The association between shoulder pain and diabetes: results from a population based study.

Antonia Cole, Tiffany K Gill, Michael Shanahan, Patrick Phillips, Anne W Taylor, Catherine L Hill,

On behalf of the North West Adelaide Health Study Team

Introduction

- Musculoskeletal symptoms are common in people with diabetes mellitus.
- Studies have reported a higher prevalence of shoulder pain in people with diabetes in the primary care setting and in hospital outpatient clinics: 11-35% in diabetics vs 2-17% of controls. (Laslett, Pal, Lequesne, Bridgman)
- No published population-based studies.
- Shoulder pain impacts on quality of life. A recent tertiary care based study found both shoulder pain and disability to be worse in people with diabetes compared to controls (Laslett).

Introduction

- Several studies have shown an association between shoulder pain and duration of diabetes mellitus and age.

-Laslett et al. Clin Exp Rheum 2007
-Bridgman et al. Ann Rheum Dis 1972
-Arkkila et al. Ann Rheum Dis 1996
-Cagliero et al. Am J Med 2002

Introduction

- Glycaemic control:
  - No convincing evidence of an association between poor diabetic control and shoulder symptoms in diabetics.

-Arkkila et al. Ann Rheum Dis 1996
-Cagliero et al. Am J Med 2002
-Laslett et al. Clin Exp Rheumatol 2007

Aim

- To assess the association of shoulder pain and/or stiffness and diabetes mellitus in a population- based cohort.

The North West Adelaide Health Study

- Population-based biomedical cohort study established in 2000
- North-Western region of Adelaide, South Australia; covers a broad range of socioeconomic areas.
- Designed to assess prevalence of chronic conditions, health related risk factors and to monitor progression of diseases over time to help plan health care provision in SA.

Methods – Stage 1 (2000-2003)

- **Recruitment:**
  - random selection from Electronic White Pages.
  - person last to have birthday and aged 18 yrs or over was interviewed and invited to attend clinic (n=4060)
- **Data Collection**:
  - Demographics, chronic conditions, risk factors, health care utilization, quality of life
  - Clinic assessment: BP, height, weight, waist & hip circumference, fasting bloods.

Data collection – Stage 2 (2004-2006)

- **Data collected via computer assisted telephone interview:**
  - Demographics, chronic conditions, risk factors
- **Clinic assessment**
  - height, weight, waist & hip circumference
  - Assessment of musculoskeletal conditions including the Shoulder pain and disability Index (SPADI), measurement of range of shoulder movement.

Shoulder pain

- **All participants in Stage 2 were asked:**
  - "Have you ever had pain or aching in your shoulder at rest or when moving, on most days for at least a month?"
  - "Have you ever had stiffness in your shoulder when getting out of bed in the morning on most days for at least a month?"
  - "Does the stiffness last for at least 15 minutes?"

Shoulder Pain and Disability Index (SPADI)

- **Severity of pain**
  - At its worst?
  - When lying on the affected side?
  - Reaching for something on a high shelf?
  - Touching the back of your neck?
  - Pushing with the involved arm?
- **Degree of functional impairment**
  - Difficulty washing your hair? Your back?
  - Difficulty putting on a jumper? Buttoning a shirt?
  - Difficulty putting on your pants?
  - Difficulty placing things on a high shelf ?
  - Difficulty carrying a heavy object?
  - Removing something from your back pocket?

Roach et al. Arthr Care Res 1991

Diabetes

- Defined as
  - Fasting plasma glucose (FPG) level of at least 7.0 mmol/L

    OR
  - Self reported having been diagnosed with diabetes by a doctor

Demographics of NWAHS: Stage 2

		Frequency	Percent
Gender	Male	1569	48.9%
	Female	1637	51.1%
Age	20-39yr	1226	38.3%
	40-59yr	1171	36.6%
	60+ yr	809	25.1%

BMI (kg/m2) (Mean, SD)
- Females 27.7 (6.3)
- Male 28.0 (5.0)

Current Smokers: 19.3%

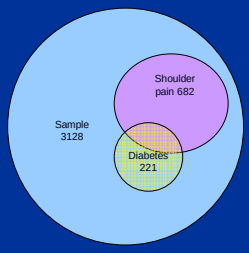
Prevalence of diabetes and shoulder pain/stiffness

3128 participants had assessment for both diabetes and shoulder pain/stiffness

	No Diabetes		Diabetes		Total	
	n	%	n	%	n	%
Pain &/0r stiffness	620	**(21.3)**	62	**(27.9)***	682	21.8
No pain /stiffness	2287	(78.7)	160	(72.1)*	2447	78.2
Total	2907	(100)	221	(100)	**3128**	(100)

*Significant difference between diabetes and no diabetes p=0.02

Study population Schematic presentation



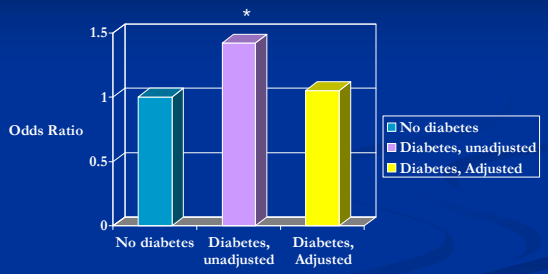
Shoulder pain/stiffness, stratified into HbA1c levels

	HbA1c<6.0%		HbA1c 6.0-7.0%		HbA1c >7.0%	
	n	%	n	%	n	%
Pain &/0r stiffness	531	**20.6*^**	119	**27.2***	32	**29.0^**
No Pain &/or stiffness	2050	79.4*^	318	72.8*	78	71.0^
Total	**2582**	100	**437**	100	**110**	100

