

Risk factors for upper-extremity musculoskeletal disorders in the working population.

Yves Roquelaure, Catherine Ha, Clarisse Rouillon, Natacha Fouquet, Annette Leclerc, Alexis Descatha, Annie Touranchet, Marcel Goldberg, Ellen Imbernon, 83 Occupational Physicians of The Pays de la Loire Region

► **To cite this version:**

Yves Roquelaure, Catherine Ha, Clarisse Rouillon, Natacha Fouquet, Annette Leclerc, et al.. Risk factors for upper-extremity musculoskeletal disorders in the working population.. *Arthritis and Rheumatism*, Wiley, 2009, 61 (10), pp.1425-34. 10.1002/art.24740 . inserm-00425480

HAL Id: inserm-00425480

<https://www.hal.inserm.fr/inserm-00425480>

Submitted on 7 Sep 2011

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Table 1. Potential risk factors for UEMSDs considered in the study and univariate analyses

| | | Altogether (n = 3,710) | | | | | Men (n = 2,162) | | | Women (n = 1,548) | | |
|--|---|------------------------|-------------------|-----|-------------|------------------|-----------------|-------------|------------------|-------------------|--------------|------------------|
| | | N _{sample} | n _{UMSD} | OR | [95%CI] | p ^γ | OR | [95%CI] | p ^γ | OR | [95%CI] | p ^γ |
| PERSONAL FACTORS | | | | | | | | | | | | |
| 1. Personal factors and medical history | | | | | | | | | | | | |
| Age | < 30 (ref) | 875 | 39 | 1 | | | 1 | | | 1 | | |
| | 30-34; | 572 | 44 | 1.8 | [1.1 - 2.8] | | 1.8 | [1.0 - 3.3] | | 1.7 | [0.9 - 3.4] | |
| | 35-39; | 508 | 61 | 2.9 | [1.9 - 4.4] | | 2.5 | [1.4 - 4.4] | | 3.6 | [1.9 - 6.6] | |
| | 40-44; | 561 | 73 | 3.2 | [2.1 - 4.8] | <0.001 | 2.9 | [1.7 - 5.1] | <0.001 | 3.5 | [1.9 - 6.4] | <0.001 |
| | 45-49; | 538 | 109 | 5.4 | [3.7 - 8.0] | | 4.9 | [2.9 - 8.2] | | 6.4 | [3.4 - 10.8] | |
| | 50-54; | 451 | 103 | 6.3 | [4.3 - 9.4] | | 5.5 | [3.2 - 9.2] | | 7.6 | [4.3 - 13.7] | |
| | 55 yrs | 198 | 42 | 5.8 | [3.6 - 9.2] | | 5.1 | [2.7 - 9.6] | | 6.7 | [3.4 - 13.5] | |
| Gender | <i>Female vs male</i> | 1,548 | 229 | 1.4 | [1.1-1.7] | 0.001 | | | | | | |
| Body mass index (Kg/m ²) | Normal (BMI=18.5-24.9) | 2,157 | 230 | 1 | | | 1 | | | 1 | | |
| | Underweight (BMI<18.5) | 124 | 8 | 0.6 | [0.3 - 1.2] | <0.001 | - | - | <0.001 | 0.7 | [0.3 - 1.4] | 0.006 |
| | Overweight (BMI=25-29.9) | 1,078 | 160 | 1.5 | [1.2 - 1.8] | | 1.6 | [1.2 - 2.1] | | 1.6 | [1.1 - 2.2] | |
