

糖 尿 病 醫 學 新 知

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題目：Association between Healthy Eating Index-2015 and physical frailty among the United States elderly adults the National Health and Nutrition Examination Survey (NHANES) 2011-2014

2015 年健康飲食指數 (HEI-2015) 與美國老年人身體衰弱之間的關聯：2011-2014 年國家健康與營養調查研究 (NHANES)

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前言

衰弱是一種老年病症候群，老年人較易受到健康不良的影響，已成為全球關注的健康問題之一^[1]。過去研究發現，社區居住的老年人衰弱和衰弱前期患病率分別為 10.7% 和 41.6%^[2]，且衰弱與跌倒、殘疾、住院和死亡風險增加有關^[3-5]，因此適時介入可預防衰弱發生，以提高老年人生活品質及降低治療負擔。飲食為預防衰弱的重要因子之一，研究發現某些食物或營養素（如：蔬菜、水果、蛋白質、維生素）均與老年人的衰弱有關^[6-9]，而目前研究已逐漸探討整體飲食品質，因為飲食造成的健康結果通常是飲食攝取量的綜合作用，而非某種食物或營養素。

根據 2015-2020 年美國飲

食指南 (DGA) 發現，最新的健康飲食指數 (HEI-2015) 與老年人的類風濕性關節炎、肥胖及步行速度有關^[25-27]，但目前尚未有大型研究針對美國老年人評估 HEI-2015 與衰弱之間的關聯性^[4]。因此，本研究欲探討美國 2011-2014 年國家健康與營養調查研究 (NHANES) 的數據，HEI-2015 評估美國老年人的整體飲食品質是否與身體衰弱有關。

研究方法

納入 2011-2014 年 NHANES 的 60 歲以上老年人數據，排除未完成兩次 24 小時飲食回憶、熱量攝取量數據不可靠、缺少衰弱及共變量相關數據等參與者，本研究最終共納入 2345 名老年人作為分析對象。

● 飲食品質的估算

NHANES 飲食攝取量數據由受過培訓的訪談員進行兩次的 24 小時飲食回憶訪談取平均值。飲食品質以 HEI-2015 評估對於 2015-2020 年 DGA 的依從情況。HEI-2015 共有 13 個食物類別，鼓勵攝取主要食物種類（蔬菜總量、豆類蔬菜、水果總量、原態水果、全穀物、乳製品、蛋白質食物、海鮮和植物蛋白、脂肪酸），限制次要食物攝取量（鈉、精製穀物、飽和脂肪、添加糖），得分越高表示飲食品質越好，最高得分為 100。

● 身體衰弱狀態的評估

Fried 等人在 Cardiovascular Health Study (CHS) 中提出衰弱表型的臨床定義，並已廣泛用於高齡化人群^[4]。本研究採用在 NHANES 的數據中建立和驗證改良的 4 項衰弱指標（疲憊、虛弱、低體力活動及非刻意體重減輕）^[28-30]。符合 3 項以上為衰弱；符合 1-2 項是衰弱前期；無符合任何項目則代表無衰弱。

● 共變量

人口基本學包含年齡、性別、教育程度、種族及家庭月貧困水平；生活方式包含吸菸和飲酒；

身體檢查數據則包含體重、身高、SBP、DBP、TC、HbA1c 以及是否有高血壓、高膽固醇血症或糖尿病。

研究結果

HEI-2015 四分位數在年齡、性別、BMI、種族、教育、家庭月貧困水平、熱量攝取量和吸菸狀況呈顯著差異。與 HEI-2015 最低四分位數的參與者相比，最高四分位數的參與者可能與年齡較大、女性、亞洲或其他種族、較高的教育水平及家庭月貧困水平、較低的 BMI 及熱量攝取量有關。

