Is metabolic syndrome in mid-life associated with increased risk of frailty at age 69? Findings from a British birth cohort study

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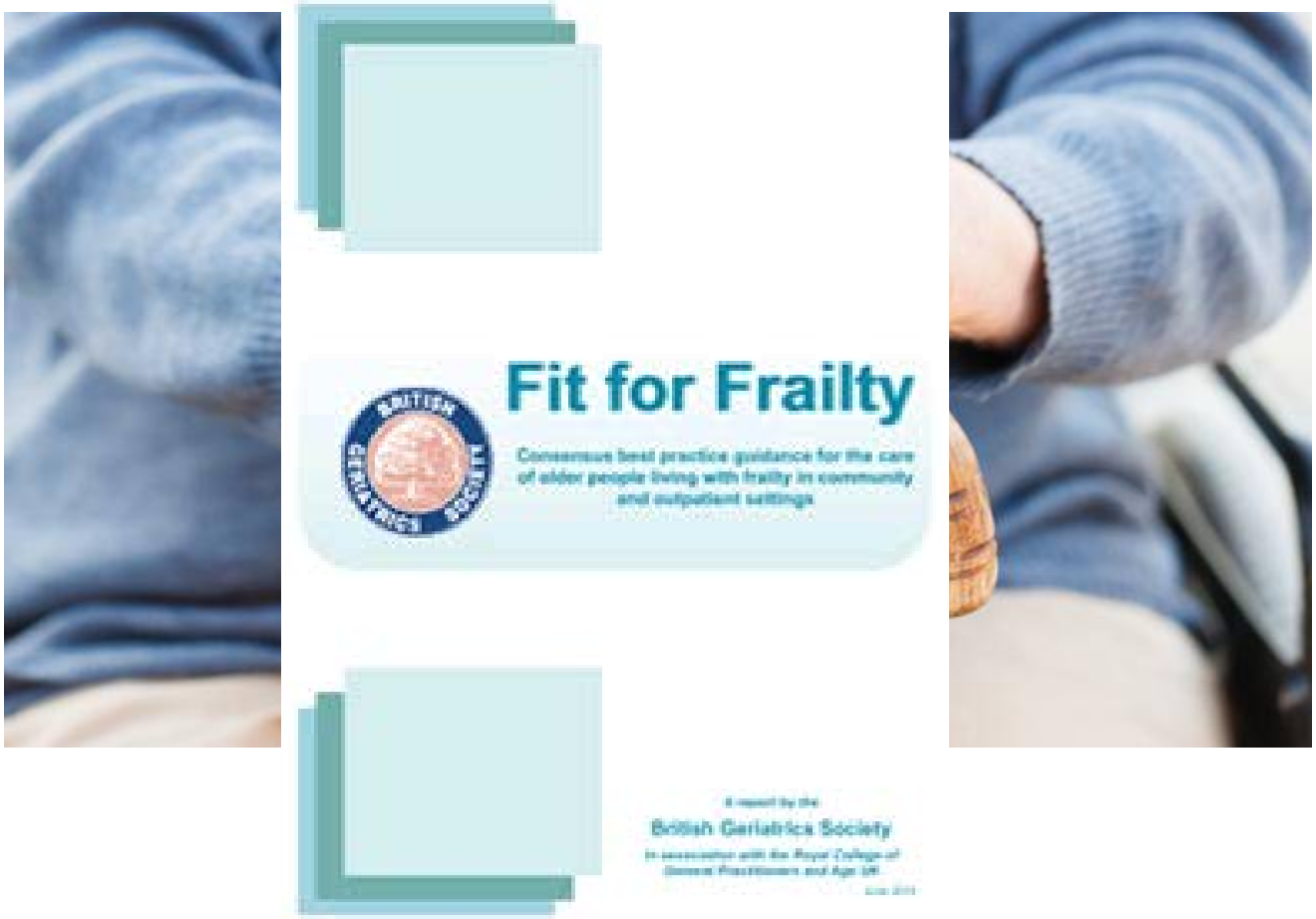
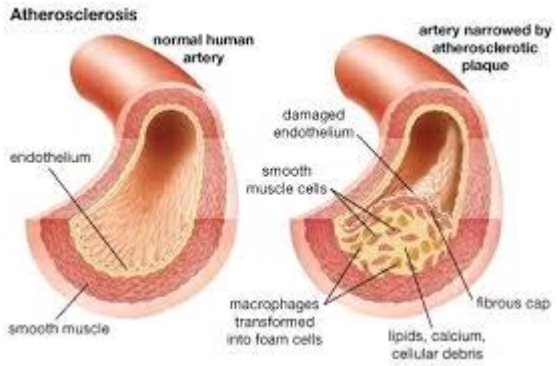
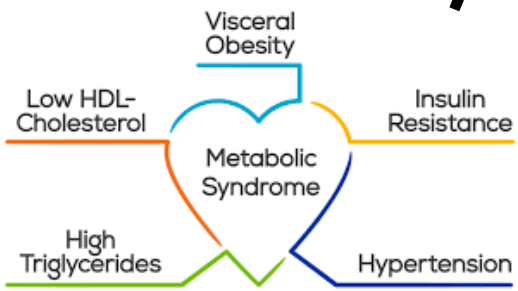
Frailty


