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## **Effects of personal and work-related factors on the incidence of shoulder pain in a French working population**

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HAL Authorization

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## Objectives

Shoulder pain (SP) is common in the general population, with 1-year prevalence rates between 7 and 47%, and in the working population<sup>1</sup>.

We used the data from a prospective surveillance program for musculoskeletal disorders implemented by the French Institute for Public Health Surveillance in the Pays de la Loire region, collected between 2002 and 2005<sup>2</sup> and then between 2007 and 2009.

The aim of this study was to assess the effects of personal and work-related factors on the incidence of SP.

## Methods

### Study population

- Working population of the Pays de la Loire region, in France
- 83 occupational physicians were trained by the investigators to randomly include workers undergoing a mandatory annual health examination
- Between 2002 and 2005, 3710 workers (58% men and mean age=38.7 ± 10.3 years) were included
- In 2007, a follow-up questionnaire was mailed to subjects (reminder letters until 2009)

### Outcome

- Subjects free from SP at baseline were those :
  - without SP during the preceding 7 days and
  - without SP of more than 8 days during the preceding 12 months
- Incident cases were defined as subjects free from SP at baseline who declared SP during the 7 days preceding the second questionnaire.

### Potential risk factors

- Answers at baseline
- Variables were divided into four groups:
  - Personal factors
  - Organizational factors
  - Biomechanical factors
  - Psychosocial factors

### Statistical analysis

- Analyses were performed separately for men and women to account for possible differences in exposure to work constraints between genders.
- Age was forced into the models.
- 3-stage process:
  - **Stage 1:** bivariate analyses, using Khi2 test, were performed between each of the potential explanatory variables and SP. Non-significant variables ( $p > 0.20$ ) were excluded from further analyses.
  - **Stage 2:** Manual backward multivariate logistic regression models were then performed for each group of variables. Non-significant variables ( $p > 0.10$ ) after this stage were excluded.
  - **Stage 3:** Final multivariate logistic regression analyses were performed using all variables remaining after stage 2, and manual backward selection retained only significant variables at a p-level of 0.05.

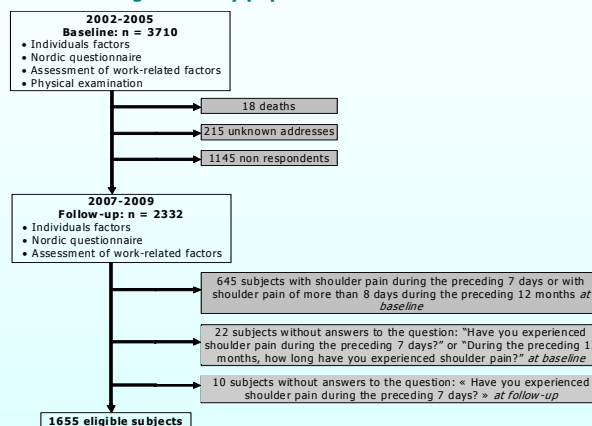
## Results

233 (6.3%) subjects did never receive the questionnaire because their address was unknown ( $n=215$ ) or because they were deceased ( $n=18$ ). Finally, a total of 2332 subjects (67.1%, excluding subjects that could not be contacted) fulfilled the second self-administered questionnaire.

### Study population

Among the 2332 subjects, 645 had reported SP during the preceding 7 days at baseline or of more than 8 days during the preceding 12 months at baseline. In addition, there was missing values for 32 subjects. Finally, 1655 subjects (946 men (57%) and 709 women (43%)) were eligible for analysis of incidence of SP (figure).

Figure: Study population flowchart



### Incidence of shoulder pain

- 11.1% ( $n=105$ ) for men and 20.5% ( $n=145$ ) for women
- 44.2% declared right SP, 28.1% left SP and 27.7% bilateral SP
- Among active subjects, there is no difference between those who changed job or not (14.7% vs 14.8%, respectively,  $p=0.958$ ).

### Risk factors (Table)

- The risk of incident SP increased with age whatever the gender.
- In men, high physical demand and working with arms above the shoulder were of borderline significance.
- In women, temporary employment, high physical demand and low decision authority were associated with incident SP.

Table: Multivariate logistic models for incidence of shoulder pain

	Men (n=944 ; 105 incident SP)					Women (n=694 ; 143 incident SP)				
	N	%	OR	95% CI	p	N	%	OR	95% CI	p
Age					0.001					0.001
< 30	198	7.1	1			147	14.3	1		
30-39	292	8.2	1.2	0.6 2.4		222	17.1	1.5	0.8 2.9	
40-49	279	12.2	<b>2.0</b>	<b>1.0 3.8</b>		212	25.0	<b>2.9</b>	<b>1.6 5.3</b>	
≥ 50	175	18.9	<b>3.3</b>	<b>1.7 6.5</b>		113	27.4	<b>3.0</b>	<b>1.5 5.9</b>	
Temporary employment										0.013
No						612	19.6	1		
Yes						82	28.1	<b>2.1</b>	<b>1.2 3.8</b>	
Arms above the shoulder					0.073					
No	581	9.5	1							
Yes	363	13.8	1.5	1.0 2.3						
High physical demand*					0.075					<0.001
No	751	10.0	1			567	17.6	1		
Yes	193	15.5	1.6	1.0 2.5		127	33.9	<b>2.4</b>	<b>1.5 3.7</b>	
Low decision latitude										0.024
No						291	15.8	1		
Yes						403	24.1	<b>1.6</b>	<b>1.1 2.4</b>	

\*RPE Borg scale ≥15 for men and ≥14 for women

## Conclusion

This study showed that incident SP was related to personal and work-related factors and differed according to gender.

The effect of age was greater than that of other factors. However, age is not modifiable contrary to work-related factors.

Mechanical and psychosocial exposure should therefore be an important target for strategies for the prevention of shoulder pain in the working population.

## References

- <sup>1</sup> Luime JJ, Kuiper JJ, Koes BW, Verhaar JA, Miedema HS, Burdorf A. Work-related risk factors for the incidence and recurrence of shoulder and neck complaints among nursing-home and elderly-care workers. *Scand J Work Environ Health* 2004;30(4):279-286.
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