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## RESEARCH ARTICLE

# STUDY OF PATTERN OF USE OF PORTABLE LISTENING DEVICES AND HEALTH PROBLEMS RELATED TO IT AMONG COLLEGE STUDENTS FROM DELHI

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**ABSTRACT**

The popularity of portable listening devices (PLDs) including iPods has increased dramatically over the past decade. Many of them use earphones for prolonged periods at high sound that may pose a risk for hearing loss; and accidents because of their use even on road.

**Objective:** To study the knowledge, attitude, practices and health problems related to the use of Portable Listening Devices among college students of Delhi. Settings and design: cross sectional, descriptive study conducted among college going students of Delhi in the year 2016.

**Materials and Methods:** The study was undertaken among 399 students from 8 different colleges of Delhi in the year 2015. A 27-item, pre-tested, semi-structured, self-administered questionnaire was used. Data was analyzed using SPSS Version 16, Chi-square test for association was used and $P<0.05$ was considered statistically significant.

**Results:** 67.2% students listened to Portable Listening Devices every day, and 61.2% used them for more than an hour. Most common Portable Listening Device used is mobiles. 28.3% students listened to music at high volume. 72.2% students faced one problem or the other due to the use of Portable Listening Devices. 5.5% students have already been in some kind of accident due to use of earphones. Maximum percentage of subjects perceived the same period of use of Portable Listening Devices to be less than ones hour. There was a significant difference in the practice and health problems between males and females; students who stayed alone and who stayed with parents.

**Conclusion:** Use of personal listening devices is a part of lifestyle of an average college going student from Delhi and they need to be educated about various aspects of its use.



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## INTRODUCTION

Portable Listening Devices (PLDs) includes all electronic gadgets like mobiles, MP3 players, iPODs that allow users to listen to music uninterrupted for prolonged periods without disturbing the people around (Rekha *et al.*, 2011). Use of portable listening devices has increased dramatically over the last decade with portable listening devices being used in all the activities like while studying, walking on the road, travelling in bus or metro, driving, exercise, sleep, etc. Studies have shown 83.1% students used portable listening devices regularly with 77.7% of them using them for more than 1 hour/day (Rekha *et al.*, 2011). While using portable listening devices, college students are likely to engage in risky listening behavior. Many respondents can be at risk of injury to themselves and others if they become unaware to surroundings (Danhauer *et al.*, 2012). Subjects could even be distracted while wearing MP3 players (Hoover *et al.*, 2010).

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Apart from unawareness to surroundings, use of portable listening devices also poses risk for hearing loss and other health problems like headache, lack of concentration, difficulty in sleeping, temporary hearing loss, etc. just analogous to occupational noise induced hearing loss. Sine use of PLDs has become a part of lifestyle of college going this research was conducted with the aim to study the practices and attitude regarding the use of portable listening devices among college students and also health problems related to it.

## MATERIALS AND METHODS

This was a descriptive, cross sectional study conducted among students of 8 colleges under Delhi University in the year 2015. A sample size of 358 was calculated by taking into account the prevalence rate of use of Portable Listening Devices as 83.1% (Rekha *et al.*, 2011), relative error of 5% in formula $4pq/l^2$ and a non-response rate of 10%. For data collection, 27-item, pre-tested, semi-structured, self-administered questionnaire was used which had questions pertaining to socio-demographic data, pattern of use of Portable Listening Devices, problems

faced due to their use and attitude of subjects towards use of Portable Listening Devices. Participants were selected from 8 colleges under Delhi University, 4 co-ed colleges each from North Campus and South campus were included in the study to reach the required sample size. Permission was taken from the administration of the college to conduct the study. It was convenient sampling. Students belonging to co-ed colleges were included and students who did not use Portable Listening Devices were excluded. 15 minutes were given to each student to fill the questionnaire and discussion among group of students was discouraged. A total of 450 questionnaires were distributed, of which 399 completed questionnaires were received, giving response rate of 88.66%. Data was analyzed using SPSS version 16, chi-square test for association was used and $p<0.05$ was considered statistically significant.

## RESULTS

A total of 399 students participated in our study. The mean age of participants was 18.93 years. Half of the study population pursued B.Sc. Course (50.4%); and maximum students stayed with parents (67.7%). Majority of students listened to portable listening device everyday (67.2%). As many as 67.2% listened to them for more than one hour. .Most of them had been using Portable Listening Devices since past 1-5 years (Table1).

