

**NARRATIVE REVIEW ON
LISTENING HABITS**

Make Listening Safe, WHO

The review was carried out by the team of Ass. Prof. Sara Rubinelli as a first step towards the development of appropriate messages on safe listening for integration into the safe listening software application and safe listening standards.

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Narrative Review on Listening Habits

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Aim

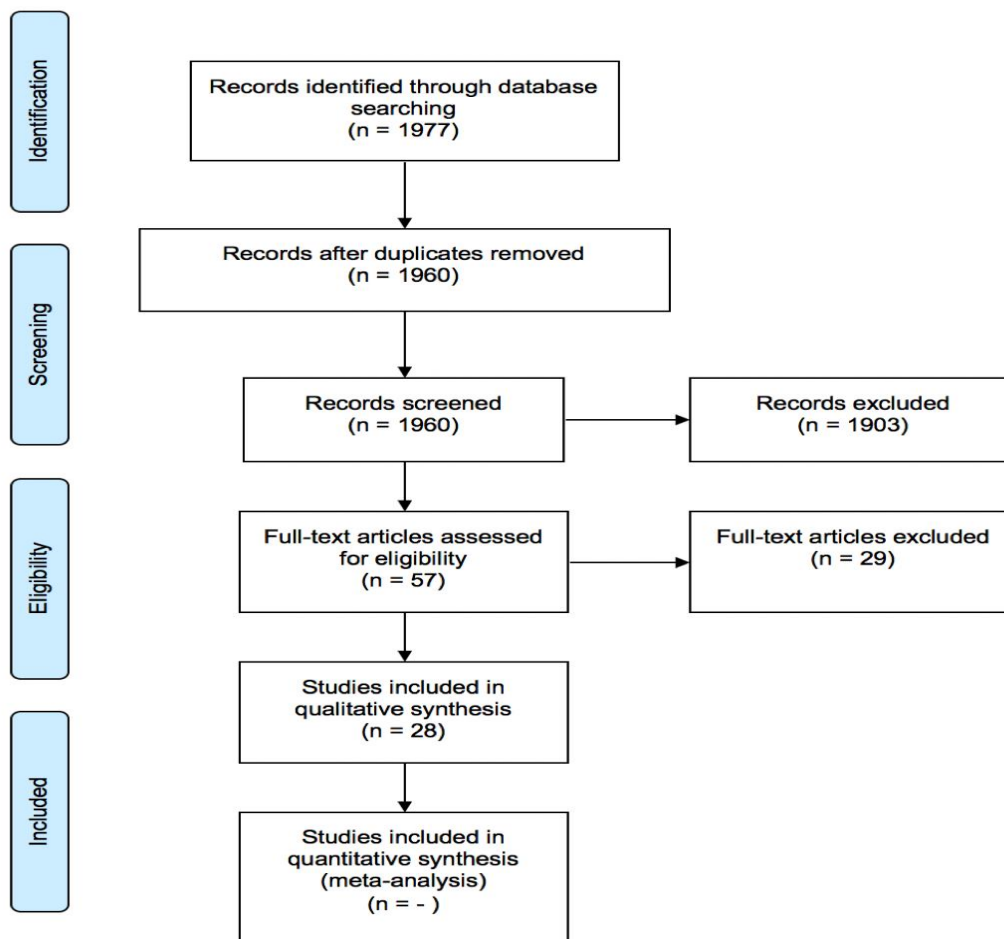
According to empirical research, who are the people using headphones to listen to music, why do they do it, what are their listening habits and the motivations behind them, are they aware of the risks, and are there effective ways to modify their listening behavior?

Methods

Five scholarly databases were searched for relevant literature in November 2016: PubMed, PsycINFO, Web of Science, JSTOR, and the Cochrane Database of Systematic Reviews. The search string included a combination of terms related to “hearing” and terms related to “portable listening device”.

Results

The search yielded 1977 hits. After abstract screening, 57 papers were retained for full-text screening and 28 were included in the present review [1-28].