Fit for Frailty
Consensus best practice guidance for the care of older people living with frailty in community and outpatient settings
British Geriatrics Society

Early intervention to prevent frailty





Research gaps

- The majority of studies have examined associations between frailty and metabolic syndrome in later life *(*Barzilay 2007; Hao 2016 *)*

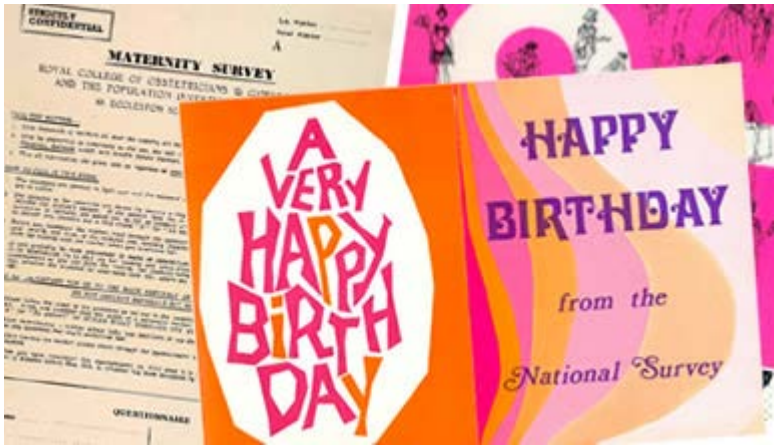
- those studies which explore MS in middle age appear to provide more conflicting evidence (Hoogendijk 2017; Kane et al 2017)

Research question

Is metabolic syndrome in mid life associated with increased risk of frailty in older age?

MRC National Survey of Health and Development

- Representative sample of 5,362 singleton births in one week in March 1946 in England, Scotland and Wales
- Followed up 24 times across infancy, childhood, adolescence and adulthood
- Most recent clinical assessment at age 69 when 2148 (80% of target) were visited by a research nurse at home



(Kuh et al., 2011; 2016)

Measures

Exposure: Metabolic syndrome (ATP III criteria)

Characteristic	Limit to indicate deficit
Blood pressure	≥130/≥85 mmHg
Waist circumference	Men: >102cm Women: >88cm
Triglycerides	≥1.7 in fasting samples
HDL	Men: <1.036mmol/l Women: <1.295mmol/l
HBA1C	>5.8%

Measures

Outcome: Frailty (Fried phenotype)

Characteristic	Limit to indicate deficit
Grip strength	Men: <30kg Women:<20kg
Gait speed	<0.8m/s
Exhaustion	‘a moderate amount of the time’ or 3-4 days or more
Weight loss	>10lbs unintentional weight loss in 1 year

