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Auditory Hazards of Social Media and its Digital Devices among University Students in Dhaka City

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Abstract

***Background:** Excessive use of social media has impaired auditory hazards of the users.*

***Objective:** A cross-sectional analytical study was conducted to identify the auditory hazards of social media users among students of public and private Universities in Dhaka city.*

***Materials and Methods:** A pretested, semi-structured standard questionnaire and randomized sampling technique was used to collect the data, the number of calculated sample size was 726.*

***Results:** Mean age of the public and private university students was 21.55 ± 1.93 and 21.14 ± 1.62 years. About 40.50% and 46.30% students of public and private University had auditory disorders. Study showed that 18.70%, 15.20%, 3.90%, 11.30%, 9.60% and 3.90% students of public University had pain in the external ear, middle ear, tinnitus, and temporary hearing loss after removal of headphone, auditory hallucination, and auditory processing disorders respectively whereas among private university students it was 26.40%, 16.00%, 6.30%, 13.20%, 10.70% and 5.80%. Among the respondents headphone positively influenced the problem of ear of the respondents of both public (r= 0.204) and private (r= 0.271) Universities.*

***Conclusion:** Social media has a lot of auditory hazards among the students of both public and private University in Dhaka city.*

Keywords: *Social Media, Headphone, and Auditory Hazards.*

Background

Noise related hearing loss is the social and public health problem. Loss of concentration, irritability and heated in ear were the prominent complained among the students aged 19 to 25 years those who used social media and using tools as a head phone (Feroz et al, 2016). Extensive usage of mobile phone which hazardous effects of auditory functions, whereas auditory functions deteriorate with increasing years and hours of mobile phone use (Nair et al, 2016). It was found that noise-cancelling headphone beneficial in reducing the risk of hearing damage where as high volume music listening levels lead to hearing problems (Liang et al, 2012). Earphones are a pair of small listening devices that are design to be worn on or around the head over a users' ear. It is small device that directly fitted to the ear or inserted in the ear cannel (Sharma, 2019). It was found that adolescents with severe to profound hearing loss due to listening louder sound levels for longer periods by use of headphone whereas sound level more than 85 dB for occasional used of device causes hearing loss (Widen et al, 2018). Prolonged heard of music by the use of headphone lead to hearing loss of the users (Reddy and Thenmozhi, 2018). There was significance difference in average air conduction and bone conduction hearing threshold of exposed and non exposed to mobile phone among medical students (Das et al, 2017). Study found that 79% of the respondents use headphone or portable music device among the respondents 61.83% had often used headphone, 34.35% used long period and

37.40% used headphone at high volume (Herrera et al, 2016). Of the respondents 58% of the social media users were willing to participate the study and they got treatment whereas experiences with auditory hallucination (Crosier et al, 2016). Global system mobile communication and code division multiple access phone users were having higher risk than nonusers whereas long duration and intensive mobile phone use may cause damage cochlea as well as auditory cortex (Panda et al, 2011). High frequency loss and absent distortion product otoacoustic emission that indicate prolong and intensive use of mobile phone may cause inner air damage (Panda et al, 2010). Mobile phone had lot of adverse effect of health specialty auditory systems, mobile phone generate potential harmful radiofrequency electromagnetic field particularly hearing aspect, whereas dominant ear was worse than nondominant ear (Kerekhanjanarong et al, 2005).

Materials and Methods

A cross-sectional analytical study was conducted to identify the auditory hazards of social media among University Students of public and private University in Dhaka city with 726. This study sites in Dhaka University and Daffodil International University. A pretested, semi structured questionnaire was used to collect the data on the basis of objective and variables. The data were analyzed by using statistical packages for social sciences (SPSS) software, version 20 for windows.

