

Discussion and Prospective: Global Overview of The Landscape of Currently Available Tinnitus Apps and Future Recommendations



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Abstract: Tinnitus is a hearing problem that has been neglected or misunderstood in the field of information sciences. Most existing reviews of smartphone apps for tinnitus focus primarily on English-language apps, and tinnitus-related research is often confined to a single country. This study aims to provide a cross-country overview of currently available tinnitus-related smartphone applications. Using a quantitative descriptive design, the study examined apps identified through tinnitus-related keyword searches in the Google Play Store and Apple App Store in China, South Korea, the United Kingdom, and the United States. The collected dataset was analyzed for the proportion of tinnitus-related apps, platform distribution, therapy methods, cost structures, and keywords in app descriptions. The results indicated that most apps offered only a single treatment option, which was typically sound therapy. Educational terms were largely absent from app descriptions, while platform availability varied across the four countries. This cross-country study is expected to act as a roadmap for future research, improving the existing smartphone apps for treating tinnitus and eventually enhancing the user's experience.

Keywords: tinnitus, health application, accessibility, tinnitus management, user experience

1. Introduction

Sufferers of tinnitus have long been a neglected group in the field of information sciences. Tinnitus is the perception of a sound or sounds, such as ringing or other non-speech tones, in one or both ears that are not caused by an external source ([Mayo Foundation, 2022](#)). It is most often a chronic condition, in which the sound is perceived throughout the waking hours. Tinnitus is often described as an unpleasant experience and has the potential to cause insomnia, communication challenges, stress, and deterioration of one's quality of life ([Norena et al., 2021](#)).

An effective smartphone tinnitus treatment application (app) should contain several functions to meet tinnitus sufferers' concerns. First, smartphone tinnitus treatment apps are expected to offer a convenient and accessible way for individuals to

access tinnitus management resources anytime and anywhere. However, current and typical treatments of tinnitus, including amplification, psychotherapy, and in some cases medication for associated anxiety or depression, are not accessible to all patients, leading to a demand for apps that are tailored to tinnitus ([Sereda, 2019](#)). Second, these apps should not only provide effective treatment options but also educate users with reliable, tailored information. Nowadays, users increasingly use apps as a source of information for their health concerns ([Liu et al., 2022](#)). Therefore, for tinnitus sufferers, tinnitus treatment apps should provide educational features to address their concerns and make informed decisions.

Additionally, tinnitus apps need to be culturally and linguistically customized because the way users obtain and engage in health information is also

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influenced by social and cultural contexts. More specifically, different countries may have various social and cultural norms, leading to different preferences, such as platforms and customized treatment plans. Therefore, this study aims to investigate how the accessibility of current tinnitus treatment apps, their inclusion of educational functions, and their alignment with diverse countries' cultural and social norms enhance or fail to enhance user experience. The study findings are hoped to provide corresponding recommendations for information professionals to increase the effectiveness of existing apps and ultimately increase tinnitus sufferers' well-being.

2. Background & Literature Review

Tinnitus affects approximately 15% of the global population (Crist, 2022), yet there is currently no universally accepted treatment for this hearing problem. Some research demonstrates that 7.2% reported their tinnitus as a "big" or "very big" problem versus 41.6% reporting it as a "small" problem (Bhatt et al., 2016). From the latest data, about 14% (740 million) of the world's adults have experienced tinnitus (Criado, 2022). "Desert Hearing Care" (2022) revealed that a lack of effective treatments for tinnitus was due to it being an insignificant symptom of other hearing problems, such as noise-induced or age-related hearing loss.

The most prevalent form of tinnitus is constant, chronic subjective tinnitus, and the research indicates that smartphone apps for managing tinnitus-related symptoms are promising (Mehdi et al., 2020). However, existing smartphone apps for this objective have several drawbacks. The fact is that some apps presented as relevant to tinnitus are not specifically designed for people with tinnitus; instead, they serve more general purposes, such as addressing sleep problems, reducing anxiety, and so on. Moreover, most tinnitus treatment apps only offer a single, monotonous treatment method (Sereda, 2019). An earlier study by Kalle et al. (2018) collected tinnitus smartphone app data from Google's Play Store (2 of 146 results) and Apple's App Store (1 of 100 results

for iPhone, 4 of 90 results for iPad) in the US and analyzed their effectiveness. The result revealed that only a few smartphone apps have demonstrated evidence supporting their effectiveness in reducing tinnitus symptoms (Kalle, 2018). Similarly, Nagaraj (2020) reported that the evidence supporting the effectiveness of tinnitus-related smartphone applications remains limited. These findings suggest that, although the number of available tinnitus applications continues to increase, further evaluation of their effectiveness is still needed.

