



# ADHERENCE TO MEDITERRANEAN DIET PROTECTS FRAIL ELDERLY INDIVIDUALS AGAINST COGNITIVE DECLINE

Solfrizzi Vincenzo<sup>1</sup>, Mazzoccoli Carmela<sup>1</sup>, Cella Alberto<sup>2</sup>, Custodero Carlo<sup>1</sup>, Quispe Guerrero Katerin Leslie<sup>2</sup>, Sulpasso Roberto<sup>1,2</sup>, Di Fino Lucia<sup>1</sup>, Mastropierro Valeria<sup>1</sup>, Elia Veronica<sup>1</sup>, Stefano Poli <sup>3</sup>, Veronese Nicola <sup>2</sup>, Sabbà Carlo<sup>1</sup>, Pilotto Alberto<sup>1,2</sup>

1. Dipartimento Interdisciplinare di Medicina, Università degli Studi di Bari, Italy
2. Dipartimento Cure Geriatriche, Ortogeratria e Riabilitazione, E.O. Ospedali Galliera, Genova, Italy
3. Dipartimento di Scienza della Formazione (DISFOR), Università degli Studi di Genova, Italy

# Frailty syndrome and all-cause mortality in demented patients: the Italian Longitudinal Study on Aging

2,581 participants aged 65-84 years old (Italian Longitudinal Study)

1° Survey (1992-1993)

Variable	Total sample ( <i>n</i> = 2,581)	Nonfrail ( <i>n</i> = 2,329)	Frail ( <i>n</i> = 252)	<i>p</i>
MMSE	25.8 ± 4.3	26.2 ± 3.9	23.2 ± 4.8	0.001 <sup>a</sup>
ADL				
0 lost functions (%)	1,863 (72.2%)	1,764 (75.7%)	99 (39.3%)	0.001 <sup>b</sup>
1–2 lost functions (%)	599 (23.2%)	512 (22%)	87 (34.5%)	0.001 <sup>b</sup>
≥2 lost functions (%)	119 (4.6%)	53 (2.3)	66 (26.2%)	0.001 <sup>b</sup>
IADL	8.8 ± 3.4	8.4 ± 3.4	12.5 ± 6.4	0.001 <sup>a</sup>

2° Survey (1995-1996) – 3° Survey (2000-2001)

Frailty syndrome was a short-term predictor of disability in nondemented older subjects and short- and long-term predictor of all-cause mortality in nondemented and demented patients.

