

Brief Research Report

Awareness of Ototoxicity among Medical Doctors in Assam

Writisha Bora, BASLP (Student)¹; Himanshu K. Sanju, M.Aud^{2*}; Vijay Kumar, MASLP¹; Prasanta Borah, MBBS³; Tushar Jain, MS²

¹Department of Audiology and Speech-Language Pathology, Amity Medical School, Amity University Gurgaon, Haryana, India

²Department of ENT, Audiology and Speech Language Pathology, Shri Jagdamba Charitable Eye Hospital, Sri Ganganagar, Rajasthan, India

³Old MLA Hostel Medical Unit, Guwahati, Assam, India

*Corresponding author

Himanshu K. Sanju, PhD

Assistant Professor, Department of ENT, Audiology and Speech Language Pathology, Shri Jagdamba Charitable Eye Hospital, Sri Ganganagar, Rajasthan, India;

E-mail: himanshusanjuaslp@gmail.com

Article information

Received: February 11th, 2020; **Revised:** March 3rd, 2020; **Accepted:** March 16th, 2020; **Published:** March 21st, 2020

Cite this article

Bora W, Sanju HK, Kumar V, Borah P, Jain T. Awareness of ototoxicity among medical doctors in Assam. *Otolaryngol Open J.* 2020; 6(1): 1-4.

doi: [10.17140/OTLOJ-6-159](https://doi.org/10.17140/OTLOJ-6-159)

ABSTRACT

Introduction

Previous literature has reported ill-effect of ototoxic drug on hearing and balance. Present study investigated awareness among medical doctors for the same.

Method

A total of 55-medical doctors of multiple specialties from Assam, India participated in the present study. A total of 14 questions with Likert Scale based scoring pattern were framed and validated for the present study.

Results

Outcome of the present study showed high awareness percentage about side effect ototoxic drugs was obtained, which was a satisfying outcome.

Conclusion

While low audiological referral and consultation awareness was identified as an area of concern.

Keywords

Ototoxicity; Doctors; Assam; Awareness.

INTRODUCTION

Ototoxicity is defined as the tendency of certain medicine to cause functional injury and cellular degeneration of tissues of the inner ear and vestibular nerve. Most medical doctors prescribe certain medicines to the patients during treatment, which upon consumption may cause temporary or permanent hearing loss in patients. These medicines are known as ototoxic medications and cause ototoxicity.¹ Currently, there are no therapies for the prevention or treatment of ototoxicity that the Food and Drug Administration (FDA) has approved.² The World Health Organization (WHO) has identified ototoxicity as one of the main preventable causes of deafness and an outcome that can be most directly influenced by healthcare professionals.³ Previous literature has well reported the ill-effect of ototoxic drugs on hearing.^{2,4,7} The present study has been undertaken to evaluate the level of awareness about ototoxicity among the Doctors in Assam (North-

east India). The primary objective of this study was to identify the level of awareness on ototoxicity among the Doctors of Assam. Additionally, this study was designed to know and quantify audiological referral and consultation in case of ototoxicity.

MATERIALS AND METHOD

A total of 55-Doctors of multiple specialties from Assam (North-east India) participated in this study. Out of 55, seven were under graduate and 48 were post graduate medical professionals. Oral and written consent were taken from all participants participated in the study. The study was approved by the ethics committee of Shri Jagdamba Charitable Eye Hospital, Sri Ganganagar, Rajasthan, India. The mean years of experience was $m=27.01 \pm 10.3$ -years of various disciplines of medical practice. A total of 14 multiple choice questions were framed and validated for the present study. More than 95% of content validity and test-retest reliability was

fixed for stimuli selection. All the 14 questions were analyzed for primary objective while question number 11, 12, 13 were analyzed for secondary objective of the study.

Purposive sampling was used to conduct survey-based research. Likert Scale based scoring pattern was used where response was distributed among 5 categories: strongly agree, somewhat agree, neutral, somewhat disagree, strongly disagree. The participants were contacted over phone and through e-mails and consent were obtained for response to the questionnaire which was sent through e-mail. Auto termination of this e-mail was fixed for 15-days. 12.8% responses were obtained within a day, 72.7% of responses were obtained within a week, and rest of the responses were obtained from 7 to 15-days.

