETTER HEALTH

FPSCI22 – SATURDAY, 21 SEPTEMBER 2024: 2.00pm – 5.30pm  
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Selection of readings made by A/Prof Goh Lee Gan

### READING I – ADHERENCE TO A PLANETARY HEALTH DIET AND OUTCOMES

Ye YX,<sup>1</sup> Zhang JJ,<sup>1</sup> Pan A,<sup>1</sup> Geng TT,<sup>2</sup> Zhou YF,<sup>3</sup> He P,<sup>4</sup> Liu G,<sup>5</sup> Willett W,<sup>6</sup> Koh WP.<sup>7,8</sup> Adherence to a Planetary Health Diet, Environmental Impacts, and Mortality in Chinese Adults. *JAMA Netw Open.* 2023 Oct 2;6(10):e2339468. PMID: 37874563.

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#### ABSTRACT

**IMPORTANCE:** Although the EAT-Lancet Commission has recently proposed a planetary health diet (PHD) to promote human and environmental health, little is known about how PHD affects environment and mortality risk among an Asian population.

**OBJECTIVE:** To investigate whether a PHD score is associated with environmental impacts and mortality outcomes in a Chinese cohort living in Singapore.

**DESIGN, SETTING, AND PARTICIPANTS:** This cohort study used data from the Singapore Chinese Health Study. Eligible participants were without known cardiovascular disease and cancer at baseline; they were recruited between 1993 and 1998 and followed up using record linkage data until 2020. Data were analysed from September 2022 to April 2023.

**EXPOSURES:** PHD score was calculated based on the reference consumption of 14 dietary components in PHD and individual energy intake assessed using a validated food frequency questionnaire in this cohort.

**MAIN OUTCOMES AND MEASURES:** Diet-related environmental impacts were estimated using a food frequency questionnaire. Mortality outcomes (all-cause, cardiovascular disease, cancer, and respiratory disease) were identified via linkage with a nationwide registry.

**RESULTS:** A total of 57,078 participants were included in this study (mean [SD] age, 56.1 (7.9) years; 31,958 women [56.0%]). During a median (IQR) follow-up of 23.4 (18.7-26.2) years, 22,599 deaths occurred. Comparing the highest and lowest quintiles, higher PHD scores were associated with lower greenhouse gas emissions ( $\beta=-0.13$  kg CO<sub>2</sub> equivalent; 95% CI, -0.14 to -0.12 kg CO<sub>2</sub> equivalent), but with higher total water footprint ( $\beta=0.12$  m<sup>3</sup>; 95% CI, 0.11-0.13 m<sup>3</sup>) and land use ( $\beta=0.29$  m<sup>2</sup>; 95% CI, 0.28-0.31 m<sup>2</sup>). In the adjusted multivariable model, compared with the lowest quintile, participants in the highest quintile of PHD score had lower risk of all-cause mortality (hazard ratio [HR], 0.85; 95% CI, 0.81-0.89), cardiovascular disease mortality (HR, 0.79; 95% CI, 0.73-0.85), cancer mortality (HR, 0.93; 95% CI, 0.86-1.00), and respiratory disease mortality (HR, 0.81; 95% CI, 0.74-0.89).

CONCLUSIONS AND RELEVANCE: In this study of Singapore Chinese adults, higher adherence to PHD was associated with reduced risk of chronic disease mortality. However, environmental impacts were uncertain, as higher adherence was associated with lower greenhouse gas emissions but higher total water footprint and land use.

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## READING 2 – NUTRITION AND HEALTHY AGEING IN ASIA

Zhou YF,<sup>1</sup> Song XY,<sup>2</sup> Pan A,<sup>3</sup> Koh WP.<sup>4,5</sup> **Nutrition and Healthy Ageing in Asia: A Systematic Review. *Nutrients*. 2023 Jul 14;15(14):3153. PMID: 37513571.**

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### ABSTRACT

**BACKGROUND:** Nutrition plays a key role in modulating the likelihood of healthy ageing. In the present study, we aimed to conduct a systematic review to assess the impact of nutrition on healthy ageing in Asia.

**METHODS:** The systematic review was registered in the International Prospective Register of Systematic Reviews database (CRD42023408936) and conducted based on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines. The PubMed, Web of Science, and Embase databases were searched up to February 2023 without language restrictions. We included prospective cohort studies that evaluated the associations of intake of a single food or consumption of a single nutrient at midlife; adherence to various dietary patterns at midlife; and improved adherence to dietary patterns from mid- to late life with the likelihood of healthy ageing and its components.

