

Attitudes toward smartphone-based self hearing test among mild cognitive impairment population; A mixed method study

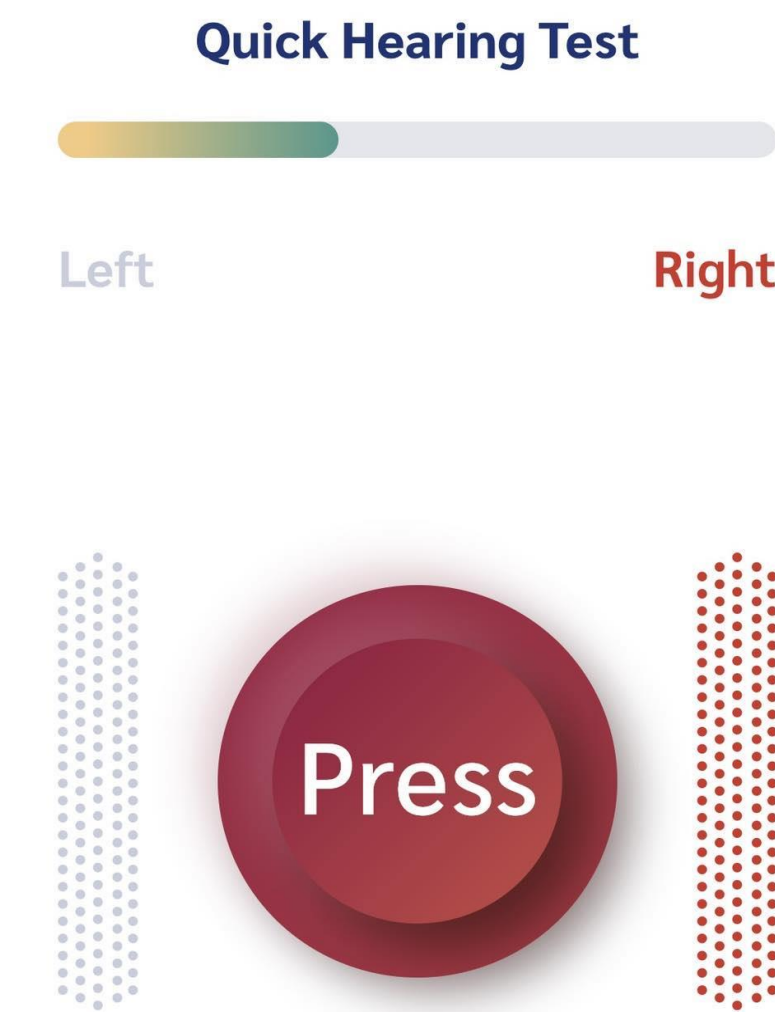
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Abstract