Many studies focused on the apps for tinnitus therapy in individual countries. For instance, Mehdi et al (2020) provided recommendations on designing tinnitus apps based solely on an analysis of the United States' apps. However, some factors, such as users' preferences for app platforms, might greatly impact their decision-making regarding app downloads, which vary from country to country. Approximately 75% of smartphones in China were Android-based, and 24% were on Apple's iOS (Taylor, 2023), whereas iOS users outnumbered Android users in the United States (Wallen et al., 2022).

Existing research in the field of information science (IS) also highlights other factors that influence users' experience of health applications. The following section will discuss several key factors identified in previous studies within the IS field, including health information literacy, information-seeking behavior, demographic differences, emotional factors, and social contexts, to better enhance user experiences when using tinnitus-related apps.

First, among the various factors that affect the user's experience of tinnitus-related apps, one of the most important is health information literacy. For example, Imeri et al. (2024) noted that users may struggle to benefit from well-designed applications because they have difficulty evaluating health information when their health literacy is low. This can also be reflected in tinnitus treatment apps, whose effectiveness often requires users to conduct long-term self-monitoring and health management.

Secondly, demographic factors significantly shape users' health information behaviors, which affect how they interact with health-related applications. For example, Yilma et al. (2019) conducted a simulated search task on Malaysian college students. They found that interactive health information search is limited by users' language proficiency and cultural context, which means that in non-English-speaking countries, the application of English interfaces may negatively impact users' willingness to continue using the app. Further, Konca et al. (2022) highlighted that socio-economic conditions, educational levels, and age would influence whether users actively participate in online health information behaviors. Similarly, Pálsdóttir (2022) conducted a telephone survey of elderly men and women and found that older people were interested in health information but had very little knowledge of how to use health information and communication technology (ICT). This is because older people usually have problems such as technical anxiety.

In addition to external factors such as age and socio-economic factors, users' intrinsic motivations shape their health information behavior and how they interact with health-related applications. Wilson's (2000) study of human information behavior showed that people often actively seek information for their health, especially for people with life-threatening illnesses. Dewitz (2022), from the perspective of digital well-being, argued that digital health is not only about the use of technology, but also involves behavioral patterns that shape how individuals interact with health information. This suggests that users' motivation to use health apps can also help them engage daily with and manage their health information. Zolbin et al. (2022) emphasized that the continuous use of health apps largely depends on the individual motivation of users, including their interest and desire for effective control over health information.

Building on this, the interaction between information behavior and system interfaces becomes another critical factor in shaping user engagement.

Jamali and Nabavi (2022) indicate that although the citation rate of information behavior research in human-computer Interaction (HCI) is not high, more than 30% of the citations are of practical significance. This shows that integrating information behavior research into interpersonal interaction helps construct a more humanized system interface.

In addition, emotional and social factors significantly influence users' trust and engagement in health-related treatment and management applications. Oliphant et al. (2022) proposed that information acquisition behavior is often linked to social identity and emotional well-being. Users usually download treatment apps through peer recommendations or community evaluations (Jiang et al., 2022). Additionally, Zolbin et al. (2022) highlighted that users' sustained engagement with health apps is significantly influenced by the social support structure and emotional factors such as the pursuit of emotional comfort and the management of anxiety. Multas and Kulmala (2025) also emphasize that obtaining health information is a practical activity driven by social relationships. This trend also demonstrates users' choices of treatment apps; for example, Huisman et al. (2020) found that social pressure and privacy concerns often cause some users to avoid using health apps. Also, some users are afraid of being labeled as "sick," are unwilling to define themselves by health conditions, or feel that health is a private matter not meant for sharing (Huisman et al., 2020). These emotional concerns and social perceptions serve as key barriers against sustained usage of health treatment apps.

