

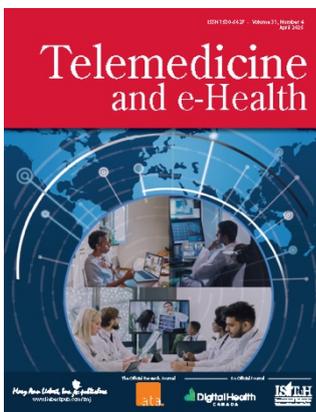
## Short- and Long-Term Outcomes of e-Health and Internet-Based Psychological Interventions for Chronic Tinnitus: A Systematic Review and Meta-Analysis.

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### Abstract:

**Objective:** e-Health or web-based systems in the field of tinnitus have gained increasing interest. Cognitive behavioral therapy (CBT) delivered via the internet is currently witnessing a surge in both attention and offerings. This systematic review analyzed the efficacy and sustainability of internet-based therapies aimed at reducing tinnitus distress and comorbidities such as anxiety, depression, and sleep disorders. The review exclusively considered randomized controlled trials (RCTs) in which trained personnel were actively involved during intervention.

**Methods:** Utilizing search terms such as tinnitus, internet-based therapy, and e-Health therapy, we identified 155 studies, from which 37 RCTs were carefully examined for data availability. Primary outcome measures included treatment effects for tinnitus distress (Tinnitus Questionnaire and other questionnaires) and handicap (Tinnitus Handicap Inventory), while secondary outcomes encompassed depression, anxiety, and sleep problems. Meta-analyses were conducted employing random-effect models. A study effect model was applied, yielding a singular effect size for each sample. The effect sizes were examined for influences of various moderators.

**Results:** We found a statistically significant large effect size for improvement in tinnitus distress ( $d = 0.83$ ; [confidence interval 0.61–1.06] with total  $n = 450$  for the experimental group and total  $n = 504$  or the controls), while the reduction of tinnitus handicap was smaller (moderate effect size  $d = 0.59$ ; [0.44–0.73]). Less strong but still significant effects resulted for depression, anxiety, and insomnia. Most of the long-term

outcomes remained stable. As moderators, the risk of bias (RoB) and the severity of tinnitus manifestations were identified.

**Conclusions:** Internet-based therapy provides a valuable avenue for initial therapeutic contact, as supporting component in tinnitus treatment if accompanied by therapists. The heterogeneous quality with high drop-out rates or partly high RoB and the wide range of interventions (counseling, eCBT, mindfulness) might be considered as a limiting factor for a first-line management in tinnitus. So far, the use of e-Health is dependent on availability or user preferences.

#### Related links:

- Online publication: <https://doi.org/10.1089/tmj.2024.0050>