| | Obesity (BMI≥30) | 300 | 59 | 2.1 | [1.5 - 2.8] | | 2.5 | [1.7 - 3.9] | | 1.7 | [1.0 - 2.7] | |
| Prior history of at least one of the UEMSDs | <i>yes vs no</i> | 713 | 226 | 5.3 | [4.3 - 6.5] | <0.001 | 4.3 | [3.2 - 5.8] | <0.001 | 6.4 | [4.7 - 8.6] | <0.001 |
| Diabetes mellitus | <i>yes vs no</i> | 61 | 17 | 2.7 | [1.5 - 4.8] | <0.001 | 2.0 | [0.9 - 4.4] | 0.083 | 4.5 | [1.9 - 10.8] | <0.001 |
| Thyroid disorders | <i>yes vs no</i> | 135 | 24 | 1.5 | [1.0 - 2.4] | 0.073 | 0.8 | [0.2 - 2.6] | 0.693 | 1.6 | [0.9 - 2.6] | 0.086 |
| Upper limb inflammatory arthritis | <i>yes vs no</i> | 78 | 20 | 2.4 | [1.5 - 4.1] | <0.001 | 1.7 | [0.8 - 4.0] | 0.187 | 3.0 | [1.5 - 6.0] | 0.001 |
| OCCUPATIONAL FACTORS | | | | | | | | | | | | |
| 2. Current occupational category and length of service | | | | | | | | | | | | |
| Current occupational category | <i>Managers, professionals, technicians (ref)</i> | 1,133 | 116 | 1 | | | 1 | | | 1 | | |
| | <i>Low-grade white-collar</i> | 986 | 114 | 1.1 | [0.9 - 1.5] | <0.001 | 0.9 | [0.5 - 1.7] | 0.026 | 1.0 | [0.7 - 1.4] | <0.001 |
| | <i>Skilled blue-collar</i> | 943 | 135 | 1.5 | [1.1 - 1.9] | | 1.5 | [1.1 - 2.1] | | 1.9 | [1.1 - 3.3] | |
| | <i>Unskilled blue-collar</i> | 643 | 107 | 1.8 | [1.3 - 2.3] | | 1.4 | [1.0 - 2.1] | | 2.0 | [1.3 - 3.0] | |
| Length of service in the current job (year) | <1(ref) | 455 | 36 | 1 | | | 1 | | | 1 | | |
| | 1-2 | 591 | 48 | 1.0 | [0.7 - 1.6] | | 1.7 | [0.9 - 3.2] | | 0.6 | [0.3 - 1.2] | |
| | 3-10 | 1,238 | 127 | 1.3 | [0.9 - 2.0] | <0.001 | 1.9 | [1.0 - 3.4] | <0.001 | 1.0 | [0.6 - 1.7] | <0.001 |
| | > 10 | 1,389 | 257 | 2.6 | [1.8 - 3.8] | | 3.6 | [2.0 - 6.3] | | 2.0 | [1.3 - 3.3] | |
| 3. Factors related to the work organization | | | | | | | | | | | | |
| Paced work | <i>yes vs no</i> | 383 | 59 | 1.3 | [1.0 - 1.8] | 0.078 | 1.3 | [0.8 - 1.9] | 0.242 | 1.4 | [0.9 - 2.1] | 0.147 |
| Work pace dependent on automatic rate | <i>yes vs no</i> | 400 | 70 | 1.5 | [1.2 - 2.0] | 0.002 | 1.5 | [1.0 - 2.1] | 0.043 | 1.8 | [1.2 - 2.7] | 0.009 |
| Work pace dependent on other technical organization | <i>yes vs no</i> | 742 | 100 | 1.1 | [0.9 - 1.4] | 0.405 | 1.1 | [0.8 - 1.5] | 0.511 | 1.4 | [0.9 - 2.1] | 0.113 |
| Work pace dependent on customers' demand | <i>yes vs no</i> | 1,643 | 184 | 0.8 | [0.7 - 1.0] | 0.025 | 0.9 | [0.7 - 1.1] | 0.299 | 0.7 | [0.5 - 0.9] | 0.021 |
