ATTRIBUTABLE RISK OF CARPAL TUNNEL SYNDROME ACCORDING TO INDUSTRY AND OCCUPATION IN A GENERAL POPULATION

Y. Roquelaure, C. Ha, M.C. Pélié-Cady, A. D’Escatha, C Mariot, A. Leclerc, M. Goldberg, E. Imbernon,

Laboratory of Ergonomics & Epidemiology in Occupational health, University of Angers
Occupational Health Department, French Institute for Public Health Surveillance; INSERM U 687
Introduction

• Surveillance of carpal tunnel syndrome (CTS) in the general population
  – Part of a program of the French Institute for Public Health Surveillance in the Pays de la Loire region in western France

• Objectives of the present study
  – To estimate the attributable fractions of risk of CTS according to industry sector and occupation categories in the general population of the Maine & Loire (M&L) area
Methods: case definition

• Cases of CTS defined by both clinical and electrophysiological criteria:
  – Symptoms classified as “classic/probable”
  – Electrodiagnostic (EDX) criteria (standardized protocol)
  – Absence of previous CTS of the same hand
  – Patients aged 20-59 years and living in the M&L area

• Prospectively included by the 4 EDX centers over the three year period (2002-2004)

• Postal self-administered questionnaire
  – Response rate: 97% (1,185 subjects, 815 ♀ and 320 ♂)
  – Medical & surgical history (obesity, thyroid disease, diabetes, MSDs)
  – Work history in the last five years
Methods : Analyses

• Distribution of CTS cases according to the last industry sector and occupation during the 5 years preceding the EDX diagnosis

• Age-adjusted relative risks (RR) of CTS according to industry and occupation categories
  – computed using the Mantel-Haenszel method with the whole sample of subjects included in the study as a reference, whether they were employed at the time of diagnosis or not.

• Attributable fractions of risk to work in the particular industry or occupation category in exposed individuals
  – computed for industries and occupations at high risk when at least five cases of CTS occurred

\[
AFE (\%) = \frac{(RR-1)}{RR}
\]
Results (1)

• Work history
  – 91% worked in the last 5 years and 80% at the time of the diagnosis

• Industries at high risk of CTS
  – 14 for women with RR ranging from 1.6 to 14.7
  – 7 for men with RR ranging from 2.4 to 13.2

• Occupational categories
  – 8 (26 subcategories) for women with RR from 1.6 to 10.8
  – 5 (12 subcategories) for men with RR from 2.5 to 13.3
Attributable risk fraction of CTS to industry

<table>
<thead>
<tr>
<th>Industry</th>
<th>AFE in women (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>58</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>50</td>
</tr>
<tr>
<td>Chemicals</td>
<td>83</td>
</tr>
<tr>
<td>Basic metals</td>
<td>81</td>
</tr>
<tr>
<td>Transport equipment</td>
<td>80</td>
</tr>
<tr>
<td>Computer</td>
<td>63</td>
</tr>
<tr>
<td>Food products</td>
<td>63</td>
</tr>
<tr>
<td>Shoes</td>
<td>42</td>
</tr>
<tr>
<td>Construction</td>
<td>0</td>
</tr>
<tr>
<td>Services</td>
<td>28</td>
</tr>
<tr>
<td>Health</td>
<td>72</td>
</tr>
<tr>
<td>Personal services</td>
<td>66</td>
</tr>
<tr>
<td>Retail trade</td>
<td>49</td>
</tr>
<tr>
<td>Hotels-restaurants</td>
<td>44</td>
</tr>
<tr>
<td>Insurance</td>
<td>74</td>
</tr>
<tr>
<td>Recreational &amp; sporting</td>
<td>39</td>
</tr>
<tr>
<td>Private households (employed)</td>
<td>64</td>
</tr>
</tbody>
</table>

N > 5; RR > 1

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Attributable risk fraction of CTS to industry

AFEs in men (%)

- Agriculture: 0
- Sand quarrying: 89
- Manufacturing: 23
- Transport equipment: 92
- Furniture: 77
- Shoes: 68
- Basics metals: 62
- Food products: 68
- Construction: 66
- Services: 0

N > 5; RR > 1
Attributable risk fraction of CTS to occupation

N > 5; RR > 1

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Attributable risk fraction of CTS to occupation

<table>
<thead>
<tr>
<th>Occupation</th>
<th>AFEs of CTS in men (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farmers</td>
<td>0</td>
</tr>
<tr>
<td>Managers, sales &amp; crafts women</td>
<td>0</td>
</tr>
<tr>
<td>Professionals</td>
<td>0</td>
</tr>
<tr>
<td>Associate professionals</td>
<td>0</td>
</tr>
<tr>
<td>Lower grade white collar workers</td>
<td>0</td>
</tr>
<tr>
<td>Blue collar workers</td>
<td>73</td>
</tr>
<tr>
<td>Skilled craft workers</td>
<td>59</td>
</tr>
<tr>
<td>Material handlers</td>
<td>74</td>
</tr>
<tr>
<td>Unskilled industrial blue collar workers</td>
<td>70</td>
</tr>
<tr>
<td>Unskilled craft blue collar workers</td>
<td>70</td>
</tr>
<tr>
<td>Agricultural blue collar workers</td>
<td>71</td>
</tr>
</tbody>
</table>

N > 5; RR > 1
AFEs of CTS in female employees of public services, trades and personal services

**AFE of CTS (%)**

- Low grade government clerks: 76%
- School cleaners: 89%
- Nurses' aides: 57%
- Hospital cleaners: 48%
- Cashiers: 82%
- Hairdresses: 87%
- Child care workers: 39%
- Waitresses: 72%
- Cleaners: 54%

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AFEs of CTS in female unskilled industrial workers

**AFE of CTS (%)**

<table>
<thead>
<tr>
<th>Occupation</th>
<th>AFE of CTS (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanical machinery assemblers</td>
<td>91</td>
</tr>
<tr>
<td>Packers</td>
<td>88</td>
</tr>
<tr>
<td>Food processing operators</td>
<td>87</td>
</tr>
<tr>
<td>Electronic equipment assemblers</td>
<td>78</td>
</tr>
<tr>
<td>Chemical, plastic product assemblers</td>
<td>86</td>
</tr>
<tr>
<td>Textile product assemblers</td>
<td>65</td>
</tr>
<tr>
<td>Shoemaking operators</td>
<td>53</td>
</tr>
</tbody>
</table>
AFEs in male skilled and unskilled craft workers

AFEs of CTS (%)

- Plumbers: 91%
- Gardeners: 88%
- Bricklayers: 87%
- Cooks: 78%
- Building construction laborers: 86%
- Construction finishing laborers: 65%
- Mechanical machinery assemblers: 91%
- Food processing operators: 87%
- Chemical, plastic products assemblers: 88%
- Vineyard workers: 89%

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Discussion

• Incidence rates of CTS were underestimated
  – unequal participation of the physicians
  – no systematic bias according to economic sectors
    and occupations

• AFEs of CTS to work in high risk sectors and occupations should not be used at the individual level.
Conclusion

• A substantial proportion of cases of CTS occurring in blue collar workers and low grade white collar workers were attributable to work.

• Although these results should be confirmed in other regions, they provide important new insights to evaluate the potential impact of preventive interventions at the population level.
Thank you for your attention