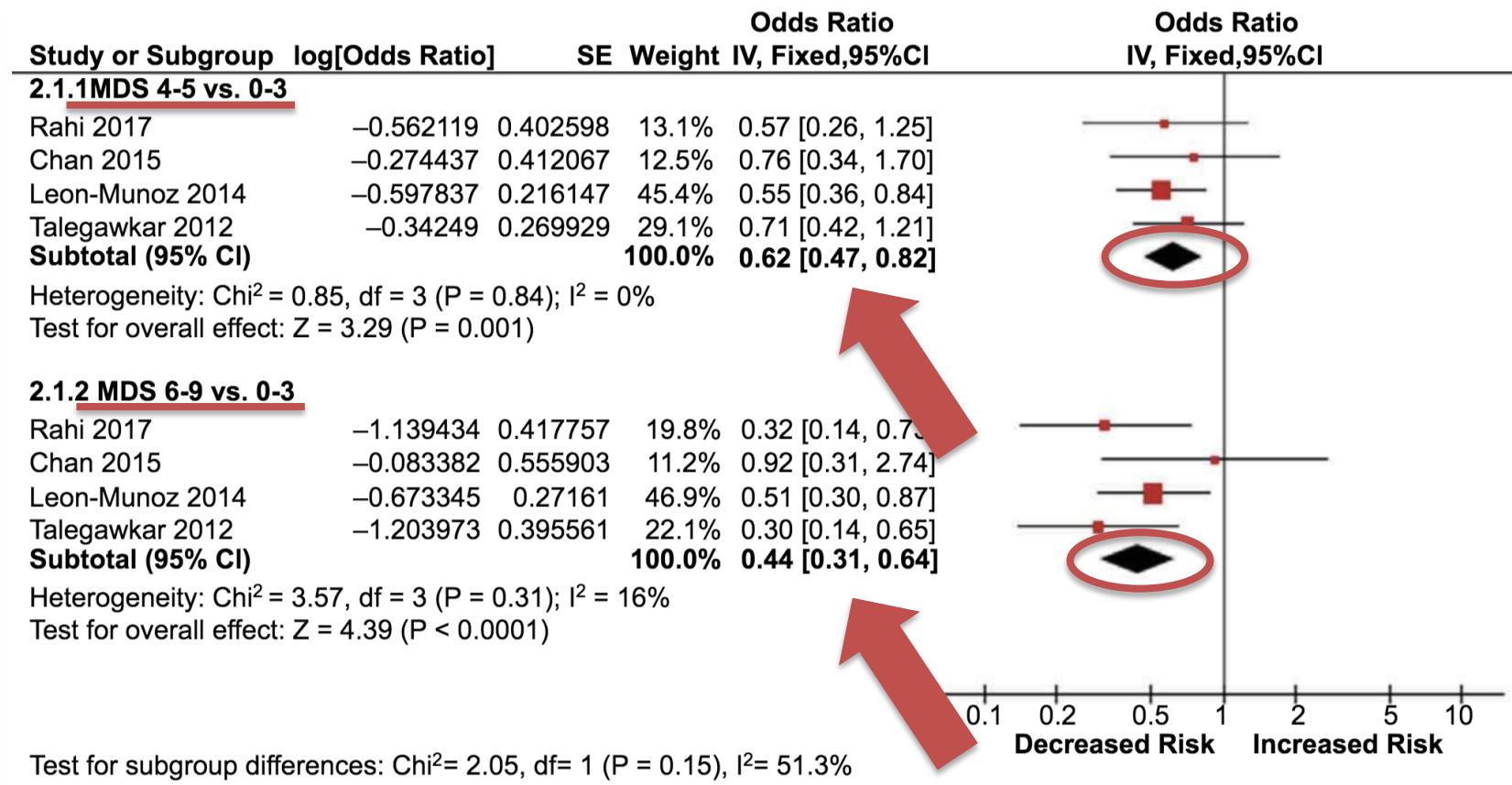
# Adherence to Mediterranean Diet Reduces Incident Frailty Risk: Systematic Review and Meta-Analysis

Systematic review (4 studies) and meta-analysis

5,789 community-dwelling older adults (mean age  $\geq 60$ )

Mean follow-up of 3.9 years

3 Mediterranean diet score (MDS) groups (0–3, 4–5, 6–9)



# Mediterranean diet improves cognition: the PREDIMED-NAVARRA randomised trial

Multicentre randomised parallel-group study

522 participants at high vascular risk

2 mediterranean diets (supplemented with EVOO or mixed nuts) vs a low-fat control diet

Global cognitive performance after 6,5 years of nutritional intervention

**Table 4** Multivariable-adjusted means after a 6½-year follow-up and differences versus control (95% CIs) in each intervention group

	MedDiet+EVOO (n=224)	p Value (vs control)	MedDiet+Nuts (n=166)	p Value (vs control)	Control (low-fat diet) (n=132)
	Mean (95% CI)		Mean (95% CI)		Mean (95% CI)
MMSE	27.73 (27.27 to 28.19)		27.68 (27.20 to 28.16)		27.11 (26.61 to 27.61)
Adjusted diff. versus control (95% CI)	+0.62 (+0.18 to +1.05)	0.005	+0.57 (+0.11 to +1.03)	0.015	0 (reference)
CDT	5.31 (4.98–5.64)		5.13 (4.78–5.47)		4.80 (4.44–5.16)
Adjusted diff. versus control (95% CI)	+0.51 (+0.20 to +0.82)	0.001	+0.33 (+0.003 to +0.67)	0.048	0 (reference)

General Linear Models. The PREDIMED-NAVARRA trial.

CDT, Clock Drawing Test; EVOO, extra virgin olive oil; MedDiet, Mediterranean diet; MMSE, Mini-Mental State Examination.

Adjusted for sex, age, education, family history of cognitive impairment or dementia, *ApoE4* genotype, hypertension, dyslipidaemia, diabetes, smoking status, alcohol intake, body mass index, physical activity and total energy intake.