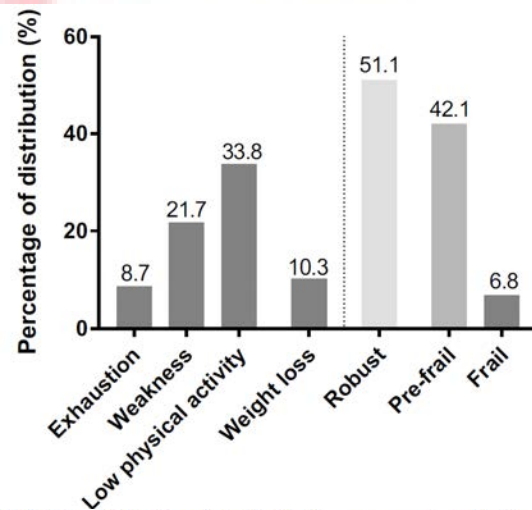


Fig. 2 The distribution of physical frailty components and frailty status

● HEI-2015 與衰弱狀態

最高的 HEI-2015 四分位數與較低的衰弱率呈現顯著關聯性，且呈線性顯著降低；當 HEI-2015 每增加 1 個標準差與衰弱率降低有關。與最低的 HEI-2015 四分位數的參與者相比，較高的 HEI-2015 四分位數的參與者較

