Dental caries and diabetes in the elderly population in San Juan, Puerto Rico

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Graduate School of Public Health,
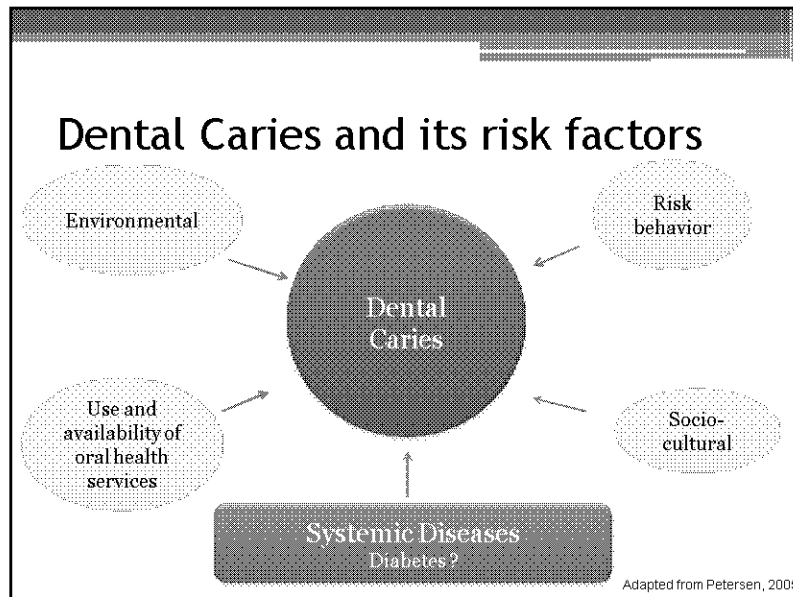University of Puerto Rico, Medical Sciences Campus

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Presenter Disclosures

Katherine Svensson

(1) The following personal financial relationships with commercial interests relevant to this presentation existed during the past 12 months:

No relationship to disclose

Dental Caries and its risk factors

Environmental

Risk behavior

Dental Caries

Use and availability of oral health services

Socio-cultural

Systemic Diseases
Diabetes ?

Adapted from Petersen, 2005


Background

- The association between diabetes and dental caries is not consistent in the literature (Taylor et al, 2004).

- Some studies hypothesize that increased salivary glucose, decreased salivary flow and more frequent intervals of food ingestion among subjects with diabetes increase the risk for caries (Taylor et al., 2004).

- People 65 years and older constitute 11.2% of the population in Puerto Rico, where the prevalence of diabetes is approximately 28.7% (Census, 2000; BRFSS, 2008).

- For these reasons, it is important to evaluate the relationship between diabetes and caries in order to develop risk-based prevention strategies in this population.

Research Question

- Will elderly Puerto Ricans residing in the Metropolitan area of San Juan with diabetes have a higher prevalence of dental caries than those without diabetes?

METHODS

Study Design
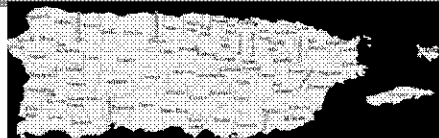
Puerto Rican Elderly Health Conditions (PREHCO), 2002-2003

Puerto Rican Elderly Dental Health Study (PREDHS), 2007

- Sub-sample selected from the San Juan Metropolitan Area (n =292)
- Non-institutionalized adults
- ≥70 years and older
- Completed a comprehensive oral exam
- Exclusion criteria applied
- n =184

Participants with diabetes
n=54

Participants without diabetes
n=103

Data Source

- PREHCO, 2002-2003
  - Socio-demographic data
  - Anthropometric measures
  - Self-reported diabetes
- PREDHS, 2007
  - Hygiene practices and use of dental health services
  - Diet
  - Oral exams to assess coronal and root caries (DMF index):
    - DMFS – decayed, missing and filled surfaces
    - DS – decayed surfaces
    - MS – missing surfaces
    - FS – filled surfaces

