Active life expectancy for elderly Singaporeans by number of teeth and chewing ability

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Introduction

- Having fewer teeth or decreased chewing ability leads to an increased risk of mortality independent of other factors including socioeconomic status, life style and health factors (Ansai et al. 2007; Hamalainen et al. 2003; Osterberg et al. 2008; Padhila et al. 2008; Shimazaki et al. 2001; Yoshida et al. 2005)

- The link between chewing ability, nutritional status and an increased risk of mortality among the elderly (Nakanishi et al. 2004; Walls and Steele 2004)

Introduction

- Oral health is
  - related to the risk of disability among the elderly (Holm-Pedersen et al. 2008; Takata et al. 2004; Takata et al. 2008)
  - related to the higher incidence of disability (Shimazaki et al. 2001; Holm-Pedersen et al. 2008)
  - a signpost and a symptom of declining overall health and may put elderly at risk for transitioning from a healthy state (Locker 2002; Locker et al. 2002; Nasu and Saito 2006)

Motivatoin

- Previous studies have investigated the association between oral health, disability and mortality

- There is little research exploring the association between oral health and active life expectancy.

Objective

- To assess the association between oral health status (number of teeth and chewing ability) and active life expectancy of older Singaporeans.

Data

- A nationally representative longitudinal (2 waves; 2009 and 2011-12) survey in Singapore

  - N=4990 at baseline

  - aged 60+

  - Analysis samples

    - number of teeth: N=3,318

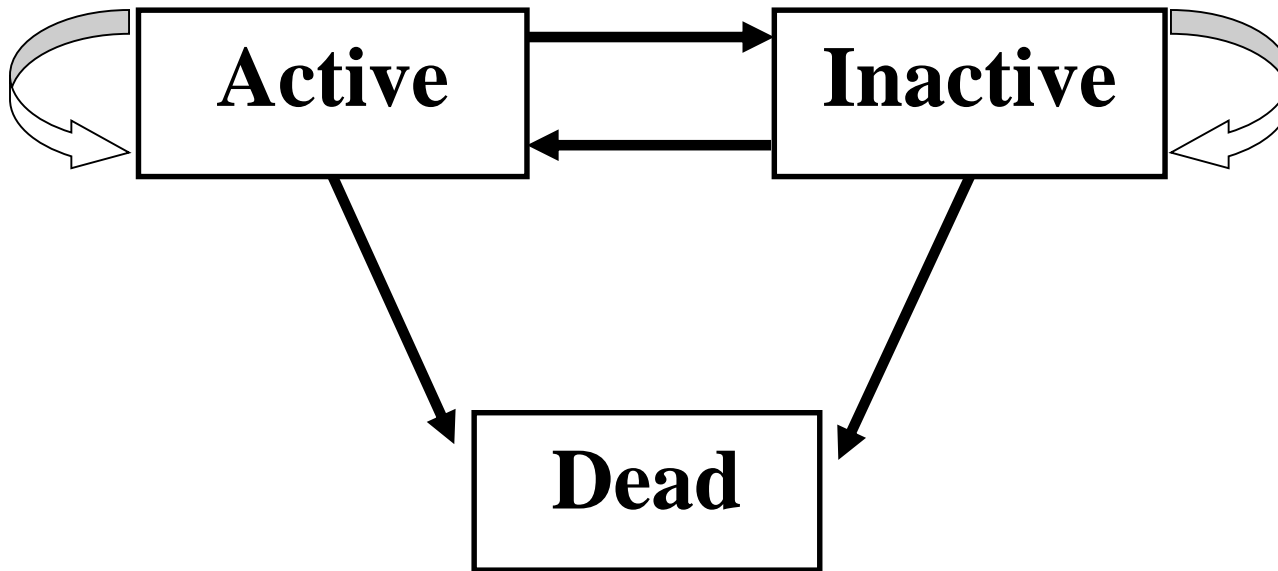   - chewing ability: N=3,356

Measures

- Death
  - linked to the national Registry of Births and Deaths databases
  - follow-up
- Disability
  - 6 ADLs
    - bath, dress, eat, bed, chair, walk, toilet
  - 7 IADLs
    - meals, shop, financial, phone, light housework, public transport, take medication

Measures

- Number of (natural) teeth
  - self-reporting
  - 0-19 vs 20+
- Chewing ability
  - self-rated
  - ability to chew the hardest group (dry small fish, shredded dry squid) of food items (able/unable to chew)

Method

- Incidence-based multistate life tables (MSLTs) were constructed by IMaCh

Health transitions

		Health Status: n(%)			
		Wave 2			
Dental Status	Wave 1	Active	Disabled	Dead	Sum
Number of Teeth	Active	2,242 (75.9)	337 (7.6)	142 (3.4)	
	Disabled	121 (3.2)	342 (7.1)	134 (2.7)	3,318 (100.0)
Chewing Ability	Active	2,263 (75.7)	340 (7.6)	143 (3.4)	
	Disabled	122 (3.2)	352 (7.3)	136 (2.7)	3,356 (100.0)

Note: sample sizes (n) are unweighted, but proportions (%) are weighted.

