Body weight changes and associations with cognitive decline among old adults

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Background

- Studies have suggested that body weight (BW) changes in old adulthood may be associated with the risk of developing mild cognitive impairment (MCI) or dementia.

- However, the associations between BW and cognitive function, before the onset of dementia, are less clear.

Aim

- Examine the longitudinal associations between changes in body weight and:

  1. Declines in cognitive function

     and

  1. Risk of MCI/dementia

  ➢ *Among older participants who are community dwelling and have <u>normal cognitive function</u>*
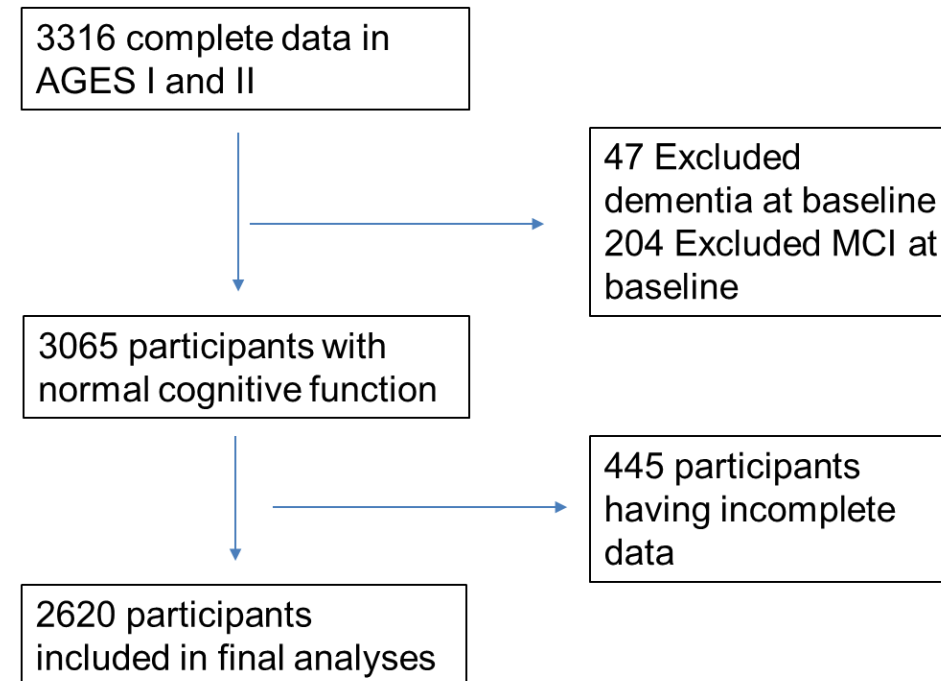
Methods

- **Data from Icelandic Heart Associations**

- **Reykjavik study (1967)**
- **AGES I- Reykjavik study (2002-2006)**
  - N=5764
- **AGES II- Reykjavik study (2007-2011)**
  - N=3316

Present study comprises :
N=2620, (65-96 years)

3316 complete data in AGES I and II

47 Excluded dementia at baseline
204 Excluded MCI at baseline

3065 participants with normal cognitive function

445 participants having incomplete data

2620 participants included in final analyses

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Study design

- Longitudinal changes in BW were classified into three groups from body mass index

  - **weight loss (< 3 kg)**
  - **weight gain (≥ 3 kg)**
  - **stable weight (reference group)**

Study design

- **Cognitive function outcomes included**
  - ✓ *speed of processing (SP),*
  - ✓ *executive function (EF)*
  - ✓ *memory function (MF).*

- **Dementia and MCI**
- ✓ Diagnosis was according to international guidelines
- ✓ Made by a team composed of a geriatrician, neurologist, neuropsychologist

Statistical analysis

- Statistical analyses were carried out using SPSS
- Multiple logistic regression models adjusting for confounding factors in 3 models
  - **Model 1**: age, gender and baseline cognitive function
  - **Model 2**: additionally adjusted for 25OHD, baseline BMI and physical activity
  - **Model 3:** marital status, smoking, education, apolipoprotein E and medicine use

Table 1.   **Results**

Demographic and health characteristics according to weight groups among AGES-Reykjavik participants (N =2620).

