

The Prevalence of Auditory Risk Factors in Using Mobile Phone

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Abstract

This study investigates the prevalence of auditory risk factors associated with mobile phone usage, especially in young and middle-aged people. The targeted groups are young people, whose ages are limited between 15 to 25, and middle-aged people between 26 to 45. The community people resided in Dhaka. Through quantitative research with very structured questionnaires regarding the risk factors of using mobile phones, this work will assess two groups of people along with compare and contrast between two groups about hearing-related issues in mobile phone users, including prolonged exposure to high volumes and frequent use of headphones, the research sheds light on the widespread nature of auditory risks in contemporary mobile phone usage. This research highlights the urgent need for public awareness campaigns and regulatory measures to mitigate these risks and protect users' hearing health.

Keywords: Auditory Risk factor, mobile phone usage, young people, middle-aged people.

1. Introduction

Auditory risk refers to any exposure to danger related to the sense of hearing. The chance of auditory risk is increasing for the extreme mobile phone usage. However, Prevalence quantifies the proportion of individuals in a population who have the disease, and proportion discusses the fraction, the part, or the number of individuals in the population with certain features. The range of the proportion is always between 0 and 1. This research assesses the proportion of individuals with the disease by analyzing the prevalence of auditory risk factors in mobile phone use.

1.1 Statement of the problem

Mobile phones play a vital role in day-to-day regular life. However excessive usage of it may cause multiple issues like hearing loss, tinnitus, headache, brain trauma, middle ear pathology, vertigo, blurred vision, sleep disturbance, insomnia, itchy ear, depression, anxiety, stress. These issues are very burning and regularly increasing due to uncontrollable usage of mobile phone. Auditory risks are now unimaginable due to mobile phone use. This study will show case how the risk factors work differently for different person and how someone is becoming diseased and someone is not.

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1.2 Research Objective

Firstly, we aim to analyze the auditory risk factor among young aged 15 to 25. Secondly, our goal is to analyze the auditory risk factor among middle-aged 26 to 45. Thirdly, we will make a comparison and contrast between these two groups. Fourthly, we will sort out the percentage of prevalence. After comparing the prevalence, our final target is to identify which group is most at risk due to prolonged mobile usage.

2. Literature Review

Since 1983, mobile phones have been available. Their use has expanded quickly and broadly. In modern times, having a mobile phone as a communication tool is essential to living. More than 2.14 billion individuals worldwide were reported to be using mobile phones in 2005, and by 2010, that quantity is predicted by an increasing rate from 90% to 6 billion people (P. Velayutham et al, 2014).

In a study, it was mentioned that Noise-related hearing degradation is a societal as well as public-related health concern. Lack of attention, irritation, and more overheating in the ear revealed the most common complaints in undergraduates period ranging from 19 to 25 years using communal platform and headphones (Feroz et al, 2016).

In 2006 there was an investigation of how using a cell phone affects hearing utilizing frequencies between 500 and 4,000 Hz & it was found that prolonged experience of the electromagnetic domains created by cellular phones is linked to damage hearing (Oktay MF et al, 2006).

Although smartphones have improved our lives and are now necessary for daily tasks, excessive and unrestrained usage of them might lead to " Mobile device dependency "(MDD). MDD is a growing global community health concern, especially for Juveniles. During the period spanning July 2021 to February, there was a inspection conducted among 440 young adults in Bangladesh who met the eligibility requirements completed an online survey, providing a data. According to the study's findings, 61.4% of young adults exhibited cellular device addicts. Participants who were hooked to their smartphones were prone to reduced physical activity, Sleep deprivation, Bulky or obesity, and engaging in unsafe phone usage while driving, roaming, or gobbling. Furthermore, the MDD group was possibly to suffer physiological and psychological health issues (Ratan, Z. A et al, 2022).

Overuse of mobile phones might raise the pure tone threshold in relation to exposure length. Human hearing may be harmed by use for more than five years at a frequency of more than sixty minutes per day. According to Shafique, M et al, in 2019, it was found that, participant's right ear bone conduction and air conduction hearing thresholds at all frequencies were significantly higher than the compare groups. With the exception of bone conduction at frequencies of 4 and 6 (kilo hertz) kHz, similar results were observed in the left ear. Sensory neuronal hearing loss was the result of excessive mobile phone use; 84% of those who used their phones for more than 60 minutes a day experienced this condition, compared to 20% of those who used them for less than 60 minutes (Shafique M, 2019).