Population-based at age 60 : # of teeth

Both gender

	0-19				20+		
	Est.	95% CI	%		Est.	95% CI	%
TLE	23.1	(21.7, 24.5)	100.0		26.6	(22.5, 30.6)	100.0
ALE	17.8	(16.8, 18.7)*	76.8		20.9	(18.9, 23.0)	78.8
IALE	5.4	(4.5, 6.3)	23.2		5.6	(2.7, 8.6)	21.2

Men

	0-19				20+		
	Est.	95% CI	%		Est.	95% CI	%
TLE	21.0	(19.3, 22.7)	100.0		24.1	(20.9, 27.3)	100.0
ALE	18.3	(16.9, 19.7)	87.2		21.2	(18.9, 23.5)	87.9
IALE	2.7	(1.9, 3.5)	12.8		2.9	(1.3, 4.5)	12.1

Women

	0-19				20+		
	Est.	95% CI	%		Est.	95% CI	%
TLE	25.0	(23.0, 26.9)	100.0		29.1	(23.7, 34.5)	100.0
ALE	17.3	(16.2, 18.5)	69.4		20.6	(18.3, 22.8)	70.6
IALE	7.7	(6.2, 9.1)	30.6		8.6	(4.2, 12.9)	29.4

* $p < 0.05$

Population-based at age 60 : chewing ability

Both gender

	Unable				Able		
	Est.	95% CI	%		Est.	95% CI	%
TLE	20.3	(18.2, 22.3)*	100.0		26.0	(23.8, 28.3)	100.0
ALE	14.9	(13.3, 16.4)*	73.3		20.1	(19.0, 21.3)	77.3
IALE	5.4	(4.2, 6.6)	26.7		5.9	(4.3, 7.6)	22.7

Men

	Unable				Able		
	Est.	95% CI	%		Est.	95% CI	%
TLE	18.6	(16.4, 20.9)*	100.0		23.2	(21.1, 25.2)	100.0
ALE	15.8	(13.9, 17.7)*	84.7		20.3	(18.7, 21.8)	87.5
IALE	2.9	(1.9, 3.8)	15.3		2.9	(1.8, 3.9)	12.5

Women

	Unable				Able		
	Est.	95% CI	%		Est.	95% CI	%
TLE	21.7	(19.3, 24.1)*	100.0		28.7	(25.5, 31.9)	100.0
ALE	14.1	(12.3, 15.8)*	64.8		19.9	(18.5, 21.4)	69.5
IALE	7.6	(5.9, 9.3)	35.2		8.8	(6.3, 11.3)	30.5

* $p < 0.05$

Status-based at age 60: chewing ability

		Both gender					
		Unable			Able		
Initial State		Est.	95% CI	%	Est.	95% CI	%
Active	TLE	20.5	(18.5, 22.4)*	100.0	26.1	(23.8, 28.3)	100.0
	ALE	15.1	(13.7, 16.6)*	74.0	20.2	(19.1, 21.4)	77.5
	IALE	5.3	(4.2, 6.5)	26.0	5.9	(4.2, 7.5)	22.5
Inactive	TLE	16.5	(13.2, 19.8)*	100.0	24.3	(21.7, 26.9)	100.0
	ALE	9.2	(6.6, 11.9)*	56.0	16.4	(14.5, 18.2)	67.4
	IALE	7.3	(5.6, 9.0)	44.0	7.9	(6.2, 9.6)	32.6

* $p < 0.05$

Status-based at age 60: chewing ability

		Men					
		Unable			Able		
Initial State		Est.	95% CI	%	Est.	95% CI	%
	TLE	18.8	(16.5, 21.0)*	100.0	23.2	(21.1, 25.2)	100.0
Active	ALE	16.0	(14.1, 17.8)*	85.1	20.3	(18.8, 21.8)	87.6
	IALE	2.8	(1.9, 3.7)	14.9	2.9	(1.8, 3.9)	12.4
	TLE	13.6	(9.7, 17.4)*	100.0	20.6	(17.6, 23.6)	100.0
Inactive	ALE	8.6	(5.3, 11.9)*	63.4	15.6	(12.8, 18.3)	75.6
	IALE	5.0	(3.4, 6.6)	36.6	5.0	(3.7, 6.4)	24.4

* $p < 0.05$

Status-based at age 60: chewing ability

		Women					
		Unable			Able		
Initial State		Est.	95% CI	%	Est.	95% CI	%
	TLE	22.0	(19.6, 24.3)*	100.0	28.8	(25.6, 32.0)	100.0
Active	ALE	14.4	(12.9, 16.0)*	65.8	20.1	(18.6, 21.5)	69.7
	IALE	7.5	(12.9, 16.0)	34.2	8.7	(6.2, 11.2)	30.3
	TLE	18.7	(15.0, 22.4)*	100.0	27.2	(23.8, 30.7)	100.0
Inactive	ALE	9.4	(6.7, 12.1)*	50.2	16.6	(14.6, 18.6)	61.0
	IALE	9.3	(7.1, 11.6)	49.8	10.6	(8.1, 13.2)	39.0

* $p < 0.05$

Summary

- Number of teeth
  - Significant association with ALE
  - But not TLE
    - Sample size
    - # of teeth may not be associated with ADL (Akifusa et al. 2005)
- Chewing ability
  - Significant association with ALE and TLE

Limitation/Further consideration

- Sample size may not be large enough
- Other factors to be considered
- Number of teeth: not functioning teeth
- Measure of chewing ability

Thank you!