**RESULTS:** Out of 16,373 records, we included 71 papers comprising 24 cohorts from Singapore, China, Japan, and Thailand. The healthy ageing components included cognitive function, physical function, and depression. The majority of studies supported the observation that the likelihood of healthy ageing and its components in late life was positively increased by a higher consumption of healthy foods, such as vegetables, fruits, fish, nuts, legumes, tea, milk, and dairy, at midlife, and also by greater adherence to dietary patterns with high diversity scores or high total antioxidant capacities. Furthermore, improved adherence to healthy dietary patterns from mid- to late life also increased the likelihood of healthy ageing in late life.

**CONCLUSION:** Consuming healthy foods and adhering to healthy dietary patterns at midlife can promote the likelihood of healthy ageing. Moreover, improving diet quality from mid- to late life can still be beneficial.

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### READING 3 – CURRENT TREATMENT LANDSCAPE FOR OBESITY IN SINGAPORE

Lee PC,<sup>1</sup> Lim CH,<sup>2</sup> Asokkumar R,<sup>3</sup> Chua MWJ.<sup>4</sup> Current treatment landscape for obesity in Singapore. *Singapore Med J.* 2023 Mar;64(3):172-181. PMID: 36876623.

doi: 10.4103/singaporemedj.SMJ-2022-216. PMID: 36876623. Free full text.

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#### ABSTRACT

The rising prevalence of obesity in Singapore is a harbinger for a corresponding increase in obesity-related complications such as type 2 diabetes mellitus (T2DM) and coronary heart disease.

Obesity is a complex disease driven by multiple factors, hence treatment cannot follow a “one-size-fits-all” approach. Lifestyle modifications involving dietary interventions, physical activity, and behavioural changes remain the cornerstone of obesity management. However, similar to other chronic diseases such as T2DM and hypertension, lifestyle modifications are often insufficient on their own, hence the importance of other treatment modalities including pharmacotherapy, endoscopic bariatric therapy, and metabolic-bariatric surgery. Weight loss medications currently approved in Singapore include phentermine, orlistat, liraglutide, and naltrexone-bupropion. In recent years, endoscopic bariatric therapies have evolved as an effective, minimally invasive, and durable therapeutic option for obesity.

Metabolic-bariatric surgery remains the most effective and durable treatment for patients with severe obesity, with an average weight loss of 25-30% after one year.

### READING 4 – THE PROGNOSTIC ROLE OF DIET QUALITY IN PATIENTS WITH MAFLD AND PHYSICAL ACTIVITY

Huang J,<sup>#,1-3</sup> Wu Y,<sup>#,1-3</sup> Wang M,<sup>1,2,3</sup> Zheng J,<sup>4</sup> Goh GB,<sup>5,6</sup> Lin S.<sup>7-9</sup> The prognostic role of diet quality in patients with MAFLD and physical activity: data from NHANES. *Nutr Diabetes.* 2024 Feb 23;14(1):4. PMID: 38395952.

doi: 10.1038/s41387-024-00261-x. PMID: 38395952. Free full text.

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#### ABSTRACT

**BACKGROUND AND OBJECTIVES:** Dietary control and increased physical activity (PA) are recommended for patients with metabolic (dysfunction-) associated fatty liver disease (MAFLD). However, not all patients can sustain both exercise and a healthy diet. This study explored the interaction between dietary quality, PA levels, and mortality in MAFLD patients.

**METHODS:** The Third National Health and Nutrition Examination Survey and linked mortality data were used in this study. Diet quality was assessed with the Healthy Eating Index (HEI). PA level was calculated by multiply self-reported exercise frequency and its Metabolic Equivalent A high-quality diet was associated. A Cox proportional hazard model was used to explore risk factors for mortality in MAFLD patients.

**RESULTS:** In total, 3,709 participants with MAFLD were included in the final analysis. The median follow-up time was 26.2 (interquartile range 19.3-28.1) years and 1,549 (41.8%) deaths were recorded over follow-up. Cox multivariate regression was used to adjust for potential confounders of mortality. The results showed both HEI score and PA level were inversely correlated with all-cause mortality ( $P < 0.05$ ). In the subgroup analysis stratified by PA level, higher diet quality decreased all-cause mortality, cardiovascular-related mortality, and cancer-related mortality in PA inactive of MAFLD patients ( $P < 0.05$ ), but these correlations were not present in active PA groups.