In 2022, in a study it was found that when a person use a mobile phone to talk it comes close to head and this causes a lot of damage to inner ear organ of corti due to phone radiation. It also causes a great hamper to the brain and other tissues on the side of exposure (Greger, Michael, 2022).

The use of mobile phones has expanded substantially during the last decade. They are now an important aspect of business, commerce, and communication, but their use may cause health issues. In 2005, a study was conducted on 873 (57.04% of males and 39.86% of females) people using mobile phones to observe mobile phone usage. The study discovered a link between mobile phone use and hearing and vision problems. About 34.59% of complaints were about reduced hearing, ear soreness, and or warmth on the ear, and 5.04% were about decreased and/or hazy vision. The study also found that using a mobile phone increases the risk of certain health problems. As a result, it is advised that excessive mobile phone use be avoided and that social awareness be raised through public health events like presentations and group discussions as well as through media outlets, both print and electronic (Meo, S. A., & Al-Drees, A. M. 2005).

The findings of a study titled "Mobile phones: influence on auditory and vestibular systems" about the relationship between mobile phone radiation and the possibility of developing an acoustic neuroma are debatable, some writers report that using analog cell phones for ten or more years increases the chance of acquiring a tumor, others did not find any evidence of a higher risk of tumor development in mobile phone users. Acute microwave radiation exposure has no effect on the electrical characteristics of the cochlear nerve, the vestibular system physiology in humans, or the function of the cochlear outer hair cells in vivo and in vitro. Digital mobile phones produce electromagnetic interference that is more prone to affect analog hearing aids. There is no proof that cell phones have caused a cochleo-vestibular injury (Balbani, A., & Montovani, J. 2008).

Over a three-year period, the impact of mobile phone usage on the hearing of 120 individuals and nonusers age range between 18–30 was investigated. Group 2 has either not used a mobile phone at all or has used one for less than a year, whereas Group 1 has used a mobile phone for more than a year for more than an hour every day. Losses of 5 dB in 10%, 10 dB in 3.3%, and 15 dB in 1.6% were observed in those who used phones for two to three hours a day. Also, those who used for three to four hours a day reported a loss of 5 dB in 6.6% and 10 dB in 3.3%. In the study group, 26.6% of the participants had sensorineural hearing loss, whereas in the control group, 3.3% had it. According to this research, there is no discernible hearing loss in mobile phone users (Chandra, M. et al. 2013).

The incidence of auditory risk factors associated with mobile phone use in Bangladesh is growing due to widespread use. Increased mobile phone ownership has improved access to healthcare services such as maternal and child care, immunization coverage, and disease management (Kibria et al., 2023). Despite multiple studies, there is a lack of study on auditory dangers from cell phone use in Dhaka. This gap encouraged us to undertake research and create questionnaires.

3. Methodology

3.1 Participants and Site

400 participants are there and the site is in Dhaka North.

3.2 Instruments

A structured interview questionnaire was used to collect the quantitative data.

3.3 Data Collection Method

A questionnaire was used to gather information from mobile phone users on their exposure to mobile phones and auditory health issues. There was a set of 10 closed-ended questions in the survey on the participant's mobile phone usage patterns (such as how frequently they use their phone, what they use it for, and how loud they set the level), as well as any auditory issues they may have experienced (such as tinnitus, hearing loss, or ear pain). Includes data about the participants' demographic data. The researcher gathered information from participants using a Google form and printed paper distribution among the two participant categories. The study includes young age (15-25) and middle age (26-45) mobile phone users.

4. Data Analysis and Result

4.1 For young age people (15-25)

Table 1: Use of mobile phone

Response	%
Yes	99
No	1

Just 1% of respondents said they do not use a cell phone, compared to 99% who said they do.

Table 2: Hours use to talk over phone

Duration	%
Less than 1 hour	20
2 hours	31
3 hours	40
More than 4 hours	9

The box represents the distribution of phone call durations, with 20% of calls lasting less than 1 hour, 31% at 2 hours, 40% at 3 hours, and 9% lasting more than 4 hours.

Table 3: Hours use phone including screen time, to talk over

Duration	%
Less than 1 hour	5
2 hours	5
3 hours	15
More than 4 hours	80

This box represents the distribution of phone usage hours, with 80% of people using their phones for more than 4 hours, 15% for 3 hours, and 5% for 2 hours or less.