**Table 1. Socio-demographic profile of study participants and pattern of use of portable listening devices of students (N=399)**

| Age (in years) | n (%) |
|---|---|
| 16- 18 | 159 (39.8%) |
| 19- 21 | 233 (58.4%) |
| 22- 24 | 6(1.6%) |
| 25- 27 | 1(0.3%) |
| Sex | n (%) |
| Male | 214(53.6%) |
| Female | 185(46.4%) |
| Course | n (%) |
| B.Sc. | 201(50.4%) |
| B.A. | 147(36.8%) |
| B.Com. | 51(12.8%) |
| Stay | n (%) |
| With Parents | 270(67.7%) |
| Alone | 129(32.3%) |
| Frequency of use in a week | n (%) |
| Everyday | 268(67.2%) |
| >3 times | 51(12.8%) |
| Thrice | 15(6.3%) |
| Twice | 29(7.3%) |
| Once | 26(6.5%) |
| Frequency of use in a day | n (%) |
| <1 hour | 155(38.8%) |
| 2 hour | 109(27.3%) |
| 3 hours | 63(15.8%) |
| 4 hours | 27(6.8%) |
| >5 hours | 45(11.3%) |
| Duration of use of PLDs | n (%) |
| <1 year | 73(18.3%) |
| 1-5 years | 230(57.6%) |
| >5 years | 96(24.1%) |

252 (63.2%) students preferred to listen to soft music while 118 (29.6%) hard music and 20 (7.3%) listened to all kinds of music using PLDs. Of the total students, 113 (28.3%) students listened to music at high volume, while 252 (63.2%) and 34 (8.5%) preferred medium and low volume respectively (high, medium & low volume were subjective). Of the 113 who listened to high volume, 39(34.5%) wanted to get totally lost in the music, 34(30.1%) wanted to feel the beat, 18(15.9%) perceived that loud music made them feel better when they felt lousy while 14(12.4%) claimed to be able to concentrate better while using high volume. Portable Listening Devices were most commonly used while travelling in bus/ metro 327 (82%). 203 (50.90%) used Portable Listening Devices while walking on road, while 136 (34.1%) students kept their Portable Listening Devices plugged in even while sleeping. The use of Portable Listening Devices during various activities has been depicted in Figure 1.

**Table 2. The preference for type of portable listening devices among college students of Delhi (N=399)**

| Type of Portable Listening Devices(PLDs) | n (%) |
|---|---|
| Mobile | 269(67.4%) |
| Multiple | 81(20.3%) |
| i-pod | 31(7.8%) |
| F.M. Player | 14(3.5%) |
| Any Other | 4(1%) |
| Total | 399(100%) |

The most popular portable listening device in our study population was mobile phones (67.4%). (Table2)

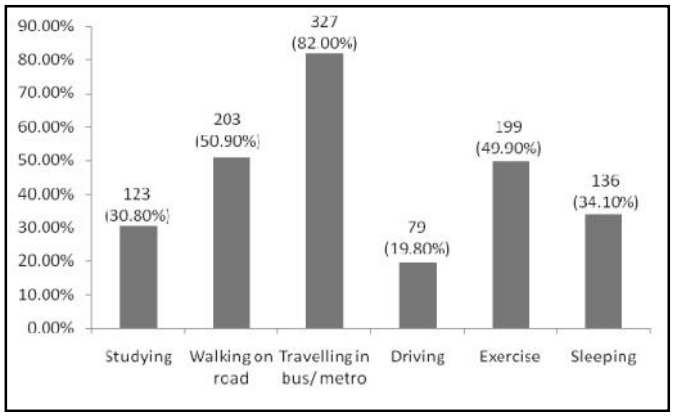


**Figure 1. Bar-graph showing portable listening device use in various activities done by study participants**

Out of a total of 399, 288 (72.2%) students faced one problem or the other due to the use of Portable Listening Devices. 173 (43.4%) faced unawareness to surroundings.22 (5.5%) students out of 399 had already been in some kind of accident due to their use. Other problems faced by the users are shown in table 3. When students were categorized for number of hours of use of Portable Listening Device and test of significance was applied for various problems faced, it was found that students who used Portable Listening Devices >1 hour/day experienced more fatigue as compared to those who used it for <1 hour ($p=0.045$). Perception of study subjects regarding the safe period of Portable Listening Devices use is shown in Figure 2. A maximum of subjects perceived that the safe period of use of PLDs to be less than one hour which does coincide with the actual practice (38.8%). 107(26.80%) out of 399 worried about the ill effects of PLDs but still used and 42(18%) had no idea about the ill effects. Perception of students regarding the future consequences of use of Portable Listening Devices is shown in Figure 3. 206 (51.6%) study subjects shared their earphones with their family/ friends. Regarding the frequency of cleaning earphones used with Portable Listening Devices, 149 (37.3%) cleaned their earphones when it looked dirty, 99 (24.8%) admitted to have never cleaned their earphones, while 88 (22.1%) and 63 (15.8%) cleaned their earphones after every use and daily respectively. However, not these many students actually cleaned their earphones after every use as claimed. This result might have been obtained as students were embarrassed to admit that they did not clean their ear-phones regularly.