**CONCLUSION:** Healthy diet and physical activity may have different impacts as lifestyle interventions for MAFLD. A high-quality diet is associated with lower mortality in inactive individuals with MAFLD but not in those with active PA levels. Sedentary individuals require healthier diet.

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## **READING 5 – EXPERIENCES OF OLDER ADULTS PARTICIPATING IN DANCE EXERGAMES**

**Yong SQ,<sup>1</sup> Wu VX,<sup>2</sup> Jiang Y.<sup>3</sup> Experiences of older adults participating in dance exergames: A systematic review and meta-synthesis. *Int J Nurs Stud.* 2024 Apr;152:104696. PMID: 38301305.**

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### ABSTRACT

**BACKGROUND:** Interventions to encourage adequate physical activity amongst older adults have had limited long-term success. Dancing and exergames, two beneficial and enjoyable physical activities for older adults, may make regular exercise more interesting and effective. Dance exergames are physical exercises that integrate sensory, cognitive, psychological, and physical functions by requiring users to interact with game scenarios through deliberate body motions and receive real-time feedback. They provide an inherently enjoyable gaming and workout experience, which may boost exercise adherence. However, little is known about older adults' experiences with dance exergames.

**OBJECTIVE:** To synthesise the qualitative experiences of older adults participating in dance exergames.

**DESIGN:** Systematic review and meta-synthesis.

**METHODS:** Dance exergame studies (peer-reviewed and grey literature) involving older adults in any setting published in English from inception to 17 August 2023 were included. Qualitative or mixed-method studies must use immersive or non-immersive virtual-reality platforms. PubMed, Scopus, CINAHL, The Cochrane Library, ProQuest Dissertations & Theses Global, Google Scholar, and reference lists of relevant studies and reviews were searched for eligible studies. The search strategy for Scopus was: (TITLE-ABS-KEY (danc\*) AND TITLE-ABS-KEY (exergames OR exergame OR video AND games OR virtual AND reality) AND TITLE-ABS-KEY (older AND adults OR elderly OR seniors OR geriatrics)). Thematic synthesis by Thomas and Harden was used for meta-synthesis.

**RESULTS:** Eleven studies (n=200 older adults) were included. Three themes and 14 subthemes were synthesised: 1) Dance exergames as dual-task training for physical, cognitive, and psychological well-being; 2) Concerns on usability issues; and 3) Possible enhancements of dance exergames. Older adults recognised that dance exergames could improve their physical, cognitive, and psychological well-being. Existing dance exergame systems had several usability issues. For example, some older adults were unfamiliar with using new technology and had trouble navigating the game systems. The older adults also provided various suggestions for adaptation to their age group, such as ensuring a variety of dances, difficulty levels suited for older adults' cultural backgrounds, and physical and cognitive capabilities.

CONCLUSIONS: Dance exergames may be an attractive way to encourage older adults to exercise, but appropriate modifications are needed. When designing/selecting dance exergames for older persons, researchers, healthcare professionals, and senior care centres should consider using exergames that have simple designs, varied dances that are locally adapted, and appeal to a large proportion of older adults.

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## READING 6 – ADEQUACY OF NUTRIENT INTAKE AND MALNUTRITION RISK IN OLDER ADULTS

**Ye KX,<sup>1,2</sup> Feng L,<sup>1,2</sup> Kennedy BK,<sup>2,6,7</sup> Maier AB,<sup>2,6,8</sup> Sun L,<sup>3</sup> Lim SL,<sup>4</sup> Li J.<sup>5</sup> Adequacy of Nutrient Intake and Malnutrition Risk in Older Adults: Findings from the Diet and Healthy Aging Cohort Study. *Nutrients*. 2023 Aug 4;15(15):3446. PMID: 37571385.**

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### ABSTRACT

There is a lack of data on the adequacy of nutrient intake and prevalence of malnutrition risk in Asian populations. The aim was to report on the nutrient intake and prevalence of malnutrition risk in a community sample of older adults in Singapore.

Analysis was performed on 738 (n=206 female, n=532 male, aged 67.6±6.0 years) adults 60 years and above. Intakes of macro- and micronutrients were evaluated against the Recommended Dietary Allowances (RDAs). Malnutrition risk was assessed using the Nutrition Screening Initiative Determine Your Nutritional Health checklist.

It was found that 90.5% older adults exceeded the sugar intake, 68.5% males and 57.1% females exceeded the intake limit for saturated fat, and 33% males had inadequate dietary fibre intake when compared to the RDAs. Inadequate dietary calcium intake was found in 49.5% males and 55.3% females. There were 22.3% of older adults at moderate to high malnutrition risk. Singaporean older adults need to reduce their dietary intakes of sugar and saturated fat and increase their intakes in dietary fibre and calcium.

