

Hearing loss, sick leave, and disability pension: Findings from the HUNT follow-up study

Ingrid Sivesind Mehlum

National Institute of Occupational Health, Oslo, Norway

PEROSH Conference, Oslo

STAMI
NATIONAL INSTITUTE
OF OCCUPATIONAL HEALTH

Jørgensen et al. *BMC Public Health* (2022) 22:1340
<https://doi.org/10.1186/s12889-022-13760-2>

BMC Public Health

RESEARCH

Open Access

Hearing loss, sick leave, and disability pension: findings from the HUNT follow-up study



Astrid Ytrehus Jørgensen^{1*}, Lisa Aarhus¹, Bo Engdahl², Bernt Bratsberg³, Vegard Fykse Skirbekk⁴ and Ingrid Sivesind Mehlum¹

List of authors

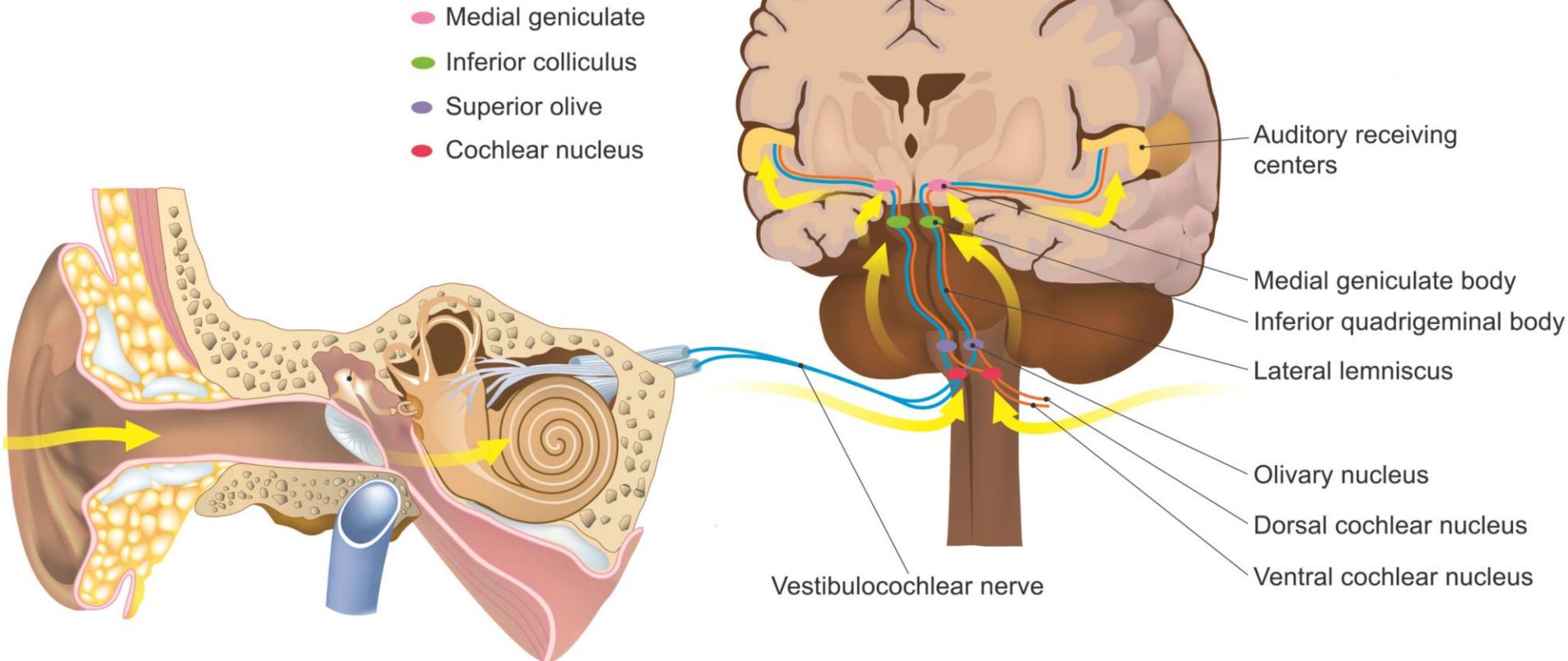
- Astrid Ytrehus Jørgensen – PhD candidate, STAMI
- Lisa Aarhus – STAMI
- Bo Engdahl – National Institute of Public Health (NIPH)
- Bernt Bratsberg – The Frisch Centre for Economic Research
- Vegard Fykse Skirbekk – NIPH
- Ingrid Sivesind Mehlum – STAMI

Funding: Research Council of Norway (project number: 301426)

Hearing is a complex process

The auditory pathways

Problems/disease at any point from ear to cortex could give hearing difficulties



Background

- Employees with hearing loss may have difficulties related to work
 - Oral communication challenges
 - A high degree of exhaustion after work
 - Increased risk of early retirement
- Evidence on the association between hearing loss and sick leave or disability pension is mainly based on a few cross-sectional studies and remains unclear

Objectives

To assess the associations between hearing loss and sick leave or disability pension in a long-term follow-up population study

We used data from

- The Trøndelag Health Study (HUNT)
 - Exposure data (explanatory variables)
 - Covariates
- Statistics Norway (SSB)
 - Registry-based outcome data
 - Sick leave
 - Disability pension

The Trøndelag Health Study (HUNT)

- Longitudinal population health study
- Data from questionnaires, clinical measurements, and samples
→ Population health research on a wide range of conditions and lifestyle factors
- Four waves of population studies (HUNT1, 2, 3, and 4) spanning the years 1984 → 2019

Methods

- **Study design**

- Long term follow-up population study
- Associations assessed with Cox regression