*^Statistically significant between HbA1c categories p=0.001

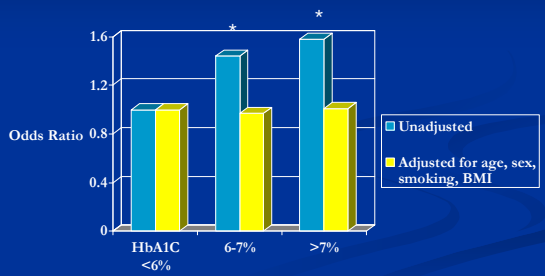
- Previous univariate analysis on the same cohort has identified several factors to be significantly associated with shoulder pain:
  - Age>50 years (p<0.001)
  - Female (OR 1.40; 1.19-1.66)
  - BMI>=30 (OR 1.54; 95%CI 1.28-1.85)
  - Current smoking (OR 1.44; 1.16-1.79)

Odds of shoulder pain and/or stiffness , unadjusted and adjusted for age, sex, BMI, smoking



*P<0.05

Odds of shoulder pain and/or stiffness according to HbA1c level, adjusted and unadjusted for covariates

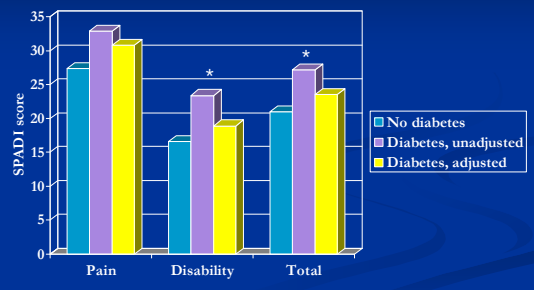


* p<0.05

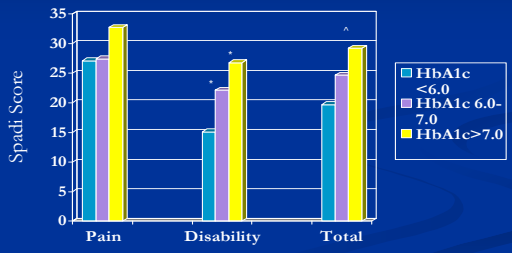
Slide 15

a1 cole, 14/10/2007

SPADI scores by diabetes status, before and after adjustment for covariates

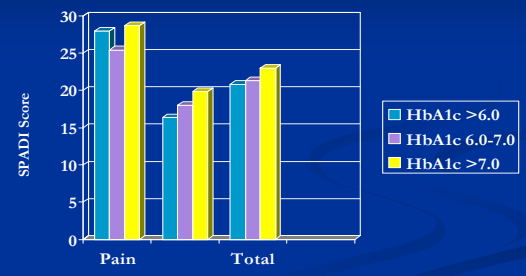


SPADI Score and HbA1c levels



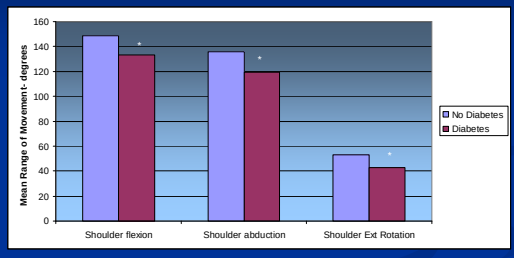
* p=<0.007
^ p= 0.045

SPADI score for HbA1c level adjusted for age, sex, BMI, smoking



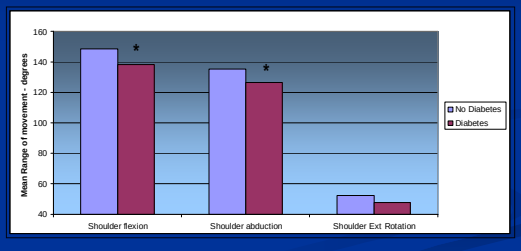
p>0.05 between all groups in all categories

Mean range of shoulder movement



Overall statistically significant difference in ROM across categories p<0.05

Mean ROM for those with shoulder pain adjusted for age, sex, BMI, smoking



*p<0.05 for shoulder flexion and abduction

Summary

- Shoulder pain/stiffness is common and affects almost one quarter of the community.
- The prevalence of shoulder pain and stiffness is higher in people with diabetes mellitus.
- Poorer glycaemic control is associated with increased shoulder pain and/or stiffness.
- People with diabetes have significantly worse shoulder - specific physical disability compared to those without.

Summary

- However, after adjustment for age, sex, obesity and current smoking there was no difference in prevalence of reported shoulder pain/stiffness or in SPADI scores between those with diabetes and those without.
- Shoulder stiffness was increased amongst those with diabetes with a significant reduction in measured range of shoulder flexion and abduction even after adjusting for covariates.

Conclusions

- Concordant with previous studies, shoulder pain and/or stiffness is common in the community particularly in those with diabetes mellitus.
- In this population based study, the differences observed between those with diabetes and those without may largely be explained by the confounding factors of age, sex, obesity and current smoking.

Contact details

- North West Adelaide Health Study website
  - **http://www.nwadelaidehealthstudy.org**
- Population Research & Outcome Studies Unit (SA Department of Health)
  - **http://www.health.sa.gov.au/pehs/PROS.html**

Acknowledgments

- Participants and staff of the North West Adelaide Health Study
- South Australian Department of Health