Current findings provide public health awareness on the importance of healthy eating and will facilitate decision-making by health promoters to deliver targeted nutrition care programmes.

## READING 7 – GET ACTIVE QUESTIONNAIRE FOR PRE-PARTICIPATION EXERCISE SCREENING

**Ho CL,<sup>1</sup> Anantharaman V.<sup>2</sup> Relevance of the Get Active Questionnaire for Pre-Participation Exercise Screening in the General Population in a Tropical Environment. *Healthcare (Basel)*. 2024 Apr 10;12(8):815. PMID: 38667577.**

**doi: 10.3390/healthcare12080815. PMID: 38667577. Free full text.**

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### ABSTRACT

The Get Active Questionnaire (GAQ), developed by the Canadian Society for Exercise Professionals (CSEP), was recently recommended for pre-participation screening of the general population in Singapore before increasing their exercise levels. This literature review examines the evidence behind the GAQ and its relevance to our tropical environment.

Searches were carried out via PubMed, MEDLINE, and the Cochrane Central Register of Controlled Trials. Resources referenced by the CSEPs were hand searched. The CSEP was also contacted for further information. The evidence behind each GAQ question was compared to international literature and guidelines, where applicable.

Out of 273 studies, 49 were suitable for analysis. Two GAQ studies commissioned by the CSEP showed a high negative predictive value but high false negative rate. Of the nine GAQ questions, those on dizziness, joint pains, and chronic diseases appear to be justified. Those on heart disease/stroke, hypertension, breathlessness, and concussion require modification. The one on syncope can be amalgamated into the dizziness question. The remaining question may be deleted. No long-term studies were available to validate the use of the GAQ. Heat disorders were not considered in the GAQ.

Modification of the GAQ, including the inclusion of environmental factors, may make it more suitable for the general population and should be considered.

## READING 8 – PUBLIC AWARENESS ON WAR ON DIABETES CAMPAIGN AND ITS ASSOCIATION WITH BEHAVIOURAL OUTCOMES

**Sambasivam R,<sup>1</sup> Abdin E,<sup>1</sup> AshaRani PV,<sup>1</sup> Roystonn K,<sup>1</sup> Devi F,<sup>1</sup> Wang P,<sup>1</sup> Subramaniam M,<sup>1,4,5</sup> Lee ES,<sup>2</sup> Sum CF.<sup>3</sup> Public awareness of war on diabetes campaign and its association with behavioural outcomes. *Health Educ Res*. 2024 Feb 22;cyae009. PMID: 38394480.**

**doi: 10.1093/her/cyae009. PMID: 38394480. Free full text.**

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### ABSTRACT

The War on Diabetes campaign was launched in 2016, encouraging Singapore residents to engage in regular exercise, adopt healthy dietary habits, and screen for early detection of diabetes. This study aims to examine campaign awareness and its associations with sedentary behaviour, dietary habits, and identifying diabetes.

Data were obtained from the nationwide Knowledge, Attitudes, and Practices study on diabetes in Singapore.

A total of 2,895 participants responded to a single question assessing campaign awareness. The Dietary Approaches to Stop Hypertension (DASH) diet screener assessed dietary habits, and the Global Physical Activity Questionnaire (GPAQ) measured sedentary behaviour. Recognition of diabetes was established using a vignette depicting a person with diabetes mellitus. Logistic and linear regression models were used to measure the associations. Most participants were 18-34 years old (29.9%) and females (51.6%). About 57.4% identified the campaign. Campaign awareness exhibited positive associations

with identifying diabetes based on the vignette [odds ratio (OR): 1.5; 95% confidence interval (CI): 1.1-2.2; P=0.022], lower odds of sedentary behaviour  $\geq 7$ h/day (OR: 0.7; CI: 0.5-0.9; P=0.018), and higher DASH scores ( $\beta=1.3$ ; P<0.001).

The study recognised early significant associations between the behavioural outcomes and the campaign, emphasising the need for ongoing campaign sustainability and evaluation of its long-term impact on population health.