The aforementioned studies indicate that the key factors influencing users' experience when using health-related apps are health information literacy, demographic characteristics, intrinsic motivation, and emotional and social context. Specifically, effective application design should account for differences in users' health information literacy, simplify technical content, and provide information through multiple modes (such as visual) to enhance accessibility. Furthermore, demographic differences, such as age, sex, and language, can help developers develop more

inclusive and accessible tinnitus treatment applications, which developers can improve based on different user needs. Recognizing users' intrinsic motivations, such as the desire to manage their own health information, can enhance their engagement and support the long-term use of the various apps. In addition, integrating information behavior research into user interface design may help create more user-friendly systems and assist in managing their symptoms. Whether an app's interactive interface and feedback path are straightforward significantly affects users' understanding of the content and trust in the application. Additionally, addressing emotional and social perceptions can help lower users' psychological and social barriers to adopting health apps. These factors highlight the importance of user-centric design in developing effective tinnitus treatment applications.

Research has begun exploring factors influencing user experiences with tinnitus treatment apps, including health information literacy (Imeri et al., 2024), emotional and social factors (Oliphant et al., 2022; Multas & Kulmala, 2025; Huisman et al., 2020), information behavior and intrinsic motivations (Wilson, 2000; Dewitz, 2022; Zolbin et al., 2022), and demographic differences (Yilma et al., 2019; Konca et al., 2022; Pálsdóttir, 2022). However, prior research had not sufficiently addressed factors such as educational function in apps, country platform preferences, therapy methods, and whether the apps are specifically designed for tinnitus. Also, discussion remains sparse concerning users' experiences with smartphone apps for tinnitus treatment through an international lens in the field of information sciences. To address this gap, current research explores how these factors affect app accessibility and effectiveness for users in other countries. This study aims to provide valuable insights and practical suggestions for improving tinnitus treatment via smartphone applications.

3. Methodology

Google Play and the Apple App Store are the most popular application markets on the Android and

iOS operating platforms (Biggest app stores in the world 2022, 2022). This study conducted a keyword search on each of the two platforms in China, Korea, the UK, and the USA. These countries were chosen as convenient samples; the research team members come from these countries. They searched for the keywords "tinnitus," "hyperacusis," "hearing loss," and others (e.g., hearing disorders, ringing sensation) to locate tinnitus apps. Additionally, the authors looked at the apps in various languages, including English, Chinese, South Korean, and some dual-language apps. In some cases, as the locations of tinnitus apps were unclear, the app's primary language was used to determine its location. The main app features reviewed were the type of platform, therapy method, country, and cost.

4. Results

4.1. Word frequency in app descriptions

Consequently, a total of 44 smartphone tinnitus apps were reviewed, including 15 from the United States, 10 from China, 10 from the United Kingdom, and nine from South Korea. Figure 1 presents a word cloud generated from the descriptions of the 44 tinnitus-related apps using the Free Word Cloud Generator web-based tool. The size of each word represents how often it appears in the app description. The most frequently occurring keywords in the Word Cloud are "tinnitus," "sound," "hearing," and "sound therapy." In addition, terms related to sleep improvement, such as "better night" and "anxiety levels," were prominent. However, keywords related to education, such as "learning," "information," and "knowledge," were absent.

Figure 1. Word cloud of keywords extracted from tinnitus app descriptions



4.2. Targeted tinnitus vs. non-targeted tinnitus

Analyzing whether an app is designed for tinnitus can help users quickly find other apps that meet their needs. The apps containing the keywords were divided into two groups: therapeutic smartphone apps designed for people with tinnitus and apps not intended for tinnitus but still used by people with tinnitus. The keyword search results from Google Play and the Apple App Store were used to categorize the data, as shown in Table 1. Of the 44 apps reviewed, 32 were specifically created for tinnitus; 4 cost money, and 28 were free. The other 12 apps were free and were not intended for people with tinnitus.

Table 1. Targeted tinnitus vs. non-targeted tinnitus. The percentage in each category was its percentage in the total collection of apps

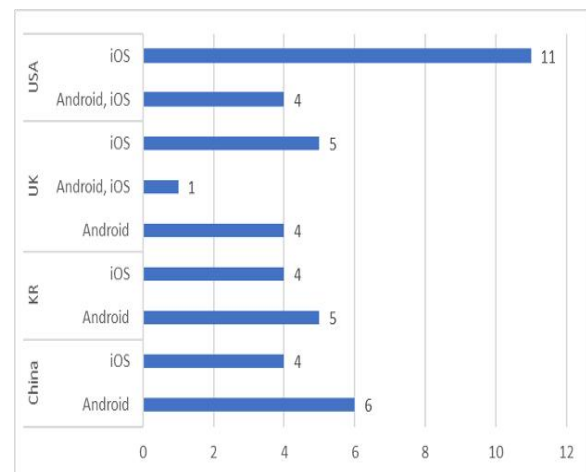
	Targeting Tinnitus	Not Targeting Tinnitus
Paid	4 (9%)	0
Free	28 (64%)	12 (27%)
Total	32 (73%)	12 (27%)