| Work pace dependent on the colleagues' work | <i>yes vs no</i> | 1,109 | 146 | 1.1 | [0.9 - 1.4] | 0.399 | 1.4 | [1.1 - 1.8] | 0.022 | 0.9 | [0.6 - 1.2] | 0.353 |
| Work pace dependent on quantified targets | <i>yes vs no</i> | 1,729 | 241 | 1.2 | [1.0 - 1.5] | 0.030 | 1.1 | [0.8 - 1.4] | 0.506 | 1.6 | [1.2 - 2.1] | 0.002 |
| Job/task rotation (≥ 1 job rotation per week) | <i>yes vs no</i> | 1,350 | 199 | 1.3 | [1.1 - 1.6] | 0.004 | 1.4 | [1.1 - 1.9] | 0.013 | 1.3 | [1.0 - 1.7] | 0.086 |
| Work with temporary workers | <i>yes vs no</i> | 1,106 | 165 | 1.3 | [1.1 - 1.6] | 0.010 | 1.3 | [1.0 - 1.7] | 0.105 | 1.4 | [1.0 - 1.8] | 0.042 |
| High visual demand | <i>yes vs no</i> | 2,380 | 331 | 1.4 | [1.1 - 1.7] | 0.005 | 1.2 | [0.9 - 1.6] | 0.201 | 1.5 | [1.1 - 2.1] | 0.008 |
| Overtime hours | <i>yes vs no</i> | 2,186 | 260 | 0.8 | [0.7 - 1.0] | 0.055 | 0.9 | [0.7 - 1.2] | 0.647 | 0.8 | [0.6 - 1.0] | 0.075 |
| Prior knowledge of the workload | <i>yes vs no</i> | 366 | 43 | 0.9 | [0.6 - 1.3] | 0.546 | 1.2 | [0.8 - 1.7] | 0.469 | 0.6 | [0.3 - 1.2] | 0.140 |
| 4. Working postures and biomechanical constraints | | | | | | | | | | | | |
| High repetitiveness (≥ 4 h per day) [#] | <i>yes vs no</i> | 958 | 183 | 2.0 | [1.6 - 2.5] | <0.001 | 1.8 | [1.4 - 2.5] | <0.001 | 2.1 | [1.6 - 2.8] | <0.001 |
| Too little recovery time (< 10-min. break possible) [#] | <i>yes vs no</i> | 205 | 50 | 2.4 | [1.7 - 3.3] | <0.001 | 1.9 | [1.1 - 3.3] | 0.020 | 2.5 | [1.6 - 3.9] | <0.001 |
| High physical demand (RPE Borg scale ≥13) | <i>yes vs no</i> | 1,856 | 309 | 2.1 | [1.7 - 2.6] | <0.001 | 2.5 | [1.8 - 3.3] | <0.001 | 1.9 | [1.5 - 2.6] | <0.001 |
| Arms at or above shoulder level (≥ 2 h/day) [#] | <i>yes vs no</i> | 487 | 104 | 2.1 | [1.7 - 2.7] | <0.001 | 2.6 | [1.9 - 3.6] | <0.001 | 1.6 | [1.1 - 2.4] | 0.013 |
| Arms abducted (≥ 2 h/day) [#] | <i>yes vs no</i> | 572 | 108 | 1.8 | [1.4 - 2.2] | <0.001 | 1.8 | [1.3 - 2.4] | <0.001 | 1.9 | [1.3 - 2.7] | <0.001 |
| Holding the hand behind the trunk (≥ 2 h/day) | <i>yes vs no</i> | 187 | 29 | 1.3 | [0.8 - 1.9] | 0.242 | 1.6 | [0.9 - 2.7] | 0.084 | 1.0 | [0.5 - 1.8] | 0.902 |
| Full elbow flexion/extension movements (≥ 2 h/day) [#] | <i>yes vs no</i> | 1,214 | 221 | 2.0 | [1.6 - 2.4] | <0.001 | 2.4 | [1.8 - 3.1] | <0.001 | 1.7 | [1.2 - 2.2] | <0.001 |
| Working with full pronosupination movements (≥ 2 h/day) [#] | <i>yes vs no</i> | 534 | 86 | 1.4 | [1.1 - 1.8] | 0.011 | 1.4 | [1.0 - 1.9] | 0.027 | 2.1 | [1.3 - 3.4] | 0.004 |