	WEIGHT LOSS (n=843)			WEIGHT GAIN (n=505)			WEIGHT STABLE (n=1272)			
	32.2%			**19.3%**			**48.5%**			
	mean	±	SD	mean	±	SD	mean	±	SD	P-value*
Demographic data										
age (years)	75.4	±	4.8	74	±	4.5	74.5	±	4.7	<0.001
female (%)		62			61			56		0.01
Lifestyle data										
physical inactivity (%)		42.0			38.4			35.9		0.008
alcohol-no (%)		32.1			35.5			29.2		0.055
smoke-yes (%)		8.3			10.1			7.8		0.213
Anthropometric data										
BMI (kg/m2)	28.1	±	4.4	27.5	±	4.5	26.6	±	3.9	<0.001
Laboratory data										
25OHD (nmol/L)	56.6	±	17	57	±	18.7	59.9	±	16.9	<0.001
Neuropsychological data										
memory (z-score)	0.032	±	0.885	0.173	±	0.890	0.154	±	0.867	0.001
executive (z-score)	0.030	±	0.730	0.060	±	0.762	0.131	±	0.729	0.004
speed (z-score)	0.104	±	0.687	0.061	±	0.705	0.163	±	0.678	0.007

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*Chi-square test for categorical variables and ANOVA for continuous variables wereused to test for statistical differences.

Table 2-4: Associations* between weight change categories and cognitive function domains among AGES-Reykjavik participants (N = 2620)**.

Parameter	Model 1		Model 2		Model 3		Memory Function
	B	P-value	B	P-value	B	P-value	
weight loss[1]	-0.097	0.001	-0.097	0.001	-0.098	0.001	
weight gain[1]	-0.015	0.666	-0.014	0.695	-0.009	0.793	

Parameter	Model 1		Model 2		Model 3		Speed of processing
	B	P-value	B	P-value	B	P-value	
weight loss[1]	-0.099	<0.001	-0.092	<0.001	-0.092	<0.001	
weight gain[1]	-0.038	0.189	-0.033	0.245	-0.031	0.276	

Parameter	Model 1		Model 2		Model 3		Executive Function
	B	P-value	B	P-value	B	P-value	
weight loss[1]	-0.035	0.224	-0.027	0.362	-0.031	0.285	
weight gain[1]	-0.051	0.128	-0.047	0.168	-0.043	0.205	

*Based on univariate GLM; **Excluded: participants with dementia and mild cognitive impaired at baseline; **Model 1**: age, gender and baseline cognitive function; **Model 2**: additionally 25OHD, body mass index and physical activity; **Model 3**: additionally marital status, smoking, education, apolipoprotein E and medicine use.[1] compared to weight stable;

Table 5: Body weight change categories and risk of development of MCI among AGES-Reykjavik participants (N = 2620)*.

Parameter	Model 1		Model 2		Model 3	
	OR	P-value	OR	P-value	OR	P-value
weight loss[1]	1.855	<0.001	1.768	0.001	1.850	0.001
weight gain[1]	1.424	0.113	1.373	0.157	1.302	0.248

*Based on logistic regression; **Excluded: participants with dementia and mild cognitive impaired at baseline; [1] compared to weight stable;

Table 6: Body weight change categories and risk of development of dementia among AGES-Reykjavik participants (N = 2620)*.

Parameter	Model 1		Model 2		Model 3	
	OR	**P-value**	OR	**P-value**	OR	**P-value**
weight loss[1]	1.463	0.181	1.426	0.217	1.517	0.152
weight gain[1]	3.031	<0.001	2.972	<0.001	3.071	<0.001

Based on logistic regression; **Excluded: participants with dementia and mild cognitive impaired at baseline; compared to weight stable

Summary

- Weight loss was associated with higher likelihood of having declines in *2 out of 3 cognitive function domains*
  - Memory and speed
    - compared to the weight stable group.

- Weight loss was associated with a higher *risk of MCI*
- Weight gain was associated with a higher *dementia risk*,

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Conclusion

- Significant BW changes in older adulthood may, independently, indicate impending changes in cognitive function.

- We conclude that keeping body weight stable during old adulthood is the best option to maintain cognitive function in old age.

Questions?

- Thank you
  - Alfons Ramel
  - Milan Chang
  - Ólöf Guðný Geirsdóttir

  - All my brilliant fellow co-workers at RHLÖ

Flow chart
AGES I
AGES II

3316 complete data in AGES I and II

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