

## Two user-friendly digital tools for multidimensional risk assessment among workers with display screen equipment

Authors: Dirk Delaruelle<sup>1</sup>, Gerrit Pollentier<sup>1</sup>, Sofie Acke<sup>2,3</sup>, Tine De Leeuw<sup>4</sup>, Cindy Goddet<sup>5</sup>, [Kristel Knops \(KK\)](#), Karine Eerdeken<sup>6</sup>, Marie-Noëlle Schmickler<sup>7</sup>

Affiliations: Occupational Physician, Mensura Occupational Health Services, Gaucheretstraat 88/90, 1030 Brussels, Belgium [Kristel.Knops@Mensura.be](mailto:Kristel.Knops@Mensura.be)

<sup>1</sup>European registered Ergonomist, Mensura Occupational Health Services, Belgium

<sup>2</sup>Department of Research & Development, Mensura Occupational Health Services, Belgium

<sup>3</sup>Occupational Physician, Mensura Occupational Health Services, Belgium

<sup>4</sup>Occupational Health Nurse, Mensura Occupational Health Services, Belgium

<sup>5</sup> Prevention Advisor Ergonomist, Mensura Occupational Health Services, Belgium

<sup>6</sup> Head of the Department of Process Development and of the Department of Risk Management, Mensura Occupational Health Services, Belgium

<sup>7</sup>Head of the Department of Medicine, Knowledge Center and of the Department of Research & Development, Mensura Occupational Health Services, Belgium

### Introduction

Workers using Visual Display Units (VDUs) face multiple risks, including upper limb discomfort and pain, mental stress, and visual fatigue. Since 2016, the Belgian Welfare Law has obliged companies to conduct risk analyses at least every five years to assess employees according to these three dimensions. To perform these assessments, researchers from Mensura developed two tools:

- 1) an online questionnaire (e-Enquête),
- 2) a self-assessment tool (e-Coach).

Research question: are these tools effective for multidimensional risk assessment among workers using VDUs?

### Population and methods

The questionnaire was validated in a two-stage Delphi process by a panel of 20 experts. Subsequently, a pilot test was conducted among all Mensura computer office workers, resulting in 425 completed questionnaires (response rate 74%).

- 1) The closed-ended questionnaire was partially based on two validated risk assessments: a standardised Nordic questionnaire for the analysis of musculoskeletal symptoms and a Dutch checklist for work involving VDUs. It consisted of five parts (10 scales, 105 items):
  - a. physical activity and nutrition,
  - b. psychosocial well-being,
  - c. occupational hygiene,
  - d. working conditions,
  - e. possible work-related complaints.
- 2) The self-assessment tool (15 items) was developed in accordance with the concept of cognitive ergonomics (e.g., tested for usability, built according to user-centered design methods). Using visualised questions, the survey examined the ergonomics of individual chair and desk settings as well as employees' working methods. After each question, advice was given and customised infographics were provided.

## Results

From October 2016 to August 2017, 17 companies implemented the questionnaire and 203 companies implemented the self-assessment tool. This resulted in 2,088 completed questionnaires and 875 completed self-assessments. The mean age of the questionnaire participants was 41.4 years (SD = 10.4); 48.5% were men and 51.5% were women. When asked whether they had experienced any pain or discomfort over the previous 12 months, 52.9% of respondents reported neck pain (95% CI 50.8-55.1) and 47.1% reported lower back pain (95 % CI 44.9-49.2). A number of employees (13%) even reported being absent from work during the previous 12 months due to lower back problems (95% CI 11.7-14.5).

## Conclusion

The prevalence of neck pain was within its reference value for the European population, while the prevalence of lower back pain was a little higher (respectively 33-54.5% and 46-47%). Both tools effectively assessed risks across multidimensional levels, enabling organisations to map priorities and target actions to increase employees' well-being. Furthermore, they provided employers with an extensive database for self-monitoring and continuous benchmarking.