Responses of each participant were coded, arranged and analysed in Statistical Package for the Social Sciences (SPSS) 21. Descriptive statistical methods were used to analyse the data. Response across each question were analysed separately.

RESULTS AND DISCUSSION

The responses from the questions were analysed and percentage was calculated. For the questions on ototoxicity, 82% of doctors in Northeast India strongly agreed that certain medications can damage the ear, resulting in hearing loss. Eighteen percent (18%) of the doctors somewhat agreed to it (Figure 1). Seventy percent (70%) of doctors strongly agreed that certain medications can damage the ear, resulting in ringing sensation in the ear. Thirty percent (30%) of doctors somewhat agreed to this statement (Figure 2). Only 55% of the doctors strongly agreed that certain medications can damage the ear, resulting in balance disorders. Thirty-seven percent (37%) of the doctors somewhat agreed on this. Seven percent (7%) of the doctors were neutral on this statement (Figure 3). Ninety-three percent (93%) of the doctors strongly agreed that they are familiar with the term ototoxicity. Three percent (3%) of the doctors somewhat agreed. Two percent (2%) of doctors were neutral on their familiarity with the term and the remaining 2% somewhat agreed (Figure 4). Forty-two percent (42%) of the doctors in Northeast strongly agreed that that they were aware that there are more than 200 ototoxic drugs that are sold by the pharmaceutical companies in the market. Thirty-five percent (35%)

of the doctors somewhat agreed that they were aware. Eighteen percent (18%) of the doctors were neutral about their awareness on this matter. Five percent (5%) of the doctors somewhat disagreed. On questions regarding the intervention for the patients, only 60% of the doctors strongly agreed that when a decision is made to treat a serious illness or medical condition with an ototoxic drug, the effects of the medications on the hearing and balance systems and their side effects are discussed with the patient (Figure 5). Twenty-nine percent (29%) of the doctors somewhat agreed. Five percent (5%) of the doctors were neutral on this matter. Another 5% of the doctors the doctors somewhat disagreed on this practice. The remaining 5% of the doctors strongly disagreed. Seventy percent (70%) of the doctors strongly agreed that if a patient is treated with ototoxic medications, it may cause damage to the sensory cells used in hearing and balance. Twenty-five percent (25%) of the doctors somewhat agree on this practice. The remaining 5% were neutral on this matter (Figure 6). Forty-five percent (45%) of the doctors strongly agreed that they were aware that aminoglycoside antibiotics, such as gentamicin are medications known to cause permanent hearing loss. Forty-one percent (41%) of the doctors somewhat agreed to it. Nine percent (9%) of them were neutral on this matter. The remaining 3% of the doctors somewhat disagree (Figure 7). Interestingly, only 38% of the doctors in Northeast strongly agreed that they were aware that cancer chemotherapy drugs, such as cisplatin and carboplatin are known to cause permanent hearing loss. Forty-eight percent (48%) of the doctors somewhat agreed on their awareness. Eleven percent (11%) of the doctors were neutral regarding this fact and the remaining 3% of the doctors somewhat disagreed (Figure 8). Fifty-four percent (54%) of the doctors strongly agreed that they are aware that pain relievers (aspirin), quinine and loop diuretics are known to cause temporary hearing loss. Thirty-nine percent (39%) of the doctors somewhat agreed to it. The remaining 7% were neutral on this matter. Only 37% of the doctors strongly agreed that the patients in the who are prescribed with ototoxic drugs are referred for a baseline record of hearing and balance to be recorded by an audiologist (which includes an audiologic hearing test that uses high-pitched testing, word recognition and other tests, which helps to decide whether to change or stop the medication). Twenty-four percent (24%) of the doctors somewhat agreed to this practice. Another 24% were neutral regarding this matter. Eleven percent (11%) of the doctors somewhat disagreed and 4% strongly

Figure 1. Response of the Question Regarding "Certain Medication can Damage the Ear, Resulting in Hearing Loss"