Table 4: Usage of ear phone while talking over mobile phone

Response	%
Yes	97
No	3

This represents the percentage of people who use earphones while talking on a mobile phone, with 97% indicating they do and 3% indicating they don't.

Table 5: Facing any problems after talking over phone

Category	%
Headache	5
Earache	7
Increased temperature of ear	25
Increased temperature of head	0
Redness of the ear	1
Blurred vision	1
vertigo	3
Itchy ear	8
Others (Tinnitus, reduced sound perception etc.)	50

The majority of issues are related to ear-related discomfort and complications, with increased ear temperature being the most common problem, followed by itchiness and earaches. Other problems, such as tinnitus and reduced sound perception, account for a significant percentage of reported issues. Less common problems include headaches, blurred vision, vertigo, and redness of the ear.

Table 6: Facing problem in noisy environment while talking over phone

Response	%
Yes	65
No	35

According to the data, 65% of respondents reported facing problems when talking on the phone in noisy environments, while 35% did not encounter such issues.

Table 7: Volume range while talking over phone

Category	%
Normal	10
Moderate	60
High	30

The distribution of the volume ranges while talking over the phone. It shows that 10% of the time, the volume is at a normal level, 60% at a moderate degree, and 30% at a higher intensity.

Table 8: Observing any sleep disturbances after using phone for long duration

Response	%
Yes	35
No	65

Sleep disturbances are observed after using the phone for an extended period. It indicates that 35% of respondents experienced sleep disturbances (Yes), while the majority, 65%, did not (No).

Table: 9: Screen time exposure

Category	Don't use	more than 30 mins	1-2hours	2-3 hours	more than 3 hours
YouTube	10	70	20		
Music	5	50	15	30	
Gaming	0	4	6	10	80
Video call	60	35	3	2	
Other applications	25	25	60		

The numbers in the box represent the amount of time spent on these applications in different time ranges: less than 1-2 hours, 2-3 hours, and more than 3 hours. The numbers indicate the extent of usage in each category for different time periods.

Table 10: Awareness about risk

Response	%
Yes	85
No	15

This represents survey responses regarding awareness of risk. It shows that 85% of the respondents are aware of the risk, while 15% are not.

5.2 For Middle-aged Group: 26-45

Table 1: Use of mobile phone

Response	%
Yes	99
No	1

The vast majority of people use mobile phones, with 99% of individuals incorporating them into their daily lives.

Table 2: Hours use to talk over phone

Duration	%
Less than 1 hour	20
2 hours	20
3 hours	6
More than 4 hours	55

This data provides a breakdown of the percentage of phone call durations. Twenty percent of the time, calls are less than 1 hour, another 20 percent are 2 hours long, 6 percent last for 3 hours, and the majority, at 55 percent, exceed 4 hours.

Table 3: Hours use phone including screen time, to talk over

Duration	%
Less than 1 hour	40
2 hours	30
3 hours	5
More than 4 hours	25

This box chart represents the distribution of phone usage, with 40% using it for less than 1 hour, 30% for 2 hours, 5% for 3 hours, and 25% for more than 4 hours, including screen time and talking.

Table 4: Usage of ear phone while talking over mobile phone

Response	%
Yes	15
No	85

The box indicates that only 15% of people use earphones while talking on a mobile phone, while 85% do not.

Table 5: Facing any problems after talking over phone

Category	%
Headache	10
Earache	7
Increased temperature of ear	15
Increased temperature of head	1
Redness of the ear	2
Blurred vision	5
vertigo	10
Itchy ear	5
Others (Tinnitus, reduced sound perception etc.)	45

After talking over the phone, some people may experience various issues, with the most common problems being headache (10%), earache (7%), increased temperature of the ear (15%), increased temperature of the head (1%), redness of the ear (2%), blurred vision (5%), vertigo (10%), itchy ear (5%), and other issues like tinnitus and reduced sound perception (45%).

Table 6: Facing problem in noisy environment while talking over phone.

Response	%
Yes	85
No	15

This information represents the issue of facing challenges when talking on the phone in a noisy environment, with 85% of respondents confirming the problem.

Table 7: Volume range while talking over phone

Category	%
Normal	5
Moderate	25
High	70

This box represents the volume range for phone conversations, with categories ranging from Normal (5%), Moderate (25%), to High (70%).

Table 8: Observing any sleeps disturbances after using phone for long duration

Response	%
Yes	75
No	25

This box summarizes that 75% of people reported sleep disturbances after using their phone for a long duration, while 25% did not.