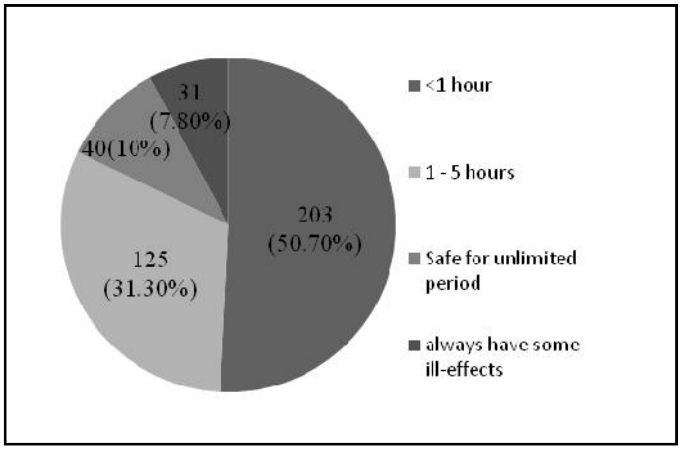


**Figure 2. Pie-chart showing perception of students regarding the safe period of use of portable listening devices**

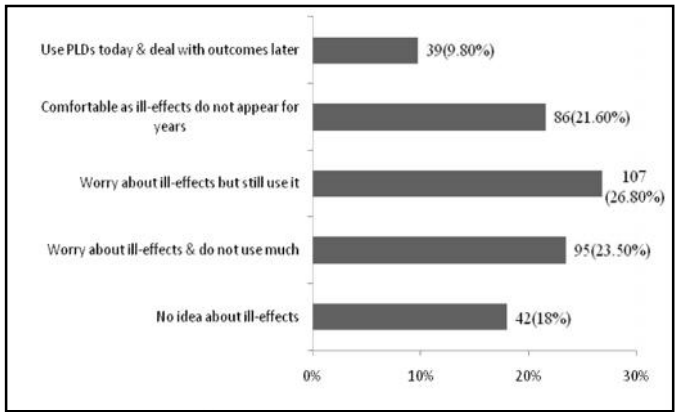


**Figure 3. Bar-graph showing attitude of study participants regarding future consequences due to use of portable listening devices**

On applying tests of significance, there was a significant difference between the students who stayed with parents and who stayed alone with respect to frequency of use of PLD in a week (p =0.004), use of PLD during study (p =0.002) and behavioral change with the use of PLD (p=0.012), all of them being more in students who stayed alone.

**Table 3. Health problems faced by study participants due to use of portable listening devices**

| Health problems faced *multiple responses possible | n (%) |
|---|---|
| Any problem faced | 288(72.2%) |
| Unawareness to surroundings | 173(43.4%) |
| Headache | 115(28.8%) |
| Lack of concentration | 101(25.3%) |
| Buzzing sound in ear | 89(22.3%) |
| Hard of hearing while conversing | 87(21.8%) |
| Soreness in ear after listening to music | 78(19.5%) |
| Behavioral change | 71(17.8%) |
| Temporary hearing loss | 56(14%) |
| Difficulty in sleeping | 49(12.3%) |
| Fatigue | 41(10.3%) |
| Mental blogging | 41(10.3%) |
| Any injury or accident due to use of P.L.D. | 22(5.5%) |

A significant association between duration of use and volume listened to was found with students using PLDs for >1 hour in a day listening to higher volumes (p=0.019). There was no significant relation between the type of earphone used (hard bud/soft bud) and soreness in the ear (p=0.184). However, more problems were associated with the use of hard bud earphones than soft bud (p =0.037). The problems faced due to PLD use were significantly more in those who used it while walking (p =0.019). This might be because a large percentage of study population (50.9%) used PLDs while walking. There was no significant association between the problems faced by the users and frequency of use, duration of use, numbers of years of use, music volume and music type. Females have been using plds for longer duration as compared to males and males were less worried about the future consequences of use of plds and this difference is statistically significant as shown in table4.

**Table 4. Association of sex with study variables**

| Association of sex with study variables | |
|---|---|
| Females used earphones for a greater number of years than males | p= 0.002 |
| Females had more difficulty in sleeping than males | p= 0.006 |
| Females preferred soft bud earphones over males | p= 0.03 |
| Males faced more behavioural change over females | p= 0.019 |
| Males faced more temporary hearing loss over females | p= 0.044 |
| Males used Portable Listening Device because of peer pressure | p= 0.006 |
| Males found use of Portable Listening Device to be cool | p= 0.0001 |
| Males worry less about future consequences | p= 0.04 |