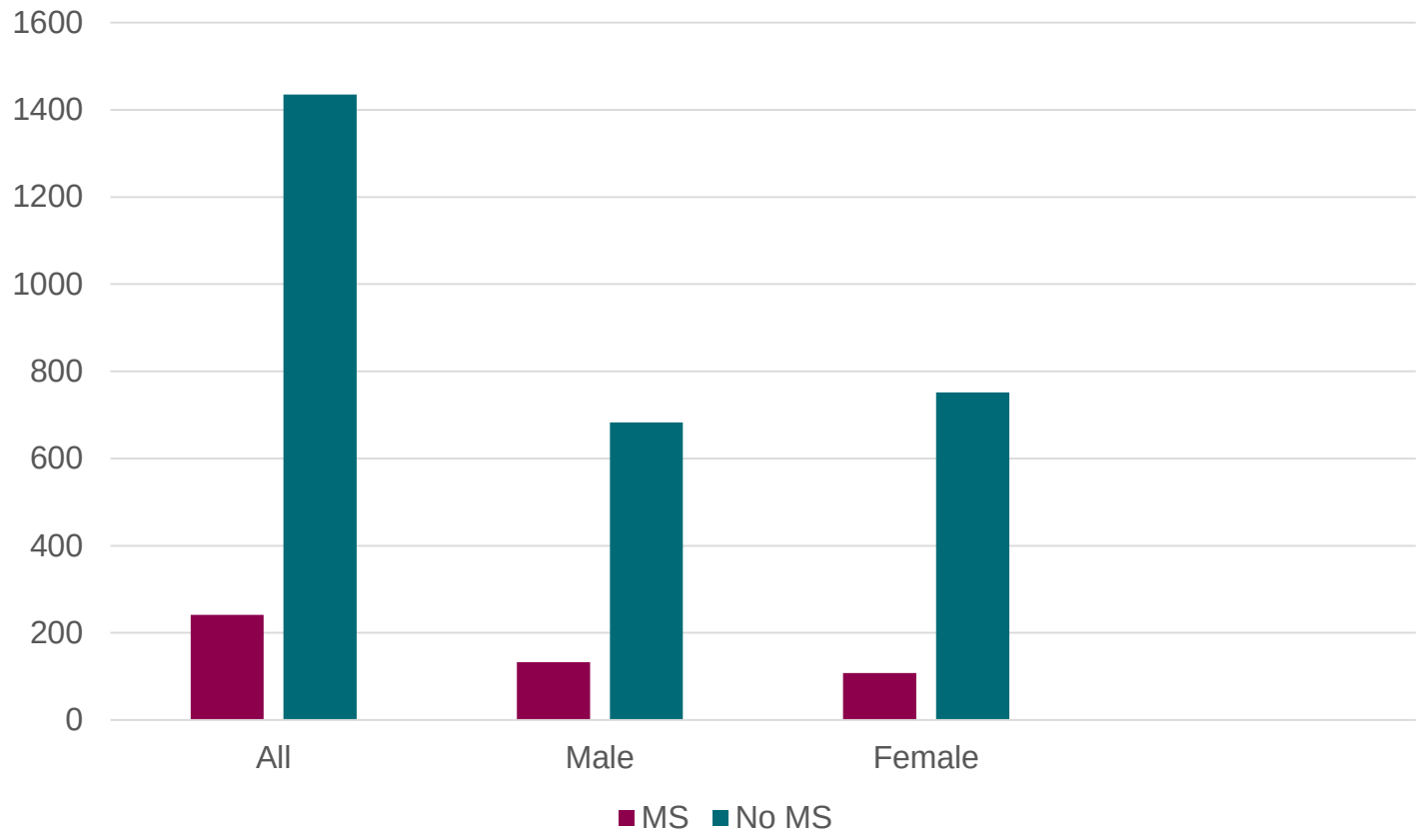
Covariates

- Sex
- Symptoms of anxiety and depression (age 53)
- Socioeconomic indicators:
  - Educational attainment (age 26)
  - Own occupational class (age 53)
- Health behaviours:
  - Smoking (age 53, 60-64, 69)
  - Leisure time physical activity (age 53, 60-64, 69)