Table: 9: Screen time exposure

Category	Don't use	more than 30 minutes	1-2 hours	2-3 hours	more than 3 hours
YouTube	20	70	10		
Music	60	35	5		
Gaming	70	4	25	1	
Video call	60	35	3	2	
Other applications	70	25			

This table represents the average time spent on various activities, such as YouTube, Music, Gaming, Video calls, and other applications, categorized by different time intervals ranging from less than 30 minutes to more than 3 hours.

Table: 10: awareness about risk

Response	%
Yes	55
No	45

4.3 Prevalance rate of diseases

4.3.1 Young Aged Group: 15-25

According to the data reported in this table, the majority of young individuals (50%) experienced tinnitus or reduced hearing sensitivity as a result of prolonged exposure to mobile phones. 42% claimed to have related auditory and vision impairments. The remaining 8% of the group reported having headache and vertigo.

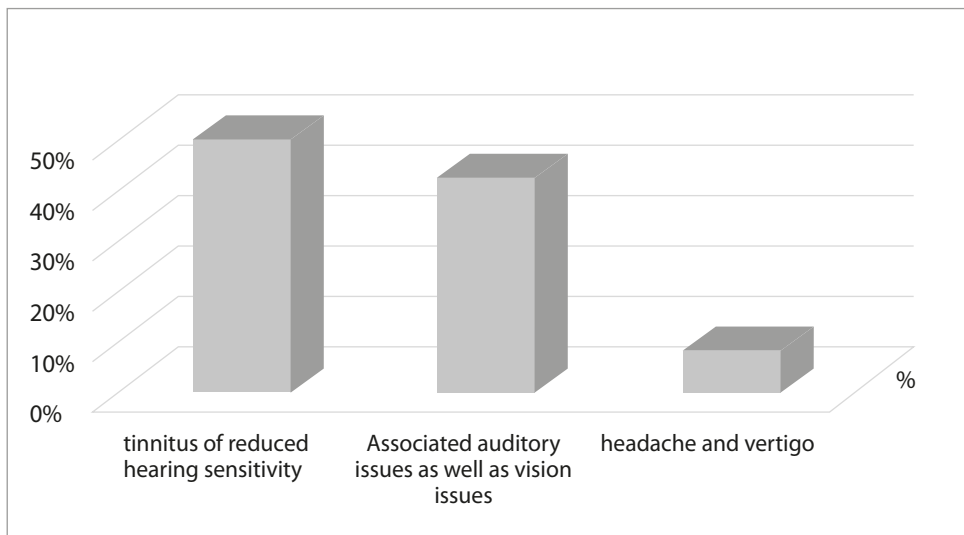


Chart 1: Prevalence rate of diseases in young age people.

4.3.2 Middle-Aged Group: 26-45

The majority of middle aged people (45%), as a result of prolonged exposure to mobile phones, experienced tinnitus or decreased hearing sensitivity, per the data presented in this table. 44% claimed to have visual and auditory problems that were connected. Vertigo and headaches were reported by the remaining 20% of the sample.

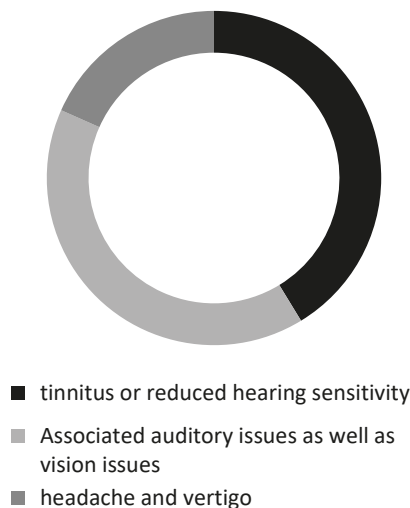


Chart 2: Prevalence rate of diseases in middle age people.

