Obesity and All-Cause Mortality in Older Adults: Maximum Weight

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BEATRIZ NOVAK

CENTER FOR DEMOGRAPHIC, URBAN AND ENVIRONMENTAL STUDIES

EL COLEGIO DE MÉXICO

Relationship between Obesity & Mortality among Older Adults

₪ This relationship is still controversial (Bales & Buhr, 2009; Lavie, De Schutter, & Milani, 2015, Metha & Chang, 2009)

₪ "Obesity Paradox"
  ₪ Beneficial effects on mortality of large body size

₪ More likely reflects confounding from age-related and health-related selection biases (Masters, 2013; Preston & Stokes, 2014)
  ₪ Reverse causation: Factors that induce weight loss and simultaneously increase mortality risks, including serious illnesses
  ₪ Selection bias
  ₪ Confounders: smoking
  ₪ Different statistical artifacts, etc.

Some Measures Aimed to Reduce Reverse Causality

₪   Restricting the sample to healthy participants

₪   Delaying the onset of risk by several years after date of survey

₪   Limitations of this strategy

   ₪   Exclusions lead to eliminate a considerable amount of deaths among participants

   ₪   Pre-existent conditions are obtained by self-reports: undiagnosed individuals cannot be excluded

   ₪   Delaying the onset of risk: may not be effective, illness-induced weight loss can start several years eelier

Maximum Lifetime Weight

₪ Stokes (2014): Addressing reverse causality

    ₪   Does not require excluding participants

    ₪   Does not require delaying onset of risk

    ₪   It is not susceptible to the fluctuations of body weight related to illness

Main Objectives

₪ Evaluate mortality risks associated with obesity among older adults using maximum lifetime body weight

₪ Compare to mortality risks associated with obesity status at baseline

Data:
CRELES: Costa Rican Longevity and Healthy Aging Study, 2005 (CRELES)

₪ Longitudinal Study

  ₪ CRELES 2005, 2007, and 2009

₪ CRELES 2005 (baseline)

  ₪ Respondents aged 60 and over

  ₪ N = 2828

  ₪ Deaths = 566

  ₪ Observation window ~ 5 years

Sample

₪   Individuals aged 60-90 years in 2005

₪   N = 2065
  ₪   46.44% Males
  ₪   53.56% Females

₪   Deaths registered during observation period: 213
  ₪   51.64% Males
  ₪   48.36% Females
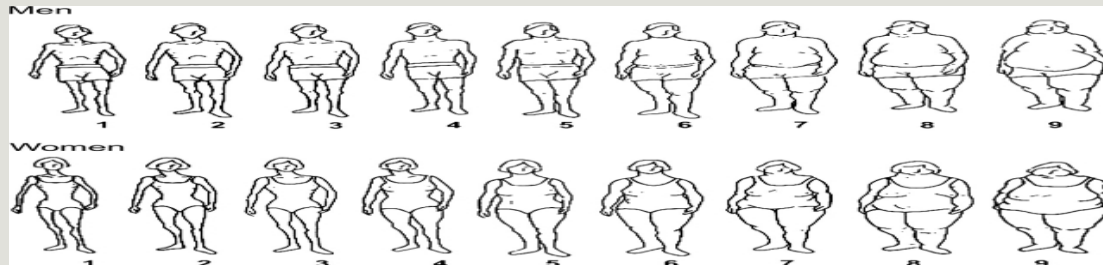
Descriptive Analysis (2005)

Variables	Males (N = 860)	Females (N = 953)
Age (Mean, SD)	68.7 (0.3)	69.0 (0.2)
Age (%)		
60-70	60.4	59.9
70-80	31.9	31.0
80-90	7.7	9.2
Education (%)		
No Formal Education	10.6	9.0
Primacy Incomplete	32.9	37.6
Primary Complete	29.3	30.9
Primary & Over	27.2	22.5
Ever Smoker (%)		
Yes	67.2	20,1

Variables	Males (N = 860)	Females (N = 953)
Self-rated Health (%)		
Excellent /Very Good	25.6	20.6
Good	33.6	32.1
Fair	35.2	41.5
Bad	5.6	5.8
ADLs (%)		
No Limitations	52.4	36.0
One	21.1	19.4
Two	9.3	16.2
Three or More	17.2	13.6
Index of Chronic Conditions (%)		
No Conditions	59.2	50.1
One	27.5	32.6
Two	9.7	12.3
Three or More	3.6	5.0

Maximum Weight

₪ "What was or what has been your maximum weight in your life?"

₪ "Using these images, what do you think you looked like at that time?"

Stunkard Rating Scale (Stunkard, Sørensen, y Schulsinger, 1983)

₪ Bulik, Wade, Heath, Martin, Stunkard, and Eaves (2001)

   ₪ Figure 4 and lower: Lean (BMI<21)

   ₪ Figure 6 and higher: Obese (BMI≥30)

Descriptive Analysis (2005)

Males (%)	Maximum Weight		
	Lean	Normal/ Overweight	Obese
At Survey			
Lean	5.6	1.3	0.6
Normal/Overweight	23.0	18.0	30.7
Obese	0.7	1.9	18.3

Females (%)	Maximum Weight		
	Lean	Normal/ Overweight	Obese
At Survey			
Lean	5.1	21.9	1.4
Normal/Overweight	0.8	18.0	8.0
Obese	0.4	18.3	26.1

