

# Middle ear barotrauma in flight and diving: a nationwide survey

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## Background

Middle ear barotrauma (MEBT) are the most common condition in flight and diving, potentially posing serious safety risks in both environments.

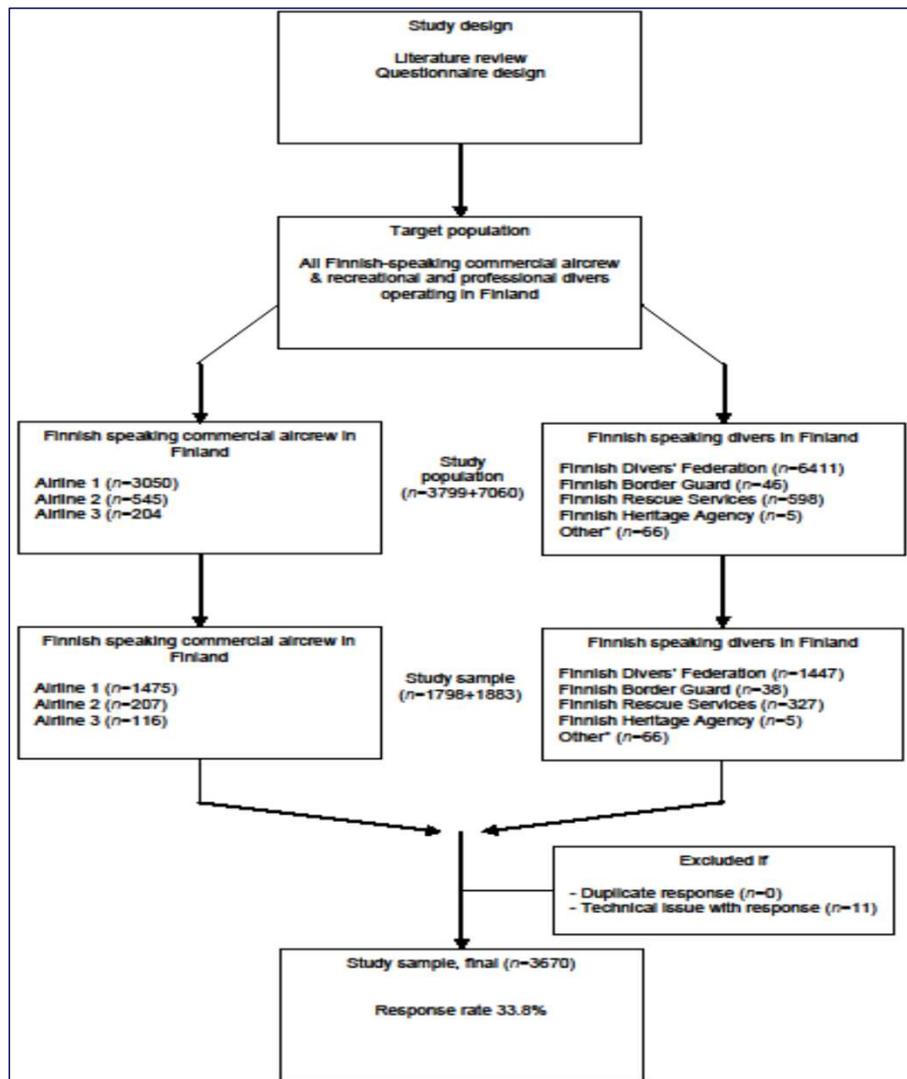
Therefore, a comprehensive overview of the condition is warranted.

## Methods

Anonymous questionnaires on MEBT in flight were sent to commercial aircrew of the three commercial airlines operating in Finland (n= 3799).

Anonymous questionnaires on MEBT in diving were sent to professional divers of the Finnish Border Guard, the Finnish Rescue Services, the Finnish Heritage agency, and recreational divers of the Finnish Divers' Association (n=7060) reachable via email. Primary outcomes the were frequency, the clinical characteristics, and the short-term health effects of MEBT while flying and diving.

Secondary outcomes were adjusted odds ratios (OR) with respect to possible risk factors.



## Results

The response rate was 47% (n=1789) in aircrew.

A total of 85% had experienced MEBT while flying and of those affected, 60% had used medications, 5% had undergone surgical procedures, and 48% had been on sick leave due to MEBT (40% during the last year).

Factors associated with MEBT were a high number of upper respiratory tract infections ( $\geq 3$  URTIs per year vs. 0 URTIs per year: OR, 9.02; 95% confidence interval [CI] 3.99 – 20.39) and poor subjective performance in Valsalva (“occasionally” vs. “always” successful: OR, 7.84; 95% CI 3.97 – 15.51) and Toynbee (“occasionally” vs. “always” successful: OR, 9.06; 95% CI 2.67 – 30.78) maneuvers.

The response rate was 27% (n=1881) in divers.

A total of 81% had experienced MEBT while diving and of those affected, 38% had used medications and 1% had undergone surgical procedures due to MEBT.

Factors associated with MEBT were poor subjective performance in Valsalva (“occasionally” vs. “always” successful: OR, 11.56; 95% CI 7.24-18.47) and Toynbee (“occasionally” vs. “always” successful: OR, 3.51; 95% CI 1.95-6.30) maneuvers.

## Conclusions

MEBT are frequent while both flying and diving.

The condition leads to an increased need for medications, surgical procedures, and sickness absence from work duty.

The most important risk factors are a high number of URTIs and poor performance in pressure equalization maneuvers.