4.4 Compare and contrast between two generations

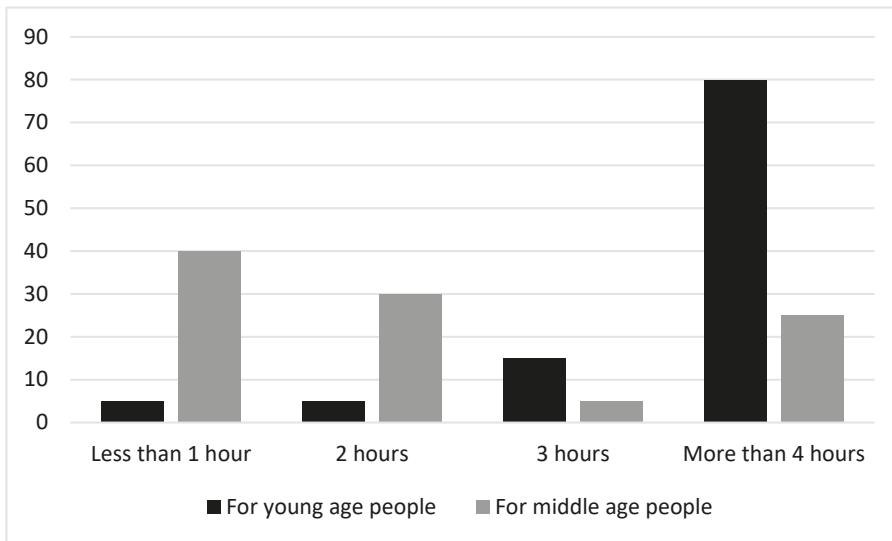


Chart 3: Hours use phone including screen time, to talk over

Young people predominantly use their phones for more than 4 hours daily (80%), whereas middle-aged individuals primarily use their phones for less than 1 hour (40%) or 2 hours (30%) daily. Notably, only 5% of both age groups use their phones for exactly 2 hours daily.

Table 1: Usage of ear phone while talking over mobile phone

Response	For young age people	For middle age people
Yes	97	15
No	3	85

The table shows responses to a question categorized by age groups: 97% of young people answered "Yes" while 3% answered "No," whereas 15% of middle-aged people answered "Yes" and 85% answered "No."

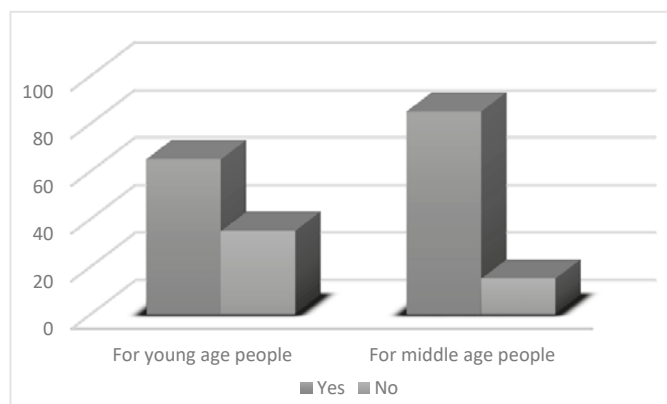


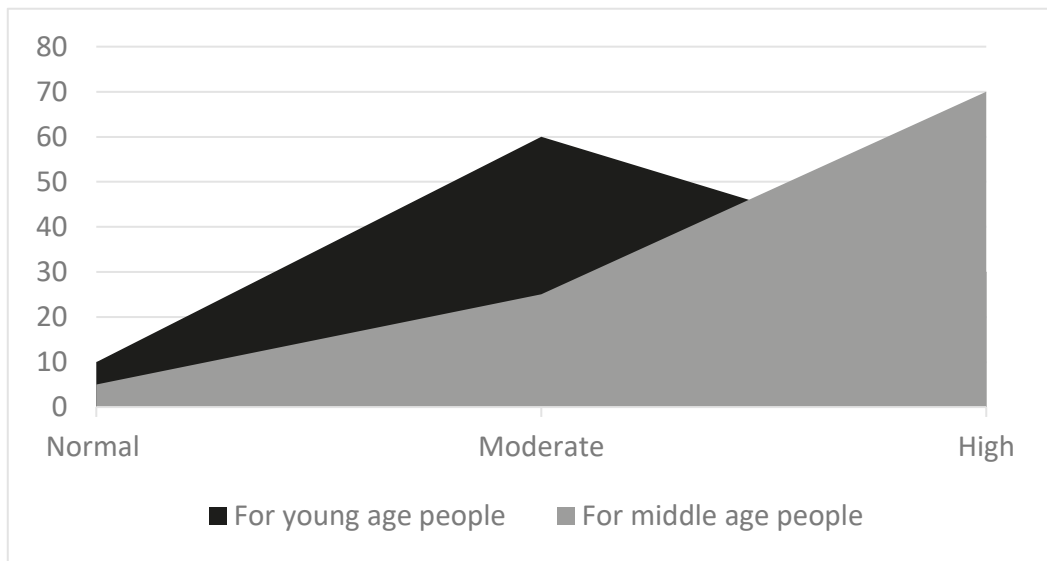
Chart 4 : Problems faced in a noisy environment while talking over the phone

Among young people, 65% responded "Yes" and 35% responded "No." For middle-aged people, 85% responded "Yes" and 15% responded "No."