| Wrist bending in extreme postures (≥ 2 h/day) [#] | <i>yes vs no</i> | 1,236 | 222 | 2.0 | [1.6 - 2.4] | <0.001 | 1.8 | [1.4 - 2.4] | <0.001 | 2.2 | [1.6 - 2.9] | <0.001 |
| Use of handtools (≥ 2 h/day) | <i>yes vs no</i> | 1,711 | 251 | 1.4 | [1.2 - 1.7] | <0.001 | 1.3 | [1.0 - 1.7] | 0.074 | 1.8 | [1.4 - 2.4] | <0.001 |
| Holding tools or objects in a pinch grip (≥ 4 h/day) [#] | <i>yes vs no</i> | 297 | 66 | 2.1 | [1.6 - 2.8] | <0.001 | 2.1 | [1.4 - 3.1] | <0.001 | 2.1 | [1.4 - 3.2] | <0.001 |
| Precise finger movements (≥ 2 h/day) | <i>yes vs no</i> | 1,665 | 263 | 1.6 | [1.4 - 2.0] | <0.001 | 1.5 | [1.1 - 1.9] | 0.004 | 1.9 | [1.4 - 2.5] | <0.001 |
| Pressing with the base of the palm (≥ 2 h/day) [#] | <i>yes vs no</i> | 294 | 59 | 1.8 | [1.4 - 2.5] | <0.001 | 1.9 | [1.3 - 2.7] | <0.001 | 2.4 | [1.3 - 4.4] | 0.004 |
| Use of vibrating handtools (≥ 2 h/day) [#] | <i>yes vs no</i> | 469 | 73 | 1.3 | [1.0 - 1.7] | 0.046 | 1.3 | [1.0 - 1.8] | 0.098 | 2.5 | [1.4 - 4.4] | 0.002 |
| Exposure to cold temperature (≥ 4 h/day) [#] | <i>yes vs no</i> | 220 | 34 | 1.3 | [0.9 - 1.9] | 0.205 | 1.2 | [0.7 - 1.9] | 0.529 | 1.6 | [0.9 - 2.8] | 0.127 |
| Keying and computer work (≥ 4 h/day) [#] | <i>yes vs no</i> | 1,024 | 96 | 0.6 | [0.5 - 0.8] | <0.001 | 0.6 | [0.4 - 0.9] | 0.022 | 0.5 | [0.4 - 0.7] | <0.001 |
| Wearing gloves (≥ 4 h/day) | <i>yes vs no</i> | 584 | 95 | 1.4 | [1.1 - 1.8] | 0.005 | 1.3 | [1.0 - 1.8] | 0.089 | 1.7 | [1.2 - 2.5] | 0.006 |
| 5. Psychosocial factors at work | | | | | | | | | | | | |
| High psychological demand (score ≥ 22) [#] | <i>yes vs no</i> | 1,814 | 250 | 1.2 | [1.0 - 1.5] | 0.050 | 1.4 | [1.1 - 1.9] | 0.009 | 1.0 | [0.8 - 1.3] | 0.968 |
| Low skill discretion (score ≤ 34) | <i>yes vs no</i> | 2,016 | 297 | 1.5 | [1.2 - 1.8] | <0.001 | 1.4 | [1.1 - 1.8] | 0.013 | 1.5 | [1.1 - 2.1] | 0.006 |
| Low decision authority (score ≤ 32) [#] | <i>yes vs no</i> | 1,276 | 185 | 1.3 | [1.1 - 1.6] | 0.014 | 0.9 | [0.7 - 1.3] | 0.711 | 1.6 | [1.2 - 2.2] | <0.001 |
| Low supervisor support (score ≤ 11) | <i>yes vs no</i> | 1,427 | 216 | 1.4 | [1.2 - 1.8] | <0.001 | 1.4 | [1.1 - 1.9] | 0.009 | 1.5 | [1.1 - 2.0] | 0.007 |
| Low coworker support (score ≤ 11) | <i>yes vs no</i> | 708 | 111 | 1.4 | [1.1 - 1.7] | 0.007 | 1.4 | [1.0 - 1.9] | 0.039 | 1.3 | [1.0 - 1.9] | 0.088 |