Statistical Analysis

- To assess differences in caries indexes across diabetes status:
  - DMFS – multiple linear regression
  - DS + FS – multiple Poisson regression
  - MS – multiple logistic regression

RESULTS

Description of the sample

	n	%
Diabetes		
Yes	51	27.7
Sex		
Female	123	66.8
Age (years)		
70-79	112	61.9
Family Income (monthly)		
≥$1000	104	57.1
BMI (kg/m²)		
≥25.0	121	66.1
Dentist visit (last 12 months)		
Yes	120	65.6
Mouthwash (last 7 days)		
Yes	87	47.3
Dental floss (last 7 days)		
Yes	120	65.2
Difficulty to chew		
Yes	33	17.9

DMFS index by diabetes status (n=184)

	DMFS (± SD)	median DS (Q_1, Q_3)	median FS (Q_1, Q_3)	median MS (Q_1, Q_3)
Diabetes status				
No	73.42 (±25.65)	0.0 (0.0, 2.0)	10.0 (4.0, 27.0)	49.0 (25.0, 79.0)
Yes	76.45 (±26.06)	0.0 (0.0, 7.0)	8.0 (1.0, 16.0)	60.0 (40.0, 86.0)
p-value	$p = 0.24$	$p = 0.37$	$p = 0.04$	$p = 0.11$

Q_1= 25th percentile
Q_3= 75th percentile

Average difference in DMFS index using a multiple linear regression model (n=184)

	Adjusted β	95%CI	p-value
Diabetes			
No	reference	------	------
Yes	3.71	(-5.20, 11.40)	0.382
Sex			
Male	reference	------	------
Female	-2.98	(-10.86, 4.92)	0.459
Age			
70-79	reference	------	------
≥ 80	8.21	(8.01, 15.62)	0.030

Relative difference (RD) in the average of DS using a multiple Poisson regression model (n=184)

	Adjusted β	SE	p-value
Diabetes			
No	reference	------------	-----
Yes	1.08	(0.85, 1.31)	<0.001
Sex			
Male	reference	------------	-----
Female	-0.84	(-1.06, -0.61)	<0.001
Age			
70-79	reference	------------	-----
80+	0.34	(0.16, 0.52)	<0.001
Difficulty to chew			
No	reference	------------	-----
Yes	0.53	(0.34, 0.73)	<0.001
Interaction			
Diabetes and sex	-0.83	(-1.19, -0.48)	<0.001

Among men:
RD = 2.95
(95% CI: 2.45, 3.69)
(p-value < 0.001)

Among women:
RD = 1.29
(95% CI: 0.97, 1.69)
(p-value = 0.079)

Relative difference (RD) in the average of FS using a multiple Poisson regression model (n=181)

Monthly Family Income	BMI (kg/m²)	RD (95% CI)	
< $1000	< 25.0	0.58	(95% CI: 0.46, 0.73)
	≥ 25.0	1.07	(95% CI: 0.91, 1.26)
≥ $1000	< 25.0	0.41	(95% CI: 0.33, 0.51)
	≥ 25.0	0.76	(95% CI: 0.66, 0.87)

* Estimates are adjusted by sex, age, difficulty to chew

Odds Ratios (OR) of MS using a multiple logistic regression model (n=183)

	Adjusted OR	95%CI	p-value
Diabetes			
No	1.00	------------	-----
Yes	1.48	(0.75, 2.92)	0.260
Sex			
Male	1.00	------------	-----
Female	0.73	(0.40, 1.39)	0.388
Age			
70-79	1.00	------------	-----
≥ 80	1.48	(0.81, 2.70)	0.207
BMI (kg/m²)			
<25	1.00	------------	-----
≥25	2.29	(1.20, 4.35)	0.012

Conclusion

- Men with diabetes had a significant higher risk of decayed surfaces than those without diabetes; however, a marginal significant differences was observed among women.

- Participants with diabetes had less filled surfaces than those without diabetes, suggesting that either diagnosed individuals receive less oral health care or have more missing surfaces due to pre-existing periodontal disease.

- Further longitudinal analysis are needed to better understand the association between diabetes and caries experience.

Acknowledgements