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Optimising work environments

# The impact of occupational noise exposure on blood pressure

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## 1. Introduction

*Known effect of noise on the endocrine and autonomic nervous system*

↓

*Noise possible adversely affect the cardiovascular system?*

**Investigation in this study**: is there an association between occupational noise exposure and systolic (SBP) and diastolic (DBP) blood pressure in workers?



## 2. Methods

- Data obtained by the non-profit association IDEWE = largest Belgian external occupational health service for prevention and protection at work
- Data of more than 200 000 employees obtained during occupational health surveillance in 2009
- 2 groups:
  - exposure <80 dB (82,3%: n=169 312)
  - exposure >= 80 dB (17,7%: n=36 425)

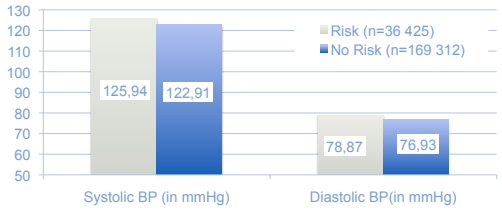


## 2. Methods

- Differences in SBP and DBP between both groups *before* and *after* correction for potential differences in
  - Age
  - Gender
  - BMI
- Analyzing package: SPSS 17



## 3. Results of t-test comparison




| BP | t-test for equality of means – sig. (2 tailed) |
|---|---|
| Systolic | <,001 |
| Diastolic | <,001 |

## 4. Results of GLM analysis

- Method: significant interactions? 3 steps

| | Effect | GLM sig. |
|---|---|---|
| Step 1 | Audiorisk*BMI | ,364 |
| | Audiorisk*gender | ,069 |
| | Audiorisk*age | <,001 |

| | Effect | GLM sig. |
|---|---|---|
| Step 2 | Audiorisk*gender | ,054 |
| | Audiorisk*age | <,001 |

| | Effect | GLM sig. |
|---|---|---|
| Step 3 | Audiorisk*age | <,001 |

- Conclusion: only exposure*age significant and stayed significant in all 3 steps (p<0,001)



## 4. Results of GLM analysis

- Parameter estimates for the last step

| Dependent variable | Parameter | B |
|---|---|---|
| Systolic BP | (Audiorisk=0)*age | ,043 |
| | (audiorisk=1)*age | ,023 |
| | Audiorisk=0 | -,552 |
| | Audiorisk=1 | 0 |
| Diastolic BP | (Audiorisk=0)*age | ,107 |
| | (audiorisk=1)*age | ,115 |
| | Audiorisk=0 | ,114 |
| | Audiorisk=1 | 0 |

- Formula to calculate the BP differences

(risk=0) - (risk=1) + ((risk=0)*age - (risk=1)*age)



## 4. Results of GLM analysis

- Systolic BP
  - Age 20: -0,172 mmHg
  - Age 40: +0,208 mmHg
  - Age 60: +0,588 mmHg
- Diastolic BP
  - Age 20: -0,046 mmHg
  - Age 40: -0,206 mmHg
  - Age 60: -0,366 mmHg

- SPB: at what age changes the effect from negative into positive?
  - -0,552+0,019*age=0 ➡ age=0,552/0,019=29,05
- DPB: increasing difference with age
- Both SBP and DBP: the differences are much smaller than those found without correction



## 5. Discussion

- High blood pressure=important cardiovascular risk factor
- Workers at risk for occupational noise had a slightly higher diastolic blood pressure at all age and a higher systolic blood pressure under the age of 29
- Gender and BMI were also taken into account



## 5. Discussion

- Major drawbacks of the study
  - No real exposure data
  - Cross-sectional study: no insight into latency time between exposure and outcome
  - Other influencing factors which are not taken into account
- Strength of the study
  - Very large dataset



## 6. Conclusion

- Results indicate that noise should be further studied as a cardiovascular risk factor
- Appropriate control for potential confounding and influencing health factors is necessary
- More sophisticated statistical analysis is necessary to bring those factors into account

## Information?

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