See references ^(10,13) for details; ^γIn bold, p-value<0.20. [#] Risk factors taken into account by the European consensus.

Table 2. Characteristics of workers participating in the French Pays de la Loire study

| | MEN | | WOMEN | | ALTOGETHER | |
|---|-------|--------|-------|--------|------------|--------|
| | N | (%) | N | (%) | N | (%) |
| Study population | 2,162 | (58.3) | 1,548 | (41.7) | 3,710 | (100) |
| Age (years) (n = 3,703) | | | | | | |
| . < 30 | 514 | (23.8) | 361 | (23.3) | 875 | (23.6) |
| . 30-35 | 344 | (16.0) | 228 | (14.8) | 572 | (15.5) |
| . 35-39 | 307 | (14.2) | 201 | (13.0) | 508 | (13.7) |
| . 40-44 | 311 | (14.4) | 250 | (16.2) | 561 | (15.2) |
| . 45-49 | 301 | (14.0) | 237 | (15.3) | 538 | (14.5) |
| . 50-54 | 265 | (12.3) | 186 | (12.0) | 451 | (12.2) |
| . ≥ 55 | 114 | (5.3) | 84 | (5.4) | 198 | (5.3) |
| Economic sector (n = 3,701) | | | | | | |
| . Agriculture | 31 | (1.4) | 25 | (1.6) | 56 | (1.5) |
| . Industry | 859 | (39.8) | 401 | (26.0) | 1,260 | (34.0) |
| . Construction | 189 | (8.8) | 25 | (1.6) | 214 | (5.8) |
| . Services | 1,078 | (50.0) | 1,093 | (70.8) | 2,171 | (58.7) |
| Occupation (n = 3,705) | | | | | | |
| . Farmers (1) | 0 | (0.0) | 0 | (0.0) | 0 | (0.0) |
| . Craftsmen (1) | 13 | (0.6) | 3 | (0.2) | 16 | (0.4) |
| . Managers and professionals | 210 | (9.7) | 78 | (5.0) | 288 | (7.8) |
| . Associate professionals and technicians | 540 | (25.0) | 289 | (18.7) | 829 | (22.4) |
| . Low-grade white-collar workers | 188 | (8.7) | 798 | (51.7) | 986 | (26.6) |
| . Skilled and unskilled blue-collar workers | 1,209 | (56.0) | 377 | (24.4) | 1,586 | (42.8) |

(1) Farmers and most craftsmen are not surveyed by the occupational physicians in France.

Table 3. Prevalence rates of clinically-diagnosed UE-MSDs of the upper extremities

| | MEN | | | WOMEN | | | ALTOGETHER | | |
|------------------------|-----|------|--------------|-------|------|---------------|------------|------|---------------|
| | N | % | 95% CI | N | % | 95% CI | N | % | 95% CI |
| Rotator cuff syndrome | 142 | 6.6 | [5.5 - 7.6] | 132 | 8.5 | [7.1 - 9.9] | 274 | 7.4 | [6.5 - 8.2] |
| Lateral epicondylitis | 51 | 2.5 | [1.8 - 3.1] | 39 | 2.7 | [1.9 - 3.5] | 90 | 2.6 | [2.0 - 3.1] |
| Ulnar tunnel syndrome | 16 | 0.7 | [0.4 - 1.1] | 14 | 0.9 | [0.4 - 1.4] | 30 | 0.8 | [0.5 - 1.1] |
| Carpal tunnel syndrome | 51 | 2.4 | [1.7 - 3.0] | 62 | 4.0 | [3.0 - 5.0] | 113 | 3.1 | [2.5 - 3.6] |
| Wrist tendinitis | 19 | 0.9 | [0.5 - 1.3] | 10 | 0.7 | [0.3 - 1.1] | 29 | 0.8 | [0.5 - 1.1] |
| De Quervain's Disease | 13 | 0.6 | [0.3 - 0.9] | 32 | 2.1 | [1.4 - 2.8] | 45 | 1.2 | [0.9 - 1.6] |
| At least one UEMSD | 243 | 11.2 | [9.9 - 12.6] | 229 | 14.8 | [13.0 - 16.6] | 472 | 12.7 | [11.7 - 13.8] |
| At least two UEMSDs | 42 | 1.9 | [1.4 - 2.5] | 44 | 2.8 | [2.0 - 3.7] | 86 | 2.3 | [1.8 - 2.8] |