# Aim

To investigate the association of adherence to the Mediterranean diet with lower risk of the cognitive impairment according to frailty status

Population – based sample of  
356 subjects ( $\geq 65$  yrs)



51%



49%



**Genoa**  
Random sampling  
recruitment (2014-2015)



**Bari**  
Data elaboration



# Methods

**Short Portable Mental Status Questionnaire  
(SPSMQ)**

**Severe cognitive impairment:  $\geq 8$**

**Fried's criteria**

**Frailty:  $\geq 3$**



# Fried's criteria

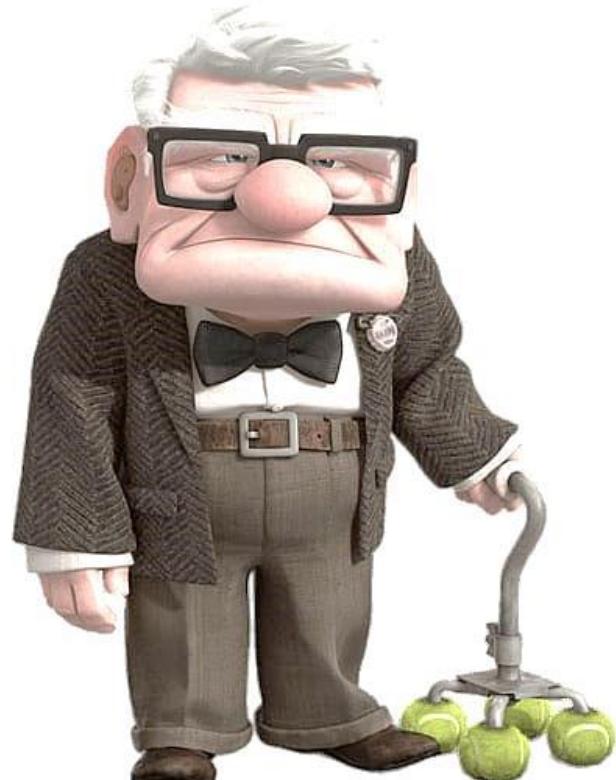
- Shrinking: Weight loss (unintentional,  $\geq 5$  kg in the last year or  $\geq 5\%$  of body weight in prior year)
- Exhaustion (self-report)
- Weakness (Handgrip strength: lowest 20% )
- Slowness (Walking time/15 feet: slowest 20% )
- Low activity (Kcals/week: lowest 20% )

***Frailty:  $\geq 3$  criteria***

# Methods

**Short Portable Mental Status Questionnaire  
(SPSMQ)**

Severe cognitive impairment:  $\geq 8$



**Fried's criteria**

Frailty:  $\geq 3$

**Mediterranean adherence diet screener  
(MEDAS)**

*Great adherence to Mediterranean diet:  $> 8$*

# Mediterranean adherence diet screener (MEDAS)

- Use olive oil as main culinary fat (yes)
- How much olive oil/day (including oil used for frying, salads, out-of-house meals, etc.) ( $\geq 4$  tbsp)
- How many vegetable/day (1 serving : 200 g [consider side dishes as half a serving]) ( $\geq 2$  ( $\geq 1$  portion raw or as a salad))
- How many fruit units (including natural fruit juices) /day ( $\geq 3$ )
- How many servings of red meat or meat products /day(1 serving: 100–150 g) ( $<1$ )
- How many servings of butter, margarine or cream/day (1 serving: 12 g) ( $<1$ )
- How many sweet or carbonated beverages drinked/day ( $<1$ )
- How much wine/week ( $\geq 7$  glasses)
- How many servings of legumes/week (1 serving : 150 g) ( $\geq 3$ )
- How many servings of fish or shellfish/ week (1 serving 100–150 g of fish or 4–5 units or 200 g of shellfish) ( $\geq 3$ )
- How many times commercial sweets or pastries (not homemade)/week ( $<3$ )
- How many servings of nuts/week (1 serving 30 g) ( $\geq 3$ )
- Preference for chicken, turkey or rabbit meat instead of veal, pork, hamburger, or sausage (Yes)
- How many times vegetables, pasta, rice, or other dishes seasoned with sofrito (sauce made with tomato and onion, leek, or garlic and simmered with olive oil)/week ( $\geq 2$ )