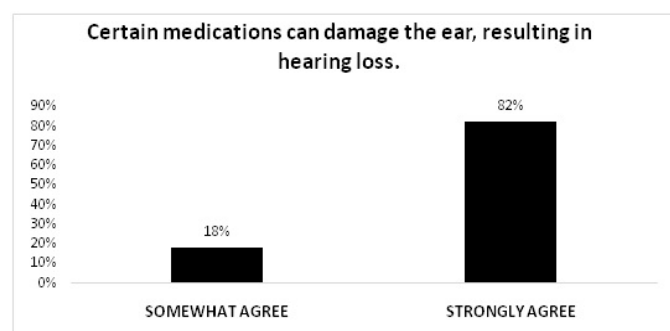


Figure 2. Response of the Question Regarding Certain Medication can Cause Tinnitus

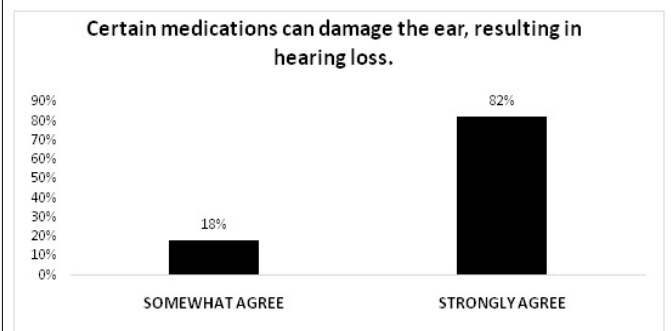


Figure 3. Response of the Question Regarding Balance Problem after Intake of Certain Medication

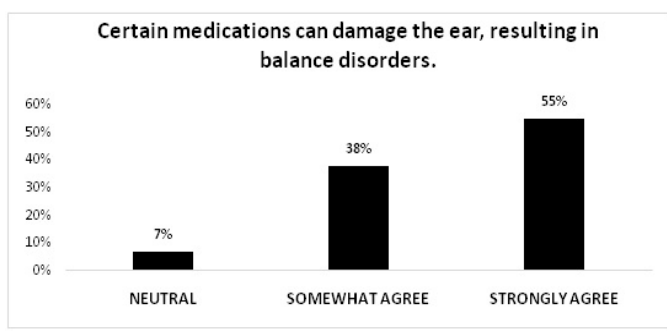


Figure 4. Familiarization with the Term "Ototoxicity"

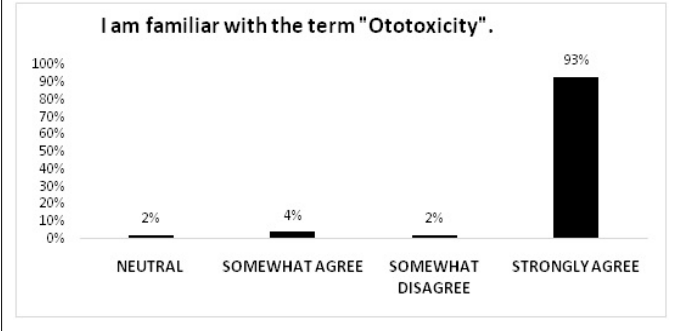


Figure 5. Response Regarding Side Effect of Ototoxic Drug Need to be Discussed with the Patient before Prescribing Them

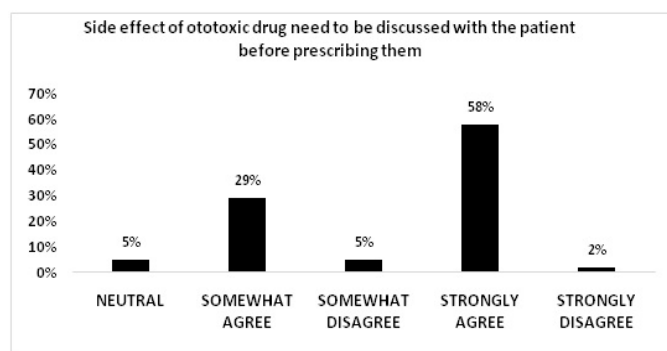


Figure 6. Ototoxic Medication may Cause Damage to Sensory Cells Responsible for Hearing and Balance