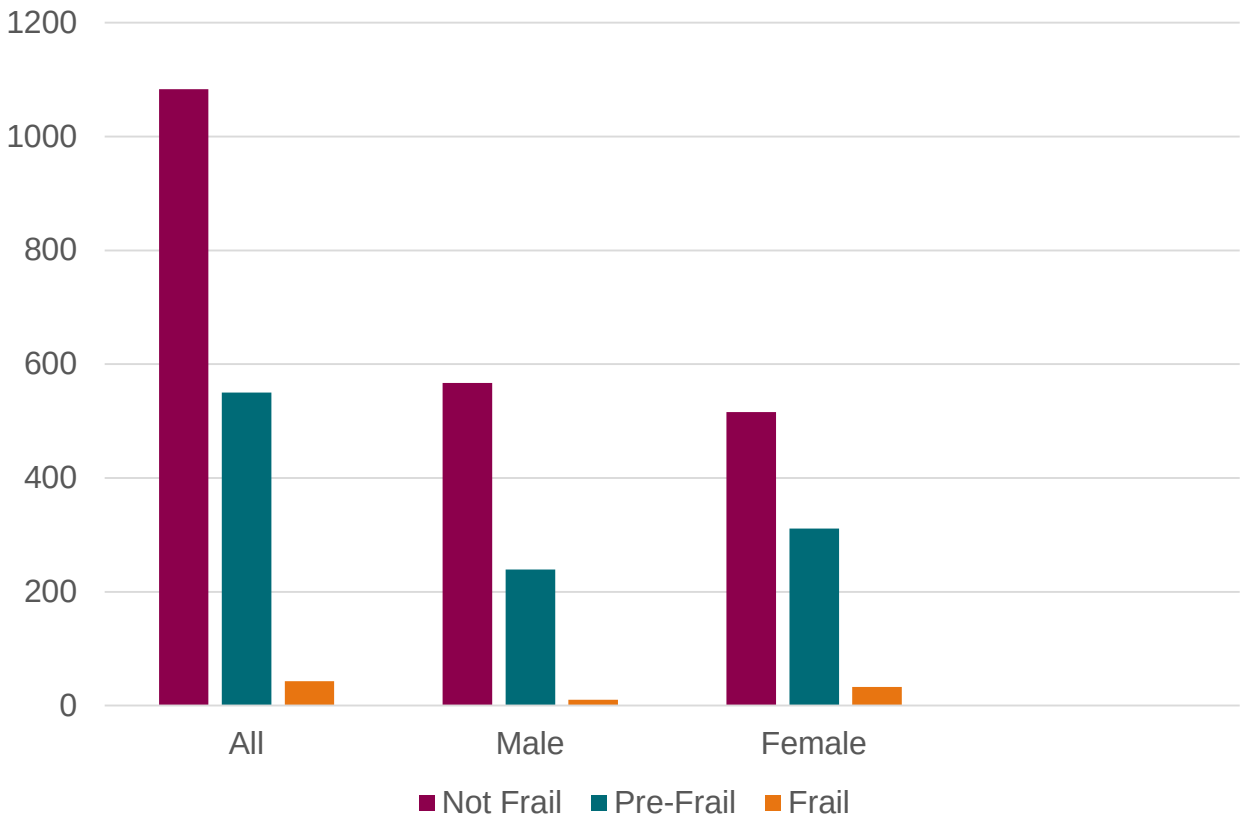
Analyses

Multinomial logistic regression to assess association between metabolic syndrome at 53 and frailty at 69

Descriptive results
Metabolic syndrome at 53:



Descriptive results
Frailty at 69:



Descriptive results: Study sample

(max n=1676)

Confounder	Status	%
Sex	Male	49%
Educational attainment	A level or higher	41%
Own occupational class	I Professional/II Intermediate	48%
Smoking status	Never smoker	31%

Multilevel regression model

Association between metabolic syndrome at 53 and frailty at 69

	Sex adjusted
	RRR (95% CI)
MS at 53 N=1676	
No Frailty (n=1083)	1.00
Pre-frailty (n=550)	1.67 (1.25-2.23)
Frailty (n=43)	5.62 (2.94-10.77)*

*p<0.001 in likelihood ratio test of models

Summary of findings

- Metabolic syndrome at age 53 is associated with an increased risk of frailty age 69 in the study population
- Causal link could be established by examining participants from MS RCTs for frailty
- Body of evidence advocating for targeting therapy at mid life to reduce complications in older age

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Questions?