- **Study sample**

- Baseline data on hearing from the HUNT Hearing Study (HUNT2, 1996-1998)
- Sample size: 21 754 adults

- **Main analysis**

The association between hearing loss (HL) and time to first sick leave episode or time to receiving disability pension

- *Exposure variable:* Hearing loss
- *Outcome variable:* Start of first sick leave episode / disability pension

Exposure variable: Hearing loss

Measurement and definition

- Pure-tone audiometry
 - Average of the hearing thresholds measured at 0.5, 1, 2, and 4 kHz
 - The best hearing ear
- Global Burden of Disease (GBDs) definition of hearing loss
 1. Normal hearing: Hearing threshold < 20 dB
 2. Mild hearing loss: 20-34 dB
 3. Disabling hearing loss: ≥ 35 dB
 4. Any hearing loss and tinnitus

Outcome variables:

- Time to first sick leave episode
- Time to start of disability pension

- Follow-up time: 1996 to 2011
- Hearing measurement data from HUNT were linked with register data from SSB (Sick leave episodes and disability pension data)

Statistical analyses

- Cox regression (Hazard Ratio HR)
- Adjusting for education level, age and sex
- Associations in the total sample
- And stratified by age, sex, education, and blue-/white-collar occupation
- STATA

Results: Physician-certified sick leave

- Hearing loss at baseline (1996–1998) was
 - weakly associated with time to first physician-certified sick leave episode during follow-up (1996–2011)
Hazard ratio (HR) 1.2 (95% confidence interval (CI) 1.1-1.3)
 - slightly stronger association among people with both hearing loss and tinnitus
HR 1.3 (95% CI 1.1–1.6)

Table 5 Associations between hearing loss at baseline and disability pension during follow-up among employed persons, The HUNT Study, Norway

	Any hearing loss (N = 523)	Mild hearing loss (N = 433)	Disabling hearing loss (N = 90)	Any hearing loss + tinnitus (N = 182)
	Hazard ratio (95% CI)	Hazard ratio (95% CI)	Hazard ratio (95% CI)	Hazard ratio (95% CI)
Total sample (N = 21 754)	1.5 (1.3–1.8) *	1.4 (1.1–1.7) *	2.3 (1.6–3.2) *	2.0 (1.4–2.8) *
Stratified analysis				
Men	1.4 (1.1–1.8) *	1.3 (1.0–1.7)	2.1 (1.3–3.6) *	1.7 (1.1–2.7) *
Women	1.6 (1.3–2.0) *	1.5 (1.1–1.9) *	2.4 (1.5–3.8) *	2.4 (1.5–3.9) *
Younger adults < 35 yr at baseline	2.2 (1.4–3.7) *	1.8 (1.0–3.4)	3.7 (1.7–8.4) *	5.3 (2.2–12.8) *
Older adults > 35 year at baseline	1.4 (1.2–1.7) *	1.3 (1.1–1.6) *	2.1 (1.4–3.0) *	1.8 (1.3–2.6) *
High education	1.4 (1.1–1.7) *	1.2 (0.9–1.6)	2.0 (1.3–3.0) *	1.8 (1.2–2.8) *
Low education	1.7 (1.4–2.3) *	1.6 (1.2–2.1) *	3.3 (1.8–6.2) *	2.2 (1.3–3.6) *
White-collar	1.6 (1.2–2.3) *	1.6 (1.1–2.2) *	2.1 (0.9–4.7)	1.7 (0.9–3.5)
Blue-collar	1.2 (1.0–1.5)	1.1 (0.9–1.4)	1.8 (1.1–2.8) *	1.9 (1.3–2.8) *

All analyses are adjusted for age, sex, and education

In the sex stratified analyses, the estimates are adjusted for age and education

In the age stratified analyses, the estimates are adjusted for sex and education

In the education stratified analyses, the estimates are adjusted for sex and age

CI confidence interval

* = $p \leq 0.05$

Results: Disability pension

- Hearing loss at baseline (1996–1998) was
 - associated with time to first received disability pension
HR 1.5 (95% CI 1.3-1.8)
- Stronger associations among
 - people with both hearing loss and tinnitus:
HR 2.0 (95% CI 1.4–2.8)
 - people with disabling hearing loss (PTA > 35):
HR 2.3 (95% CI 1.6–3.2)
 - younger adults (< 35 years at baseline)
HR 2.2 (95% CI 1.4–3.7)
 - low educated workers
HR 1.7 (95% CI 1.4–2.3)

Strengths & Weaknesses

- Strengths

- large number of participants
- long follow-up period
- register-based dates of sick leave and disability
- standardized audiometric measurements
- representative population sample from the Trøndelag County, also representative of Norway

- Weaknesses

- lower participation rates in some subgroups (e.g. low socioeconomic groups, poor health)
- people with hearing loss that are in work may be healthier or have other positive characteristics compared with unemployed (potential selection bias)

Both may underestimate the results

Conclusion

- Our findings indicate that effort should be made to implement preventive measures for hearing impaired in the workplace.
- Increased knowledge concerning hearing loss in the workplace, gives employers and public officials information that is important for the planning of supportive services.
- The association between hearing loss and disability pension was stronger among younger employees and employed persons with lower education. In terms of prevention, there is a greater need for supportive measures for people with hearing loss among these groups.

Thank you!

The background features a white space on the left and a series of overlapping geometric shapes on the right. A large, light blue diagonal shape starts from the top right and extends towards the bottom left. To its right, a darker blue shape is partially visible, and below it, a dark blue trapezoidal shape is positioned.

STAMMI
NATIONAL INSTITUTE
OF OCCUPATIONAL HEALTH