Results

Table 1. *Distribution of respondents by socio-demographic variables (n=726)*

	Group	Public University		Private University	
		Frequency	Percentage	Frequency	Percentage
Age in years	≤ 20	120	33.10	148	40.80
	21-25	232	63.90	209	57.60
	≥26	11	3.00	6	1.70
	Total	363	100	363	100
	Mean ± SD	21.55 ± 1.93		21.14 ± 1.62	
Gender	Male	243	66.90	228	62.80
	Female	120	33.10	135	37.20
	Total	363	100	363	100
Year of Education	1st year	61	16.80	156	43.00
	2nd Year	81	22.30	89	24.50
	3rd Year	88	24.20	66	18.20
	4th Year	73	20.10	44	12.10
	Post Graduate and above	60	16.50	8	2.20
	Total	363	100	363	100

Table 1 shows that 33.10%, 63.90% and 3.00% respondents belonged to age group ≤ 20 years, 21-25 years and ≥ 26 years respectively with mean age 21.55 ± 1.93 years of the respondents of public University compared to the respondents of private university 40.80%, 57.60% and 1.70% with mean age 21.14 ± 1.62 years. It is found that 66.90% of the respondents were male students and 33.10% of the respondents were female students of public University on the other hand 62.80% of the respondents were male and 37.2% of the respondents were female students of private University. Study shows that 16.80%, 22.30%, 24.20%, 20.10% and 16.50% of the students were 1st year, 2nd year, 3rd year, 4th year and post graduate and above respectively of the Public University compare to private University 43.00%, 24.50%, 18.20%, 12.10% and 2.20% of the students were 1st year, 2nd year, 3rd year, 4th year and post graduate and above respectively.

Table 2. *Distribution of respondents by using device (n=726) (Multiple responses)*

Using device	Public University		Private University	
	Frequency	Percentage	Frequency	Percentage
Android Phone	352	97.00	347	95.60
Laptop	150	41.30	243	66.90
Tab	7	1.90	19	5.20
Desk top	25	6.90	70	19.30

Table 02 reveals that 97.00% of the respondents of public University used android phone, 41.30% used laptop, 1.90% used tab and 6.90% used desktop compared to the respondents of private University 95.60 % used android phone, 66.90% used laptop, 5.20% used tab and 19.30% used desktop.

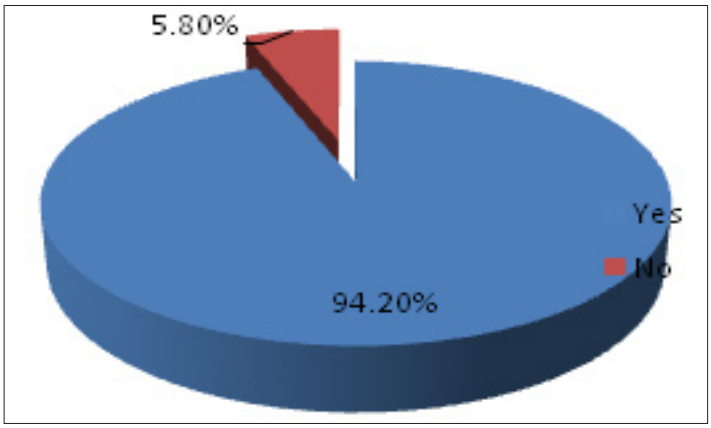

Fig 1a. *Distribution of respondents by use headphone (Public University)*

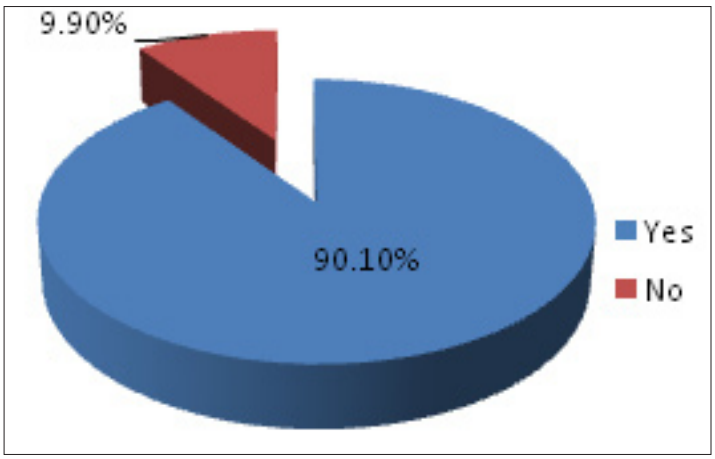

Fig 1b. *Distribution of respondents by use headphone (Private University)*

Figure 1 a and 1 b Show that 94.20% of the respondents of public University used headphone and 5.80% did not compared to private University 90.10% of the respondents used headphone and 9.90% did not

Table 3. *Distribution of respondents by auditory hazards (n=726)*

Auditory disorders	Public University		Private University	
	Frequency	Percentage	Frequency	Percentage
Yes	147	40.50	168	46.30
No	216	59.50	195	53.70
Total	363	100	363	100

Table 03 reveals that 40.50% of the respondents of public University had auditory hazards and 59.50% did not contrast to the respondents of private University 46.30% complained auditory hazards and 53.70% did not.