## DISCUSSION

This study was conducted to evaluate the knowledge, perceptions and practices of college students regarding the use of Portable Listening Devices. This study would help us shed light on to the current patterns of Portable Listening Devices use, and its harmful health effects as perceived by them. Most of our study subjects belonged to the age group of 18-20 years which is similar to that of study population in Coastal South India (Rekha *et al.*, 2011). Majority of the study population used mobile phones (67.4%), while in studies conducted in Korea (Kim *et al.*, 2009) and Toronto (Shazia Ahmed *et al.*,) MP3 players was the most commonly used Portable Listening Devices. Majority of study subjects used Portable Listening Devices for more than an hour (61.2%) which is similar to the findings of Coastal South India (77.7%) (Rekha *et al.*, 2011). However, in studies conducted in Korea (47.6%), (Kim *et al.*, 2009) Alabama USA (51.7%) (Kanobel *et al.*, 2012) and California (50%) (Torre, 2008) the proportion of students using Portable Listening Devices for more than 1 hour was lower as compared to our study. The higher proportion of students using Portable Listening Devices for more than 1 hour/day could be attributed to the fact that we had included all the types of Portable Listening Devices in our study. It has been stated that regular use of Portable Listening Devices for more than an hour a day may have an impact on hearing (Fligor and Cox, 2004). In our study, most (57.6%) of the students had been using Portable Listening Devices since past 1-5 years which is similar with the findings of Coastal South India (48.4%) (Rekha *et al.*, 2011). Although in a study conducted in Netherlands, (Ineke Vogell *et al.*, 2010) a significant association between students staying alone and their use of earphones for > 5 hours was found, no such association was found in our study. 63.2% students listened to medium volume in our study as compared to 66.3% in the study conducted in Coastal South India (Rekha *et al.*, 2011). In our study 28.3% subjects listened to music at high volume as compared to 22.2% in study in Coastal South India (Rekha *et al.*, 2011) and 33% in U.S.A (Danhauer *et al.*, 2009). A significant association between duration of use and volume listened to was found with students using Portable Listening Devices for >1 hour in a day listening to higher volumes (p=0.019). However, in study

conducted by Coastal South India, (Rekha *et al.,* 2011) this was found to be statistically insignificant. Also in our study, we found that students who use Portable Listening Devices during walking, travelling, driving, exercise and sleeping tended to use them for more than 1 hour, all of which were found to be statistically significant with p values of 0.0001, 0.016, 0.001, 0.011, and 0.001 respectively. However, only use of Portable Listening Devices during the exercise was more among those using them ≥ 1 h in study conducted by Coastal South India (Rekha *et al.,* 2011). 34.1% students sleep with earphones plugged in compared to 24.2% in Coastal South India (Rekha *et al.,* 2011). This may be attributed to the difference of health awareness among the medical students and non-medical students. 28.2% students reported headache, 25.3% lack of concentration, 22.3% buzzing sound in the ear, 17.8% behaviour change which was found to be more than that in Coastal South India (Rekha *et al.,* 2011) which were as 16.71%, 21.1%, 18.7%, and 14% respectively. The problem of temporary loss of hearing (14%) was similar to the findings of Coastal South India (12.4%) (Rekha *et al.,* 2011). Students of Coastal South India (Rekha *et al.,* 2011) had a greater difficulty in sleep (35.3%). This may be due the higher stress levels in medical studies. 21.8% students had a problem of difficulty in hearing while conversing which is less than that of study conducted in Coastal South India (40%) (Rekha *et al.,* 2011). 19.5% experienced soreness in ear after listening to music which is much less than in U.S.A. (33%) (Kanobel *et al.,* 2012).

In our study, a large number of study variables showed statistically significantly association with respect to gender i.e. females had been using earphones for more number of years (p=0.002), experienced more difficulty in sleeping (p=0.006) and preferred soft bud earphones (p=0.03) as compared to males. Males experienced more of temporary hearing loss (p=0.044), behavioural changes (p=0.019), admitted using PLDs under peer pressure (p=0.006) and under the impression that using them is cool (p=0.0001). They also worried less about the future consequences of use of PLDs (p=0.04) than females. In a similar study done by University of Toronto, (Portnuff *et al.,* 2011) females preferred lower volume (intensity of sound) as compared to males. 50.7% felt that safe period for listening to music was <1hour which was perceived as 3-5 hours as found out by the study conducted by Coastal South India (72.4%) (Rekha *et al.,* 2011) and less than 2 hours in U.S.A (Kanobel *et al.,* 2012). In the study conducted in Coastal South India, ( Rekha *et al.,* 2011) students who used PLDs for >1 hours complained of reduced concentration which was statistically significant but there was no significant association between the problems faced by the users and frequency of use, duration of use, numbers of years of use, music volume and music type in our study.

**Recommendation**

Information, education and communication activities regarding safety margin, type of earphones to be used, importance of cleaning them and various warning signs of problems should be conducted. Legislative measures like banning earphone use on road, be it the driver or the pedestrians, should be undertaken.

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