Table 4. Multivariate models for risk factors of UE-MSDs in the male and female working populations

| | Men (n = 2,058) | | | | | Women (n = 1,481) | | | | |
|---|-----------------------|--------------------|-----|-------------|--------|-----------------------|--------------------|-----|--------------|--------|
| | N _{sample} * | n _{MSD} * | OR | [95%CI] | p | N _{sample} * | n _{MSD} * | OR | [95%CI] | p |
| PERSONAL FACTORS | | | | | | | | | | |
| Age (years) | | | | | <0.001 | | | | | <0.001 |
| < 30 | 499 | 22 | 1 | | | 349 | 17 | 1 | | |
| 30-34 | 333 | 26 | 1.8 | [1.0 - 3.3] | | 221 | 18 | 1.8 | [0.9 - 3.6] | |
| 35-39 | 291 | 28 | 2.4 | [1.3 - 4.4] | | 189 | 26 | 2.8 | [1.4 - 5.5] | |
| 40-44 | 296 | 32 | 2.4 | [1.3 - 4.4] | | 242 | 37 | 3.0 | [1.6 - 5.7] | |
| 45-49 | 284 | 50 | 4.5 | [2.6 - 7.9] | | 224 | 51 | 4.5 | [2.4 - 8.2] | |
| 50-54 | 250 | 49 | 4.9 | [2.7 - 8.6] | | 177 | 48 | 5.0 | [2.7 - 9.3] | |
| ≥ 55 | 105 | 20 | 4.0 | [2.0 - 8.1] | | 79 | 20 | 4.4 | [2.1 - 9.4] | |
| Prior history of UE-MSDs | 357 | 93 | 3.1 | [2.3 - 4.2] | <0.001 | 321 | 120 | 5.0 | [3.6 - 7.0] | <0.001 |
| BMI (Kg/m²) | | | | | 0.014 | | | | | |
| Normal (BMI = 18.5 – 24.9) | 1,130 | 98 | 1 | | | | | | | |
| Underweight (BMI <18.5) | 33 | 0 | - | - | | | | | | |
| Overweight (BMI = 25 – 29.9) | 731 | 97 | 1.2 | [0.9 - 1.7] | | | | | | |
| Obesity (BMI ≥ 30) | 164 | 32 | 2.2 | [1.4 - 3.6] | | | | | | |
| Diabetes mellitus | | | | | | 20 | 9 | 4.9 | [1.8 - 12.9] | 0.001 |
| OCCUPATIONAL FACTORS | | | | | | | | | | |
| High physical demand (RPE-Borg scale ≥ 13) | 1,106 | 166 | 2.0 | [1.4 - 2.8] | <0.001 | | | | | |
| High repetitiveness | 446 | 74 | 1.5 | [1.0 - 2.1] | 0.027 | | | | | |
| Arms at or above shoulder level | 283 | 61 | 1.7 | [1.1 - 2.4] | 0.009 | | | | | |
| Full elbow flexion/extension movements | 690 | 115 | 1.6 | [1.1 - 2.2] | 0.006 | | | | | |
| Wrist bending in extreme postures | | | | | | 466 | 104 | 2.0 | [1.4 - 2.8] | <0.001 |
| Use of vibrating handtools | | | | | | 61 | 17 | 2.2 | [1.1 - 4.2] | 0.025 |
| High psychological demand | 1,006 | 129 | 1.5 | [1.1 - 2.1] | 0.005 | | | | | |
| Low level of decision authority | | | | | | 600 | 112 | 1.4 | [1.0 - 1.9] | 0.042 |