***Great adherence to Mediterranean diet: > 8***

# Results

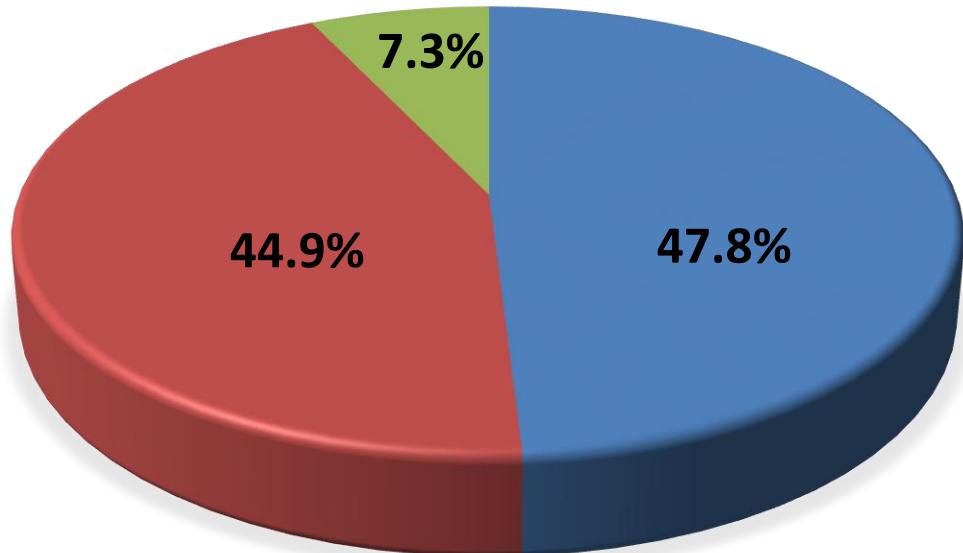
SPSMQ	$\geq 8$		< 8		p-value
	n		n		
Women n (%)	9/12	75	172/344	50	0.09
Age (years)	12	$79.86 \pm 6.49$	344	$77.77 \pm 4.48$	0.12
Education (years)	12	$4.58 \pm 2.68$	339	$10.43 \pm 4.86$	<0.0001
BMI ( $\text{kg}/\text{m}^2$ )	12	$27.62 \pm 6.61$	344	$28.30 \pm 17.73$	0.89
MEDAS	12	$7.67 \pm 1.16$	344	$8.17 \pm 2.27$	0.45
CIRS	12	$2.25 \pm 1.76$	344	$1.75 \pm 1.33$	0.21
MNA	12	$23.04 \pm 4.38$	344	$27.40 \pm 4.38$	0.0008
Fried's Frail ( $\geq 3$ ) (%)	5/12	41.67	21/344	6.10	<0.0001

	OR*	CI (95 %)	OR**	CI (95 %)
Medas	0.08	0.01-0.40	0.08	0.01-0.53
Fried's Frail (>= 3)	2.00	1.02-10.85	2.04	1.04-11.92
Medas*Fried	0.12	0.02 - 0.78	0.15	0.03 - 0.81

\* ODs adjusted for age, gender

\*\*ODs adjusted for age, gender, education, CIRS, BMI

# *Frailty*



- Robust  
0 Fried's
- Pre-frail  
1-2 Fried's criteria
- Frail  
 $\geq 3$  Fried's criteria

# ORs of Cognitive Decline for Frailty by levels of MEDAS score

	OR*	CI (95 %)	OR**	CI (95 %)
High Adherence to Mediterranean diet (Medas score > 8)	0.12	0.02-0.78	0.15	0.03-0.81
Low Adherence to Mediterranean diet (Medas score <= 8)	1.87	1.08 -2.97	1.96	1.10 -3.84

\* ORs adjusted for age, gender

\*\*ORs adjusted for age, gender, education, CIRS, BMI

# Conclusions

- ✓ A higher adherence to the Mediterranean diet in frail elderly individuals was associated with lower odds of cognitive decline.
- ✓ This finding may be of relevance in the setting of population-based prevention efforts as well as in clinical practice.