Table 2: Volume range while talking over the phone

Category	For young age people	For middle age people
Normal	10	5
Moderate	60	25
High	30	70

The table shows that among young people, 10% have normal, 60% have moderate, and 30% have high values, while among middle-aged people, 5% have normal, 25% have moderate, and 70% have high values. This indicates a trend of increasing high values with age.

**Chart 5: Volume range while talking over the phone****Table 3:** Awareness of risk

Response	For young age people	For middle age people
Yes	85	55
No	15	45

The table shows that 85% of young people and 55% of middle-aged people are aware of risks, while 15% of young people and 45% of middle-aged people are not aware. The data indicates a higher awareness of risk among younger individuals compared to middle-aged individuals.

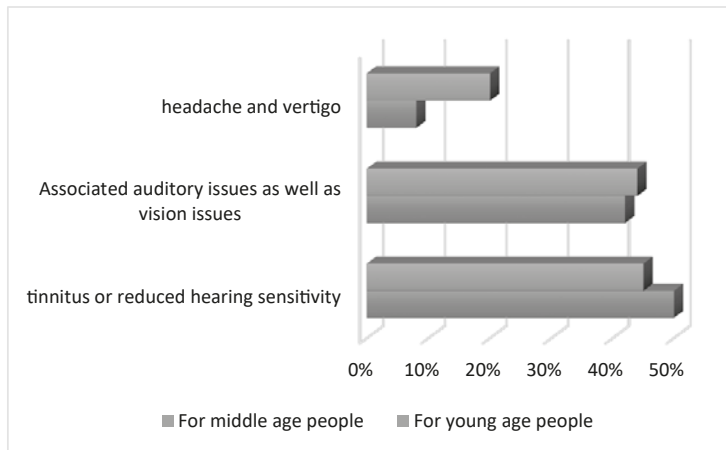


Chart 6: Prevalence rate of diseases

The prevalence rates of tinnitus or reduced hearing sensitivity are 50% for young people and 45% for middle-aged people, while associated auditory and vision issues affect 42% and 44% of these groups, respectively. Headache and vertigo are reported by 8% of young people and 20% of middle-aged people.

5. Discussion

According to the survey, 47.5% of people in the middle and younger age groups reported having tinnitus or decreased hearing sensitivity as a result of extended use of mobile phones. 38.5% reported having related problems with both hearing and vision. Merely 14% of respondents reported experiencing dizziness and headaches. The study also showed that sleeplessness and decreased speech intelligibility were common symptoms among those who spent extended periods of time using a cell phone. After talking over the phone, some individuals may experience various problems, with the most common issues being earache (7%), increased temperature of the ear (20%), headache (7.5%), and other symptoms like tinnitus or reduced sound perception (47.5%). These issues can be attributed to prolonged phone usage and potential electromagnetic radiation exposure. Additionally, the researchers found that consumers were not aware of the auditory dangers associated with prolonged use of mobile phones.

6. Scopes and Limitations

This research has multiple scopes in the field of audiology and public health. This study explains the depth of understanding of the use of mobile phones and the auditory risk factors and how our body and mind react to this. As we conducted this research combining two different generations, we may be able to understand their issues more specifically. Also, the readers are getting knowledge about the probable risk of auditory problems.

Though we can find many possible benefits of our research, there are some significant limitations of this paper. We have taken our participants from Dhaka only, so our paper cannot be a reference in general. We could not do any clinical examination; that is another limitation of this paper. If we could do a blinded RCT and clinical study, then this paper would be more authentic. Shortly, we will extend this study clinically.

7. Conclusion

The survey found a high prevalence of auditory and associated disorders as a result of prolonged mobile phone use, such as tinnitus, decreased hearing sensitivity, dizziness, and headaches. Sleeplessness and reduced speech intelligibility were among the most common symptoms. Prolonged phone use and probable electromagnetic radiation exposure exacerbate these issues. Consumers are unaware of the auditory hazards associated with mobile phone use. Balancing the benefits of mobile phone use against potential auditory dangers is critical, particularly in healthcare settings, necessitating additional study and treatments to prevent these concerns.

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