Note. (*) Subjects with no missing value for the risk factors in the multivariate model; Number of subjects excluded from analyses because of missing values: 129 men and 112 women; OR, odds ratio; CI, confidence interval; Variables excluded from the model for men (in order of exclusion): current occupational category, work with temporary workers, work pace dependent on the colleagues' work, frequent job/task rotation, low level of skill discretion, low supervisor support; Variables excluded from the model for women: work pace dependent on demand of customers, arms abducted, high visual demand, frequent job/task rotation, current occupational category, work pace dependent on quantified targets, work with temporary workers, length of service in the current job, keying and computer work, low supervisor support, knowledge of the workload, high repetitiveness; Hosmer Lemeshow goodness-of-fit test: $P = 0.016$ for the model for men and $P = 0.319$ for the model for women; area under ROC curve = 0.78 (men) and 0.78 (women).

Table 5. Multivariate model for risk factors of UE-MSDs in the total working population

| | Men and women altogether (n = 3,275) | | | | |
|---|---|--------------------|-----|-------------|--------------------|
| | N _{sample} * | n _{MSD} * | OR | [95% CI] | p |
| PERSONAL FACTORS | | | | | |
| Age (years) | | | | | <0.001 |
| < 30 | 792 | 36 | 1 | | |
| 30-34 | 520 | 41 | 1.8 | [1.1 - 3.0] | |
| 35-39 | 439 | 47 | 2.6 | [1.6 - 4.2] | |
| 40-44 | 496 | 63 | 2.9 | [1.9 - 4.5] | |
| 45-49 | 459 | 92 | 4.9 | [3.2 - 7.5] | |
| 50-54 | 401 | 92 | 5.6 | [3.6 - 8.6] | |
| ≥ 55 | 168 | 36 | 4.5 | [2.6 - 7.7] | |
| Prior history of MSDs | 621 | 188 | 3.3 | [2.6 - 4.2] | <0.001 |
| BMI (Kg/m²) | | | | | 0.056 |
| Normal (BMI = [18.5 - 25]) | 1,926 | 205 | 1 | | |
| Underweight (BMI <18.5) | 109 | 7 | 0.9 | [0.4 - 2.0] | |
| Overweight (BMI = [25 - 30]) | 975 | 143 | 1.2 | [0.9 - 1.5] | |
| Obesity (BMI ≥ 30) | 265 | 52 | 1.6 | [1.1 - 2.4] | |
| OCCUPATIONAL FACTORS | | | | | |
| High repetitiveness | 858 | 165 | 1.6 | [1.2 - 2.0] | <0.001 |
| Arms at or above shoulder level | 430 | 93 | 1.5 | [1.1 - 2.0] | 0.016 |
| Wrist bending in extreme postures | 1,107 | 198 | 1.5 | [1.2 - 2.0] | 0.002 |
| Pressing with the base of the palm | 260 | 52 | 1.5 | [1.0 - 2.1] | 0.058 ^δ |
| Frequent job rotation | 1,265 | 180 | 1.2 | [1.0 - 1.5] | 0.079 ^δ |
| Low supervisor support | 1,312 | 198 | 1.3 | [1.1 - 1.7] | 0.015 |
| Interaction terms : Gender x Physical demand | | | | | 0.037 [#] |
| Women vs men in low physical demand | | | 1.9 | [1.3 - 2.8] | |
| Women vs men in high physical demand | | | 1.2 | [0.9 - 1.6] | |
| High vs low physical demand in males | | | 1.8 | [1.3 - 2.6] | |
| High vs low physical demand in females | | | 1.1 | [0.8 - 1.6] | |

Note. (*), subjects with no missing value for the risk factors in the multivariate model; Number of subjects excluded from analyses because of missing values: 435; OR., odds ratio; CI., confidence interval; Variables excluded from the model (in order of elimination): high visual demand, work pace dependent on quantified targets, work pace dependent on customers' demand, current occupational category, full elbow flexion, high psychological demand, work with temporary workers, diabetes mellitus, low level of skill discretion; Hosmer Lemeshow goodness-of-fit test: $P = 0.243$; area under ROC curve = 0.78; δ , $P > 0.05$; #, P-value for multiplicative interaction.