不可能處於衰弱前期或衰弱的情況。

● HEI-2015 食物類別與衰弱狀態

● HEI-2015 與各項衰弱指標

與最低的 HEI-2105 四分位數的參與者相比，最高的 HEI-2015 四分位數的參與者分別與 4 項衰弱指標降低有關，且分別都存在線性關係。

衰弱前期率較低分別與蔬菜總量、海鮮和植物蛋白攝取量較高，以及精製穀物攝取量較低有關；而衰弱率較低分別與蔬菜總量、原態水果攝取量較高有關。

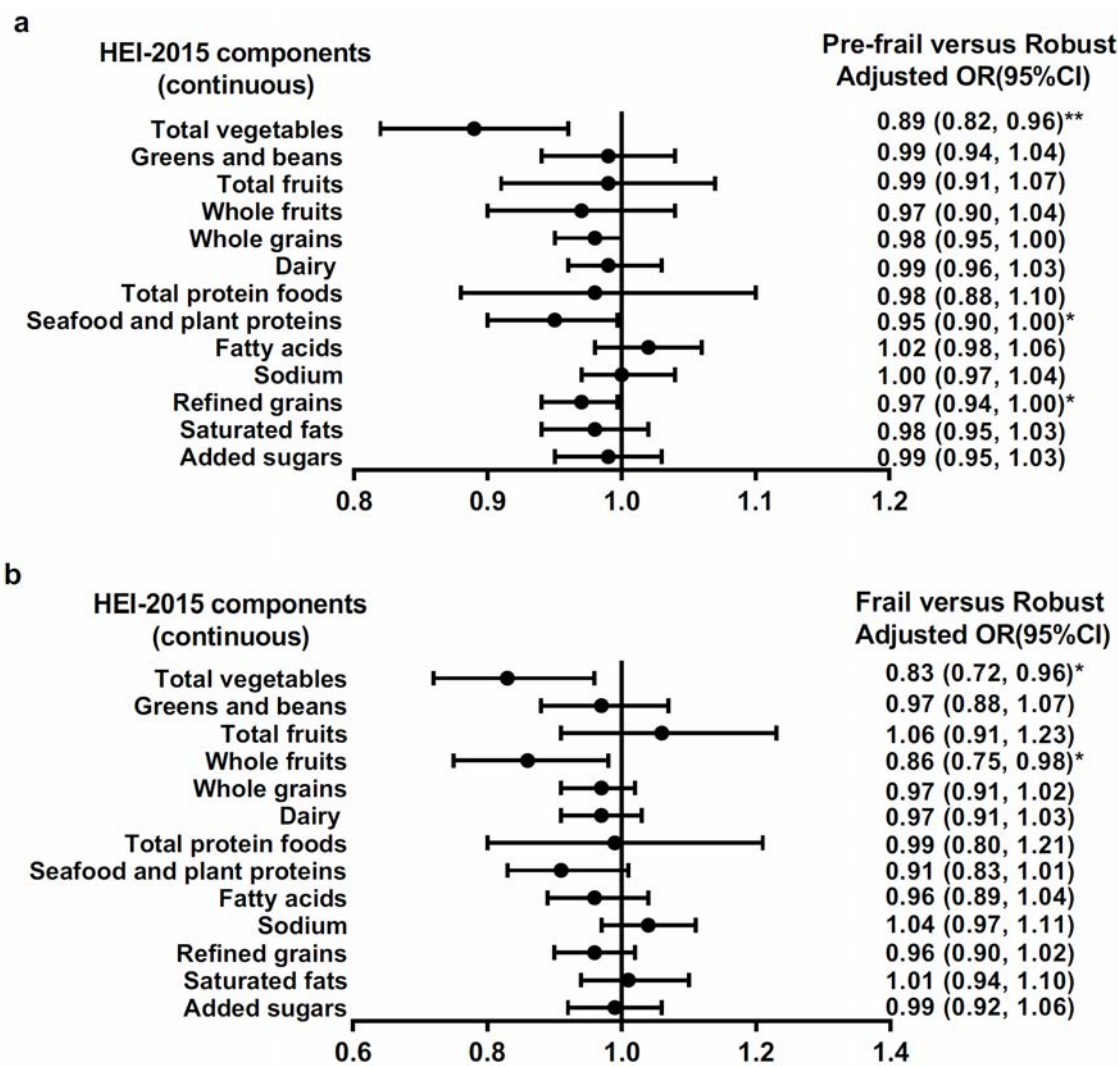


Fig. 3 Odds ratios and 95% confidence intervals of each HEI-2015 components (continuous) for being physically pre-frail (a) and frail (b). OR, odds ratio, is adjusted for age, gender, daily energy intake,

ethnicity, drinking status, smoking status, education level, family monthly poverty level, hypertension, hypercholesterolaemia, diabetes and other components; ** $P < 0.01$; * $P < 0.05$

討論

過去研究大多探討地中海飲食與衰弱之間的關聯性，研究發現地中海飲食分數較高與衰弱率較低^[13, 18, 31]，以及虛弱、行走緩慢和低體力活動風險降低有關^[14]；而前瞻性研究亦顯示地中海飲食依從性較高與衰弱風險較低有關，且地中海飲食分數與行走緩慢、體重減輕呈負相關^[11, 14, 16, 34-35]；另有研究發現飲食品質較佳與衰弱率較低有關^[12]；而 Health Aging and Body Composition (Health ABC) 研究發現 HEI-1995 與低體力活動有關^[37]。

在本研究中，發現原態水果和蔬菜總量與老人衰弱之間的關聯，與我們研究結果一致的是，中國老年人研究發現，水果和蔬菜攝取量與衰弱呈負相關^[38]；針對 60 歲以上美國女性的研究亦發現，水果和蔬菜攝取量較高與衰弱風險較低有關^[39]，而水果和蔬菜富含抗氧化及抗發炎物質（如：維生素 C、E 和類胡蘿蔔素）可能與預防衰弱的發生有關^[40]。飲食含有不同營養素，因此應強調整體飲食品質而非特定營養素或食物。

先前探討飲食品質與衰弱之間關聯性的研究結果不一致^[12, 17, 31-33]，可能與使用不同的飲食品質評估方法有關，且僅限於特定性別、職業、醫療條件或地區^{[15,}

31, 34, 35, 37]，可能無法推廣到全國的社區老年人。本研究是第一篇探討 HEI-2015 及各食物類別與美國老年人身體衰弱、各項衰弱指標之間的關聯性，而研究限制在於橫斷性研究設計無法確定其因果關係，且 24 小時飲食回憶收集可能無法反應準確實際攝取量，另外也缺少步行速度的數據。

結論

研究發現以 HEI-2015 評估的整體飲食品質與美國老年人身體衰弱率較低有關，且 HEI-2015 分別與 4 項衰弱指標較低有關，且攝取足夠的原態水果和蔬菜總量可降低身體衰弱。由於本研究的發現和限制，未來可在前瞻性世代研究或隨機對照試驗做進一步驗證。

讀後心得

臨床上常會發現老年人身體狀態逐漸退化的狀況，而近年來研究亦開始關注衰弱的議題，並以預防老年人衰弱的發生做為出發點，探討相關影響因素以及適當的介入措施。本篇研究有別於過去文獻的飲食評估方式，以最新的 HEI-2015 評估整體飲食品質與衰弱之間的關聯性，未來在臨床上可針對老年人整體飲食內容給予適當的建議及調整，有助於減少老年人身體衰弱的發生。

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