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## READING 9 – EFFECTS OF SQUARE STEPPING EXERCISE

**Kawabata M,<sup>1,2</sup> Gan SR,<sup>3</sup> Shen-Hsing AC.<sup>3-6</sup> Effects of Square Stepping Exercise on cognitive, physical, psychological, and group functioning in sedentary older adults: A center-based hybrid trial. BMC Geriatr. 2024 Apr 25;24(1):374. PMID: 38664613.**

**doi: 10.1186/s12877-024-04904-7. PMID: 38664613. Free full text.**

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### ABSTRACT

**BACKGROUND:** The Square Stepping Exercise (SSE) is an exercise training programme that integrates physical exercise and cognitive elements and can be conducted in a group setting. The potential of SSE in delaying cognitive decline in older adults is promising. However, the coronavirus pandemic has made it more difficult for older adults worldwide to exercise together in person. To address this issue, this study conducted a wholistic evaluation of the effects of a centre-based hybrid SSE trial on cognitive, physical, psychological, and group functioning in sedentary older adults.

**METHODS:** A total of 93 older adults (19 men, 74 women) participated in the study. Fifty-eight participants (9 men, 49 women) completed centre-based hybrid SSE sessions over 12 weeks under coronavirus pandemic circumstances, whereas other 35 participants in the control group maintained their current level of daily activities. Cognitive functions focused on executive functions assessed by the Stroop Colour-Word Test (inhibition) and the Trail Marking Test (TMT) (set-shifting). Psychological and group functioning were assessed by the Subjective Vitality Scale and the Physical Activity Group Environment Questionnaire. Physical function was evaluated by measuring gait speeds. A repeated ANOVA was conducted on the measured variables separately for the intervention and control groups to focus on the change of participant's performance over data collection points.

**RESULTS:** Outcomes of the Stroop Colour-Word Test and the TMT revealed that the hybrid SSE was highly effective in improving executive function. Stroop performance (correct trials) was significantly improved in the incongruent condition, as well as both TMT-A and -B over the intervention period in the intervention group. The hybrid SSE was also beneficial in improving physical (gait speed at usual pace and at the maximum pace) as well as psychological functioning (subjective vitality). Furthermore, SSE participants reported increased engagement with the SSE task, social communication, and increased bonding and closeness with their group members through the hybrid SSE.

**CONCLUSIONS:** In this study, hybrid SSE was found to be effective in enhancing cognitive, physical, psychological, and group functioning in sedentary older adults. The findings of this study are crucial in providing older adults with a safe and efficient option to exercise.

## READING 10 – LIFESTYLE-RELATED FACTORS IN LATE MIDLIFE AS PREDICTORS OF FRAILITY

Haapanen MJ,<sup>1,2,3</sup> Wasenius NS,<sup>1,2</sup> Eriksson JG,<sup>1,2,10,11</sup> Mikkola TM,<sup>1,4,5</sup> von Bonsdorff MB,<sup>1,12</sup> Jylhävä J,<sup>3,6</sup> Kajantie E,<sup>4,7-9</sup> Lifestyle-related factors in late midlife as predictors of frailty from late midlife into old age: a longitudinal birth cohort study. *Age Ageing*. 2024 Apr 1;53(4):afae066. PMID: 38557664.

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### ABSTRACT

**BACKGROUND:** Few studies have examined longitudinal changes in lifestyle-related factors and frailty.

**METHODS:** We examined the association between individual lifestyle factors (exercise, diet, sleep, alcohol, smoking, and body composition), their sum at baseline, their change over the 17-year follow-up, and the rate of change in frailty index values using linear mixed models in a cohort of 2,000 participants aged 57-69 years at baseline.

**RESULTS:** A higher number of healthy lifestyle-related factors at baseline was associated with lower levels of frailty but not with its rate of change from late midlife into old age. Participants who stopped exercising regularly (adjusted  $\beta \times \text{Time} = 0.19$ , 95%CI=0.10, 0.27) and who began experiencing sleeping difficulties (adjusted  $\beta \times \text{Time} = 0.20$ , 95%CI=0.10, 0.31) experienced more rapid increases in frailty from late midlife into old age. Conversely, those whose sleep improved (adjusted  $\beta \times \text{Time} = -0.10$ , 95%CI=-0.23, -0.01) showed a slower increase in frailty from late midlife onwards. Participants letting go of lifestyle-related factors (decline by 3+ factors vs no change) became frailer faster from late midlife into old age (adjusted  $\beta \times \text{Time} = 0.16$ , 95% CI=0.01, 0.30).

**CONCLUSIONS:** Lifestyle-related differences in frailty were already evident in late midlife and persisted into old age. Adopting one new healthy lifestyle-related factor had a small impact on a slightly less steeply increasing level of frailty. Maintaining regular exercise and sleeping habits may help prevent more rapid increases in frailty.