4.3. iOS platform vs. Android platform

A platform distribution analysis of tinnitus treatment smartphone apps was used to determine how user preferences can vary by locale. Figure 2 shows the distribution of the chosen app platform

across the countries investigated. Of the 15 apps identified as developed in the United States, 11 were available only on the iOS platform while four were available on both Android and iOS platforms. Of the 10 apps identified as developed in the UK, five used the iOS platform, four used the Android platform, and 1 used both platforms. Android and iOS platforms. Of the nine apps in South Korea, four used the iOS platform, and five used the Android platform. Of the 10 apps identified as developed in China, four apps used the iOS platform and 6 used the Android platform.

Figure 2. Number of platforms by country



4.4. Distribution of therapy methods

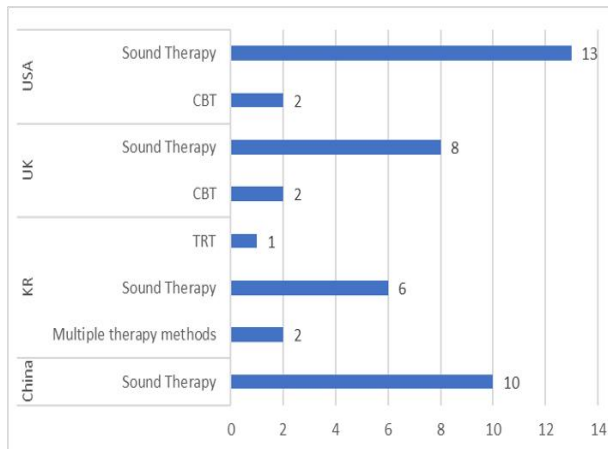
Examining the types of management options available in the apps can play a vital role in enhancing the user's experience. Figure 3 shows the number of management strategies by country of origin. For the USA, 13 apps use sound therapy, and two apps use Cognitive Behavioral Therapy (CBT)¹. In the UK, of the total of 10 apps, there were eight that use sound therapy, and two that use CBT. For South Korea, there was one use of Tinnitus Retraining Therapy (TRT)²; 6 use sound therapy, and

¹ CBT is a form of psychological treatment that has been demonstrated to be effective for a range of problems including depression, anxiety disorders, and substance abuse problems (American Psychological Association, n.d.).

² TRT is a process of learning to cope with tinnitus

the rest use multiple therapy options. China has 10 apps, all of which use sound therapy.

Figure 3. Number of therapy methods by country



5. Discussion & Recommendations

Through a keyword search, we collected data on 44 tinnitus mobile apps from the USA, UK, South Korea, and China. The main app features reviewed—including platform type (Android/iOS), therapy method (sound therapy, CBT, TRT), country, and cost (paid/free)—were documented for each smartphone tinnitus app and used to create multi-functional smartphone apps for tinnitus treatment. The mobile apps' dataset analysis enabled the authors to offer recommendations for enhancing users' experiences with tinnitus apps. The recommendations include expanding the apps' service offerings and launching them on platforms that cater to users' preferences in different countries.

First, this study suggests that tinnitus apps should include educational features. Our Word Cloud analysis shows that the selected apps do not cover these features, given that the education-related keywords are absent from them. According to Wilson's (1997) model of information behavior, users require a specific motivation to seek health information. Here, tinnitus treatment apps with educational features could serve as a source of motivation. Since users with tinnitus can obtain health-related information and enhance their

well-being, they are motivated to access tinnitus-related apps to obtain such information. Those who are without tinnitus can also benefit from downloading such apps by learning some general information and prevention methods regarding tinnitus.

Moreover, this study recommends that tinnitus apps add services tailored to users with tinnitus. Approximately 27% of the smartphone apps, which were categorized as tinnitus apps, were not specifically developed to help tinnitus sufferers. Many people with tinnitus report problems with sleep, which probably leads to using sleep support apps. Current tinnitus-based apps lack sleep management options, a lacuna that is being filled by other non-tinnitus-related apps. Therefore, this study recommends that tinnitus-based apps expand their offerings to include sleep management strategies, thereby improving users' experience. Tinnitus applications may also benefit from incorporating services related to other hearing difficulties that commonly affect people with tinnitus. For example, speech-in-noise tests could help users assess difficulties in understanding speech in noisy environments and identify whether additional hearing evaluation may be needed. Integrating such functions could broaden the practical value of tinnitus applications beyond symptom management.