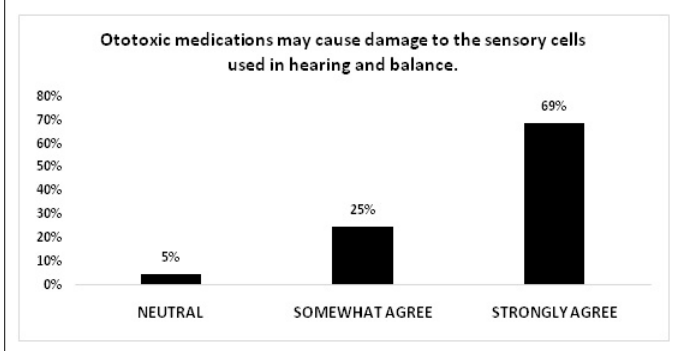


Figure 7. Awareness Regarding Aminoglycoside Antibiotics Known to Cause Permanent Hearing Loss

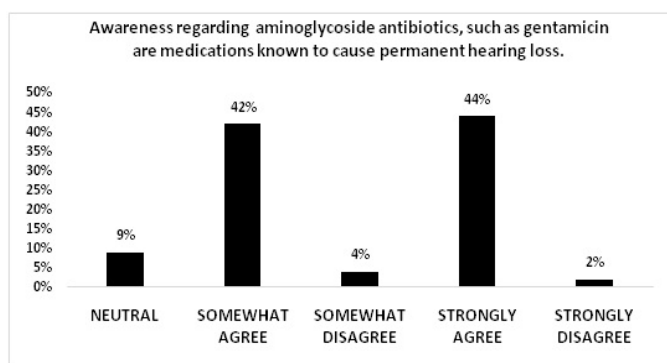
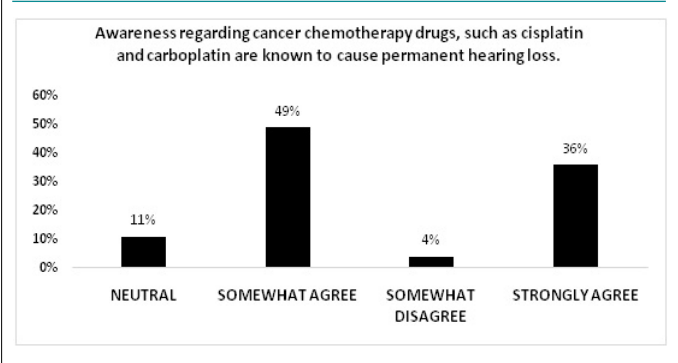


Figure 8. Awareness Regarding Chemotherapy Drugs Known to Cause Permanent Hearing Loss



disagreed when asked on the practice of this method. Fifty-four percent (54%) of the doctors in Northeast strongly agreed that they are aware that for cases in which the medications have already been taken and cannot be stopped or changed, the patient and the audiologist can take steps to manage the effects of the hearing loss that results. Thirty percent (30%) of the doctors somewhat agreed. Nine percent (9%) of doctors were neutral on this matter. Five percent (5%) of the doctors somewhat disagreed to this and 2% strongly disagreed (Figure 9). Sixty-eight percent (68%) of the doctors strongly agreed that during treatment (with ototoxic drugs), the patient is instructed to have periodic hearing tests as part of the

monitoring process, which enables to report any hearing changes, ringing in the ears, or balance problems that the patient may notice. Sixteen percent (16%) of the doctors somewhat agreed. Thirteen percent (13%) of the doctors were neutral on this. The remaining 3% strongly disagreed (Figure 10).

Eighty-four percent (84%) of the doctors in NE strongly agreed that all over-the-counter (OTC) drugs which are ototoxic should be changed to prescription drugs (Rx) to prevent unknown consumption of ototoxic drugs which might lead to hearing loss. Sixteen percent (16%) of the doctors also somewhat agreed to this to be applied.