Kaplan-Meier Survival Estimates
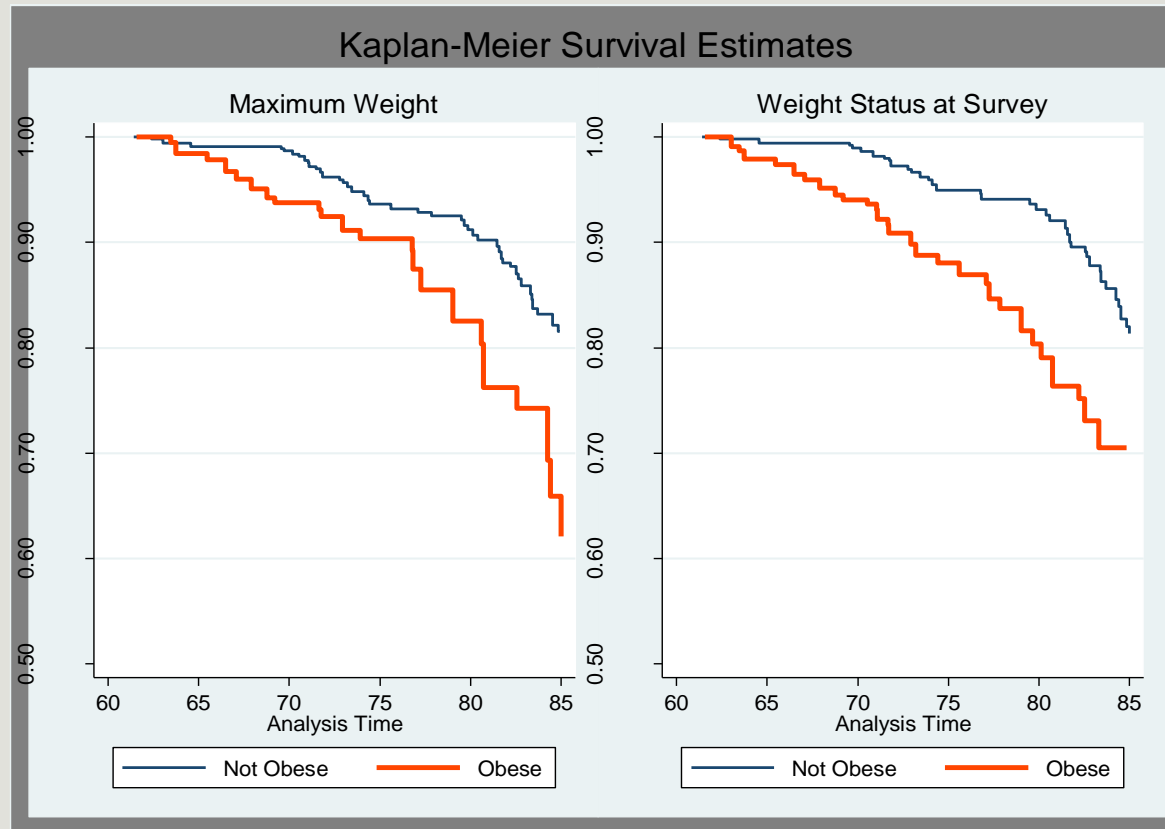
Kaplan-Meier Survival Estimates

Method: Cox Proportional Model

$$h(t|x_j) = h_0(t)exp(\beta_0 + x_j\beta_x)$$

- x variable vector with information of each individual
  - Body Weight Status (at survey or maximum)
  - Sex
  - Educational Attainment
  - Models for Body Weight Status at Survey adjusted for:
    - Index of Chronic Conditions
  - Exclusions:
    - Underweight individuals

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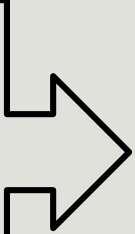 ₪ Body Weight Status (at survey or maximum)

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To reduce reverse causality

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       ₪   Ever smokers

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 ₪ Models for Body Weight Status at Survey adjusted for:

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 ₪ Exclusions:

  ₪ Underweight individuals

  ₪ Ever smokers

To reduce reverse causality

To reduce confounding factors

Results

	M 1 Maximum Weight	M 2 Weight at Survey Adjusted & 6 Months Deaths	M 3 Maximum Weight	M 4 Weight at Survey Adjusted & 6 Months Deaths
	RR (SE)	RR (SE)	RR (SE)	RR (SE)
Body Weight Status (Ref. Normal/Overweight)				
Lean	0.84 (0.31)	1.14 (0.64)		
Obese	2.50** (0.85)	2.42** (0.73)		
Body Weight Status (Ref. Not Obese)			2.46** (0.68)	2.09* (0.62)
Obese				
N	1008	962	1008	962
df	6	7	6	6
AIC	921	799	906	802
BIC	951	834	935	831

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Limitations

₪   Maximum Weight Status determined by means of Stunkard´s Rating Scale

₪   Questions on Maximum Weight only for non-proxy respondents

₪   Age at Maximum Weight Status provided by respondent

₪   Body weight at Maximum Weight only for a subsample

₪   Not able to track changes in body weight between Maximum Weight and Weight at Survey, only relative body weight status

Strengths

₪ Maximum Weight Status determined by means of Stunkard´s Rating Scale

₪ Weight at Survey measured by professionals for the whole sample

₪ Avoids confounding by smoking

₪ Controls for comorbidities at baseline

Despite its limitations...

₪   Contributes to the debate on the relationship of obesity and mortality at older ages

₪   Suggests that the mortality risk associated with obesity may be underestimated

₪   Highlights the need of the inclusion in surveys of historical data on body weight

Thanks!