Table 4. *Distribution of respondents by types of auditory hazards (n=726) (Multiple responses)*

Types of auditory disorders	Public University		Private University	
	Frequency	Percentage	Frequency	Percentage
Pain in External Ear	68	18.70	96	26.40
Pain in the Middle Ear	55	15.20	58	16.00
Tinnitus	14	3.90	23	6.30
Temporary Hearing Loss After Removal of Head Phone	41	11.30	48	13.20
Auditory hallucination	35	9.60	39	10.70
Auditory Processing disorders	14	3.90	21	5.80

It is found from table 04 that 18.70%, 15.20%, 3.90%, 11.30%, 9.60% and 3.90% of the respondents of public University had pain in the external ear, pain in the middle ear, tinnitus, temporary hearing loss after removal of head phone, auditory hallucination and auditory processing disorders respectively. On the other hand respondents of private University, 26.40%, 16.00%, 6.30%, 13.20%, 10.70% and 5.80% had complained pain in the external ear, pain in the middle ear, tinnitus, temporary hearing loss after removal of head phone, auditory hallucination and auditory processing disorders respectively.

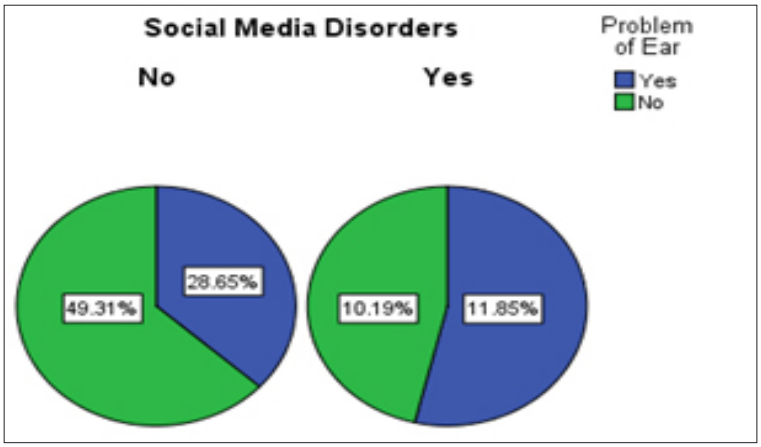

Fig 2a. *Distribution of the respondents by social media disorders and problem of ear (Public University)*

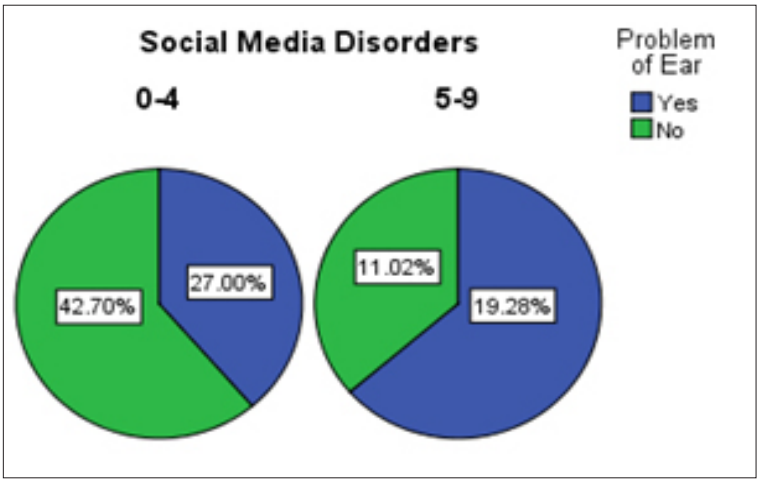

Fig 2b. *Distribution of the respondents by social media disorders and problem of ear (Private University)*

Figure 2 a and 2 b reveals that 11.85% of the respondents had social media disorders and they were suffered ear problem and 10.19% of the respondent did not suffered ear problem, 28.65% of the respondents had no social media disorders but they had been suffered ear and 49.31% of the respondent did not suffered this disorders among the respondents of public University. Contrast to private University 19.28% of the respondents had social media disorders and they were suffered ear problem and 11.02% of the respondent did not suffered ear problem, 27.00% of the respondents had no social media disorders but they had been suffered ear problem and 42.70% of the respondent did not.