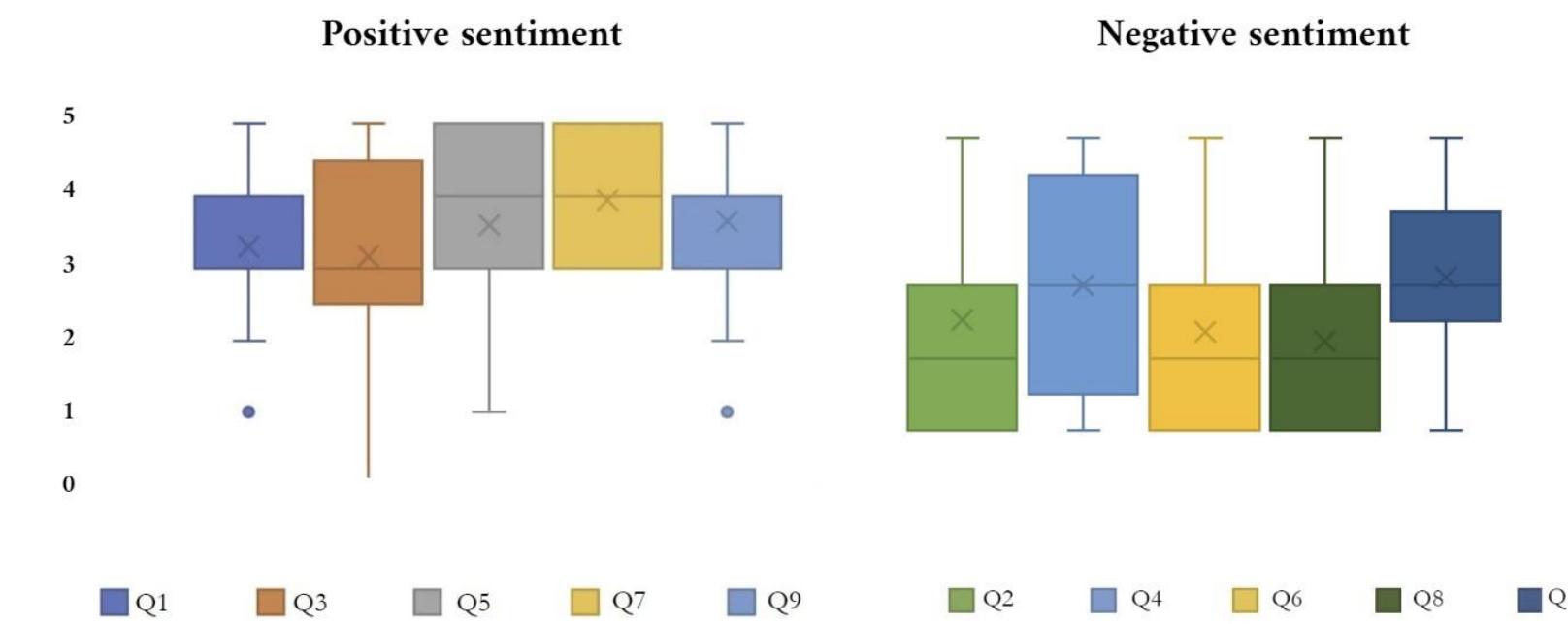
Hearing loss is the highest modifiable risk factor for dementia. Patients in memory clinics are a critical population that requires early identification and timely intervention for hearing loss to prevent further cognitive decline. Hearing status is also essential for accurate cognitive assessment. The prevalence of hearing loss in memory clinics is estimated to be 60- 90 percent.

Pure-tone audiometry needs special equipment and trained healthcare professionals which are lacking in many settings. Smartphone-based hearing screening tests have been implemented as innovative healthcare solutions for this issue. Nevertheless, cognitive impairment stands out as a significant barrier to the use of smartphones and among older adults, particularly those diagnosed with mild cognitive impairment (MCI) or dementia.



Please the red button when hear a tone

The System Usability Scale (SUS) score



Results

- Seventeen participants with mean age of 71.8 years old and mean MoCA score of 25.8 participated
- The SUS score was 61 +/- 24, considered marginal acceptability
- Thematic analysis revealed 4 main themes;
 - 1) Past hearing test experiences and hearing status,
 - 2) Experiences with smartphone-based hearing test
 - 3) Test performance and engagement
 - 4) Attitudes toward smartphone-based hearing test
 Aging significantly affected participant performance.

Objective

This study aimed to explore the perceptions, acceptability, and attitudes of older adults with cognitive impairment towards smartphone-based screening tests.

Population

17 Patients who were diagnosed with mild cognitive impairment according to ICD-10 were recruited consecutively. The cross-sectional study utilized mixed-method approach

Demographic data

Age in years, mean (SD)	71.8 (5.7)
Sex, n (%)	Female 11 (65)
Self-reported hearing problems, n (%)	4 (24)
Use of hearing aid, n (%)	1 (6)
Montreal Cognitive Assessment score (MoCA)	25.8 (3.2)
Mean (SD)	18-26
Range	

Interpretation

Smartphone-based hearing tests are acceptable for the mild cognitive impairment population, despite several concerns and limitations compared to conventional hearing tests. These findings can be utilized to rectify this innovation and address the specific needs of this valuable population.

Materials and Methods

All participants used a self-administered smartphone-based application, which consisted of The Hearing Handicap Inventory for Elderly (HHIE) screening questionnaire, hearing screening test with pure-tone signals, and the digit triplet in noise test (DTT) to screen for speech understanding in noise.

After completing the tests, participants were asked about the application with the 'System Usability Scale' (SUS) questionnaire for quantitative analysis. Additionally, the qualitative analysis involved three focus group interviews with voice recorders were also conducted in the same visit.

Conclusion

Further study about self-hearing screening tests among the cognitive impairment population is needed. This study ensures initial acceptance of the hearing test in this population. All methods of screening tests including questionnaire, pure-tone signal and speech in noise test paradigms were explored in this research. The qualitative focus group result further shapes the test implementation process to be tailored for the cognitive impairment population.