Overview of included studies

The vast majority of studies included in the review were surveys. Other **designs** included a combination of questionnaires and physical measurements (e.g., auditory examination), qualitative interviews and observational studies. All studies were cross-sectional in nature.

In regard to **study settings**, the majority of the studies were conducted in an educational setting (e.g. college, university, pre-vocational schools), some were conducted in other settings, such as train stations, laboratories, and hospitals. Almost half of the included studies were conducted in the USA [1, 3, 7-10, 13, 16, 18, 20, 23, 26, 28], 6 in Asian countries [2, 5, 15, 21, 25, 27], 6 in Europe [4, 6, 11, 12, 14, 22], 2 in the Middle-East [19, 24], and 1 in Africa [17].

Most studies were conducted among **participants** under 40 years old (e.g. students, adolescents, young adults). Only two studies presented a sample with three or more age groups including people over 40 years of age. Twenty-two studies had less than 500 participants (11 of which under 100), while the remaining 5 ranged between 500 and over 1000 participants.

Variables described in the studies included listening volumes/levels, listening frequency and duration, listening habits and preferences, listening devices used (e.g. types of earphones), and perception, knowledge, awareness of hearing loss and its interventions. Most studies relied on self-reported measures, while in some cases listening volumes were measured directly by the researchers.

Hearing habits and their predictors

Several **reasons** were mentioned for listening to music using portable devices across studies. Very frequently people reported listening while doing other activities (e.g. walking, driving, travelling on public transports, exercising, reading) [7, 9, 11, 12, 15, 19]. Other motivations included relaxation [7, 9], concentration [7, 9], excitement [27], desire to isolate from others [7], and easing boredom [7]. Some younger respondents reported that listening to an MP3 player becomes a habit because no intentional thinking is required [6, 11].

In regard to **type of earphones** used, the most popular among users is the earbud-style (insert type/ear canal headphones/canal phones) [5, 7, 9, 12, 13, 19, 24]. Some studies also showed preference for headphones (supra-aural/over-the-ear type) [5, 9, 24]. Only a small number of people reported using the supra-aural or noise-canceling types of earphones or playback limiter [5, 6, 9, 14]. One study reported a preference for earbud-type for listening among **males** [24]. Those using earbud headphones reported higher preferred listening levels [3] and higher absolute CLLs [10]. **Reasons for the choice** of this type of earphones are related to the fact that most commercially available MP3 players, mobile phones, etc. come equipped with them [15] and because they allow better mobility and are cheaper [15, 17]. **Adolescents** in two studies considered wearing earphones as a fashion/character statement (e.g. modern, high-tech, rebellion) [4, 7].

A second variable of interest was the **listening volume**. According to the studies included in the review, the majority of people listen at medium to high volume, around 80dB or higher [7, 8, 12, 14, 15, 19, 24, 26]. Some studies also show that people listening at higher volume tend to listen for longer durations [6, 21]. Although one study showed no **gender** differences in listening levels [8], several other studies showed that males tended to have higher listening levels [2, 6, 21, 23-25], and to increase more often the listening volume [24]. Also, **age** seems to play a role: younger individuals were reported to listen most often at “somewhat loud” or “very loud” volume [24] and to listen at louder volumes compared with adults [21]. **Parental influence** was reported to play a role in two studies showing that young people not living with both parents were more likely to increase the volume after a period of listening [6, 11].

Several studies mentioned **factors associated with changes in the volume**. Noise exposure/background noise/street noise/multi-talker babble/wind [3, 4, 7, 9, 10, 14, 18, 20-22], exercising [7, 20], listening to favorite songs [4, 7, 20, 28], need to hear and understand speech and conversations [22, 27], listening to middle frequencies [27], desire to sing along without hearing themselves [4], and desire to cut out the parents' voices [4] were all reported to result in an **increase in volume**. A **decrease in volume**, on the other hand, was associated with the following factors: flat batteries [4], falling asleep [4], bad sound quality [4], participation in social activities [4], and need to focus (study, hear traffic to avoid accidents) [4].