Table 5. *Association between used of headphone with problem of ear of the respondents*

Public University	**Problem of ear**	**Use of headphone**		Total	χ^2	p-value
		Yes	No			
	Yes	147(40.5)	195(53.7)	342(94.2)	15.169	0.000
	No	0(0.0)	21(5.8)	21(5.8)		
	Total	147(40.5)	216(59.5)	363(100)		
Private University	**Problem of ear**	**Use of head phone**		Total	χ^2	p-value
		Yes	No			
	Yes	166(45.7)	161(44.4)	327(90.1)	26.660	0.000
	No	2(0.6)	34(9.4)	36(9.9)		
	Total	168(46.3)	195(53.7)	363(100)		

Results were published as number (%), χ2 test was performed and p<0.05 was level of significance

The table 05 shows that there were statistically significant association between use of headphone and problem of ear of the respondents of public University (p=0.000<0.05) compared to the respondents of private University statistically significant association between use of headphone and problem of ear of the respondents (p=0.000<0.05).

Table 6. *Distribution of the respondents by Spearman's rank correlation of headphone with types of auditory hazards*

University	**Variables**	**Variables**	**r-value**	**p-value**
Public	Pain in External Ear	Head phone	0.119	0.023
	Pain in Middle Ear		0.105	0.046
	Temporary Hearing loss		0.088	0.046
	Auditory Hallucination		0.081	0.124
Private	Pain in External Ear	Head phone	0.178	0.000
	Pain in Middle Ear		0.120	0.023
	Temporary Hearing loss		0.102	0.025
	Auditory Hallucination		0.115	0.028

p-value obtained from Spearman's rank correlation test

Table 06 reveals that there were positive correlations of use of head phone with pain in external ear, pain in middle ear, temporary hearing loss (p= 0.023<0.05, p= 0.046<0.05, p= 0.046<0.05) and no correlation of head phone with auditory hallucination (p=0.124>0.05) of the respondents of public University contrast to the respondents of private University there were another positive correlations of use of head phone with pain in external ear, pain in middle ear, temporary hearing loss, auditory hallucination(p=0.000<0.05, p=0.023<0.05, p=0.025<0.05, p=0.028<0.05). These findings were statistically significant except use of headphone with auditory hallucination of the respondent of public university. Result showed that headphone positively influenced the pain in external ear, pain in middle ear, temporary hearing loss of the respondents of both public and private Universities and headphone influenced the auditory hallucination of the respondents of private University only.

Table 7. *Distribution of the respondents by binary logistic regression of auditory disorders with types of social media*

University	Dependent Variables	Covariates	p-value	Exp(B)/Odds
Public	Tinnitus	Instagram	0.015	3.982
Private	Ear problem	Imo	0.031	1.727
		LinkedIn	0.050	1.796
		Tango	0.012	0.155
	Temporary hearing loss	Whats app	0.009	0.342
		Viber	0.046	2.348
	Auditory Hallucination	Instagram	0.028	2.260

Table 07 reveals that uses of Instagram influenced significantly on tinnitus (p=0.015 and Odds=3.982) of the respondents of public University. On the other hand respondents of private University Imo, LinkedIn, Tango influenced significantly on ear problem (p= 0.031 and Odds=1.727, p=0.050 and Odds=1.797, p=0.012 and Odds=0.155), used of WhatsApp and Viber influenced significantly on temporary hearing loss (p= 0.009 and Odds=0.342, p=0.046 and Odds=2.348), Instagram influenced significantly on auditory hallucination (p= 0.028 and Odds =2.260).