According to our data, China and South Korea have the most Android smartphone apps for treating tinnitus. However, the UK and the USA have more iOS apps for treating tinnitus; the US has 15 iOS-compatible apps (11+4). Therefore, this finding indicates that user preferences for app platforms vary from country to country. If information scientists can improve a particular app for treating tinnitus according to different countries' preferences, or if tinnitus apps can be made accessible across dual platforms, they could significantly enhance accessibility and users' experiences.

Most smartphone apps for treating tinnitus focus on a single type of therapy, primarily sound therapy. However, having only one therapy method could limit the effectiveness. Therefore, tinnitus

on a conscious and subconscious level (Tinnitus retraining therapy, n.d.).

smartphone apps can be improved; users should have more options to alleviate their symptoms. In addition, although the authors realize that other apps provide some degree of educational functions, we propose that tinnitus smartphone apps can be enhanced to serve as a learning tool for individuals with tinnitus, aiding them in understanding how to manage and mitigate tinnitus symptoms.

Based on previous information science literature and our empirical research results, this study puts forward some design suggestions to enhance the usability and inclusiveness of tinnitus treatment applications. Building on existing information science research, we recommend that tinnitus treatment smartphone applications be designed to inclusively address users' diverse needs—not only in terms of health information literacy but also by considering demographic characteristics, intrinsic motivation, and emotional and social factors. First, to accommodate varying levels of health information literacy, applications should simplify medical content and provide multimodal explanations, ensuring that users with lower educational attainment can still engage with the platform (Imeri et al., 2024). Second, demographic factors such as age, gender, and language should guide interface design (Yilma et al., 2019; Konca et al., 2022). For instance, the layout can incorporate age-appropriate elements to improve accessibility. Thirdly, by recognizing users' intrinsic motivations, applications should offer personalized features (e.g., symptom tracking or goal setting) that support users in managing their own health information (Dewitz, 2022; Zolbin et al., 2022). Finally, from an emotional and social perspective, tinnitus treatment applications should integrate community support elements and chat-sharing spaces to enhance users' sense of trust and engagement.

Our research focuses on the educational function of the tinnitus treatment platform, an aspect that has largely been overlooked by older studies. The applications should incorporate clear educational functions to foster informed engagement and support users' long-term self-management. Conversational

chatbot tools may further support this function by answering general questions about tinnitus management and directing users to appropriate resources. However, chatbot-generated information should be clinically reviewed, and these tools should supplement rather than replace professional medical advice. This study focuses on several key design aspects that have received limited empirical attention in prior research on health-related applications. In particular, we examined the existence and quality of educational functions, which are crucial for helping users understand and manage their situations. In addition, we also explored how platform preferences in specific countries (iOS vs. Android) affect user engagement. Another important aspect is integrating multiple treatment methods into the application to provide greater diversity. In addition, applications should be specifically designed for tinnitus or serve a broader purpose, such as for insomnia.

6. Conclusion

The current tinnitus treatment apps are in their initial stages and need to keep pace with users' ever-changing needs. Consequently, people with tinnitus might only use these apps for a limited period. Therefore, the findings of this study provide recommendations from various perspectives. For smartphone app developers, there is an urgent need to develop more targeted tinnitus applications that integrate multiple treatment approaches beyond simple sound therapy. Enhancing these apps' educational functions could help users understand how to manage their symptoms more effectively.

Drawing on these insights, the present study provides a foundation for future research for scholars concentrating on this area. For example, the authors suggest one-on-one interviews with people suffering from tinnitus, which will be extremely valuable for better understanding their experiences of using the apps. Moreover, future research could further investigate the clinical evidence supporting tinnitus applications and examine how the communication of such evidence may influence users' trust and adoption. Last but not least, future research may

expand the scope to include diagnostic applications, such as hearing assessment and tinnitus screening tools, to provide a more comprehensive understanding of the mobile health ecosystem for tinnitus management. The authors anticipate that these research directions will provide key information for the long-term improvement of existing apps and the development of new apps for tinnitus.

Conflict of Interest

The authors declare that they have no conflicts of interest to this work.

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