With regard to **listening duration/frequency**, it is rather common for users to listen on a regular/daily basis or listen more than one day a week and more than one hour per day [7, 15, 19, 25]. Several studies showed that, in general, people don't listen to music for more than 3 hours per day [5, 7, 10, 17, 21, 23, 25]. Although some studies showed no **gender** differences in listening habits [24] and in average listening durations [21], one study suggested that males use PMPs more often and for a longer time [12]. Also **age** seems to play a role: younger individuals reported the longest single use of PM system between <1 and 2 hours per day [23] and in general to take fewer breaks from music [6]. Parental influence was reported to play a role in two studies showing that young people not living with both parents were more likely to take fewer listening breaks [6, 11].

Perception, awareness, knowledge of hearing loss and their predictors

We were subsequently interested in **perceptions, awareness, and knowledge of hearing loss**. One study showed that most of the high school students did not perceive themselves as listening at risk for hearing loss [4, 20]; moreover, they believed that hearing loss happens only when exposure to loud music was very frequent, long and loud (which they said was not the case with them) [4]. According to participants in one study, hearing loss due to aging was more of a concern than hearing loss due to PLDs use [19]; similarly, some respondents thought that the media had exaggerated the risks of hearing loss from iPod use [7, 20]. In a last study, a number of students believed that they have no hearing difficulties or uncertain if they have hearing difficulties [7].

Although in one study most respondents indicated that turning down the volume rather than limiting listening times is the way to reduce risks of hearing loss [7], and in another one most respondents were aware that prolonged use of PLDs could be harmful to their health [15], which suggests understanding of the connection between safe use and risk, other studies showed limited knowledge of hearing health and safe listening measures [4, 20]. Only one study showed a **gender** difference, namely the fact that more males considered hearing loss/impairment important [24]. In regard to age differences, only one study showed that young people not living with both parents are less likely to be motivated to protect their hearing [11].

Existing interventions and their effects

Only two studies included in the review actually assessed the effectiveness of an educational intervention on hearing habits.

The first study tested the effect of i) warning signs and ii) the behavior of one other person on a target individual's compliance with oral warnings about personal hazards from high-volume headsets. During a 6-day warning sign phase (Study 1), the mean percentage of audible headphones declined from 85% (baseline) to 59%. A 5-day modeling intervention (Study 2) reduced audible volumes from a mean of 85% to a mean of 46%. The modeling intervention was significantly more effective with women (53% compliance) than men (29% compliance) [1].

In the second study, college-age students were exposed to three information sets: text only, behind-the-ear hearing aid image with text, and inner-ear hair cell damage image with text. The behind-the-ear hearing aid image with text information was significantly ($p < .0001$) more motivating the students to listen to PLDs at lower volume levels than text alone or the inner ear hair cell damage

image with text [28].

Hints for future interventions

Several of the included studies reported on different aspects that could be useful to keep in mind when planning future interventions in this field:

- One study showed that only less than half of the respondents would like more information about iPod use and potential hearing loss [20].
- Perceived threats mentioned in the studies include the following: fear that daily life could be disturbed by hearing loss [4], fear of having to wear a hearing aid [4].
- Even people that are open to trying to apply hearing protective interventions are uncertain about their effectiveness [7];
- Respondents prefer educational messages which encourage either limiting listening time or turning down the volume [7]. Some respondents believed that iPods should be labeled with warnings like those on cigarette packages that use at high volumes can cause hearing loss [7].
- Some respondents think it would be good to limit the sound output of the device so that it'd be safe for them no matter how loud they play [11], while others would prefer to be able to decide autonomously about their listening habits [11].
- Scientific evidence of the causes of hearing loss can help people make decisions about their hearing habits [4, 9, 20]. One study showed that young people would listen to and believe their parents if warned about the possibility of loud music causing hearing loss [4]. In regard to warnings from others to turn down the volume, one study noted that many respondents wouldn't act on them [24]. About half of the respondents in one study thought that it was important to obey manufacturers' warnings regarding safe use of PLDs [7].
- Evocative imagery using hearing aids may be an effective approach in hearing protective health campaigns for motivating safer listening practices with PLDs in young adults [28].

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