Table 8. *Distribution of the respondents by binary logistic regression of auditory hazards with social media disorders*

University	Dependent Variables	Covariates	p-value	Exp(B)/Odds
Public	Ear problem	Social Media Disorders	0.018	1.900
	Tinnitus	Social Media Disorders	0.038	3.512
	Auditory processing disorders	Social Media Disorders	0.021	3.852
Private	Ear problem	Social Media Disorders	0.002	2.416
	Pain in the External ear	Social Media Disorders	0.037	1.840
	Temporary hearing loss	Social Media Disorders	0.001	3.783
	Auditory Hallucination	Social Media Disorders	0.009	2.911
	Auditory Processing Disorders	Social Media Disorders	0.012	4.307

Table 08 shows that social media disorders influenced significantly on ear problem (p= 0.018 and Odds = 1.900), social media disorders influenced significantly on tinnitus and auditory processing disorders (p=0.038 and Odds=3.512, p=0.021 and Odds=3.852) of the respondents of public University. Contrast to the respondents of private University social media disorders influenced significantly on ear problem (p=0.002 and Odds =2.416), pain in the external ear (p=0.037 and Odds =1.840), temporary hearing loss (p=0.001 and Odds=3.783), auditory hallucination (p=0.009 and Odds=2.911) and auditory processing disorders (p=0.012 and Odds = 4.307).

Discussion

Study found that 94.20% and 90.10% of the respondents of public and private University used headphone, rest of them were not. These findings were nearly similar findings to the study carried out by Widen et al in the year of 2018. Among the respondent 40.50% of the respondents of public University had auditory disorders and 46.30% of the the respondents of private University complained auditory disorders. Similar findings of the study carried out by Naik and Pai in the year of 2014 and found that uses of loud earphone causes harmful to ear (Naik and Pai, 2014). Study showed that 18.70%, 15.20%, 3.90%, 11.30%, 9.60% and 3.90% of the respondents of public University had pain in the external ear, pain in the middle ear, tinnitus, and temporary hearing loss after removal of headphone, auditory hallucination, and auditory processing disorders respectively. Similar findings of the study conducted by Bhaga et al in the year of 2016 and found that symptoms including headache, tinnitus, pain in the external air, and other auditory symptoms (Bhaga et al, of 2016). On the other hand respondents of private University 26.40%, 16.00%, 6.30%, 13.20%, 10.70% and 5.80% had

complained pain in the external ear, pain in the middle ear, tinnitus, temporary hearing loss after removal of head phone, auditory hallucination and auditory processing disorders respectively. Another similar study found that 64.12% of the respondent's need to ask to repeat what was said, 43.51% need increased TV volume, 38.93% of the respondents suffered tinnitus problem and 36.64% worried about losing their hearing (Herrera et al, 2016). There were statistically significant associations between use of headphone and problem of ear of the respondents of both public (p=0.000) and private (p=0.000). University. These findings were similar findings of the study conducted among the students of the Saveetha Dental College and found that hearing problem associated to prolonged use of music (Reddy and Thenmozhi, 2018). Among the respondents headphone positively influenced the problem of ear of the respondents of both public (r= 0.204) and private (r= 0.271) Universities. Similar findings that adolescents with severe to profound hearing loss due to listening louder sound levels for longer periods by use of headphone whereas sound level more than 85 dB (Widen et al, 2018). Use of headphone positively influenced the pain in external ear (r=0.119 and r= 0.178), pain in middle ear (r=0.105 and r=0.120), temporary hearing loss (r=0.088 and r= 0.102) of the respondents of both public and private Universities and headphone influenced the auditory hallucination (r=0.102) of the respondents of private University only. These findings were similar findings to the study carried out by the study carried out Huh et al in the year of 2016. Among the respondents of private University, used of headphone influence significantly on ear problem (Odds = 17.52) , pain in the external ear (Odds = 14.33), pain in the middle ear, temporary hearing loss (Odds = 14.7.38). Another similar finding found that in-ear headphone using musical exposure 3 hours causes the hearing loss (Dobrucki et al, 2013).

Conclusion

Study conclude that respondents of both public and private University had been suffering pain in the external ear, pain in the middle ear, tinnitus, and temporary hearing , auditory hallucination, and auditory processing disorders due to excessive use of social media and its digital devises.

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