Figure 9. Awareness Regarding Routine Audiological Evaluation of the Patients Undergoing Treatment with Ototoxic Drugs

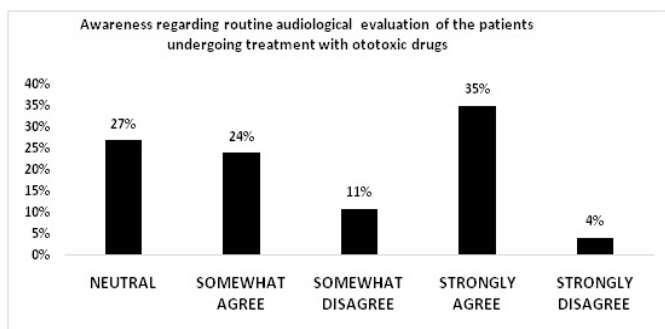
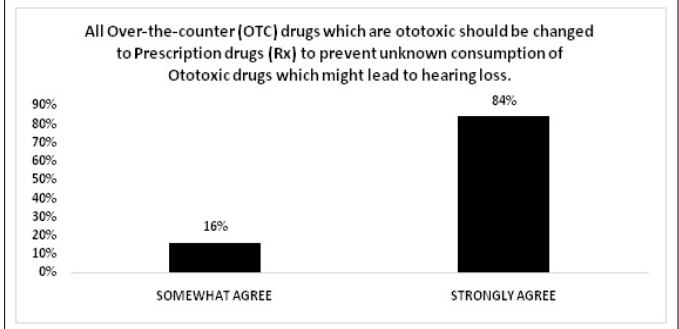


Figure 10. All Over-the-Counter (OTC) Drugs which are Ototoxic should be Changed to Prescription Drugs (Rx)



From the present study it was observed that 95.03% respondents responded positively about awareness of the impact of ototoxic drugs on hearing sensitivity, out of which 61.36% of strongly agree and 33.67% of somewhat agree across all 14 questions. It was also reported that 76.36% respondents were aware of referral and consultation services offered by audiologists, out of which 52.83% of strongly agree and 23.53% of Somewhat Agree. Lower sensitivity percentage of 4.97% i.e. combination of neutral, somewhat disagree and strongly disagree responses on all questions may be attributed to the qualitative and professional experience of the medical professionals. However, high percentage identified up to 23.54% of respondents for lack of audiological referral and consultation is alarming. Present study also justifies the extension of this study among other health professionals. This also justifies the need for awareness programs among well trained and highly experienced medical doctors.

CONCLUSION

The findings of the present questionnaire based study showed high awareness percentage about ototoxic drugs, which was a satisfying outcome. While low audiological referral and consultation awareness was identified as an area of concern.

CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

REFERENCES

1. Steyger PS, Cunningham LL, Esquivel CR, Watts KL, Zuo J.

Editorial: Cellular mechanisms of ototoxicity. *Front Cell Neurosci.* 2018; 12: 75. doi: 10.3389/fncel.2018.00075

2. Wood MB, Zuo J. The Contribution of immune infiltrates to ototoxicity and cochlear hair cell loss. *Front Cell Neurosci.* 2017; 11: 106. doi: 10.3389/fncel.2017.00106

3. World Health Organization (WHO). WHO recommendations on: Intrapartum care for a positive childbirth experience Website. <https://www.who.int/reproductivehealth/publications/intrapartum-care-guidelines/en/>. Accessed February 10, 2020.

4. Robertson CM, Tyebkhan JM, Peliowski A, Etches PC, Cheung PY. Ototoxic drugs and sensorineural hearing loss following severe neonatal respiratory failure. *Acta Paediatr.* 2006; 95(2): 214-223. doi: 10.1080/08035250500294098

5. Arslan E, Orzan E, Santarelli R. Global problem of drug-induced hearing loss. *Ann N Y Acad Sci.* 1999; 884: 1-14. doi: 10.1111/j.1749-6632.1999.tb00277.x

6. Guthrie OW. Aminoglycoside induced ototoxicity. *Toxicology.* 2008; 249(2-3): 91-96. doi: 10.1016/j.tox.2008.04.015

7. Carlson K, Neitzel RL. Hearing loss, lead (Pb) exposure, and noise: A sound approach to ototoxicity exploration. *J Toxicol Environ Health B Crit Rev.* 2018; 21(5): 335-355. doi: 10.1080/10937404.2018.1562391