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Effect Of Loud Music And Active Telephonic Conversation On Simple Reaction Time In Dental Students.

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ABSTRACT

The present study is taken up to understand the effect of loud music on simple reaction time of the dental students while on telephonic conversation. A total of 90 apparently healthy, male and female participants within the age group of 18-24 were part of the study after obtaining the written informed consent. After recruiting the participants were randomly grouped into control and distraction groups with 45 participants in each group. Auditory and visual reaction time for red light was assessed using RT apparatus, manufactured by Anand agencies, Pune. All the participants were subjected to practice reaction time well in advance of actual recording. There was significantly higher auditory reaction time both right and left responses in the distraction group when compared with the control group ($P < 0.0001$). There was significantly higher visual reaction time both right and left responses in the distraction group when compared with the control group ($P < 0.0001$). Our study recommends of not using either phone or loud music during the driving. We recommend further detailed studies in this area to support stoppage of using the loud music and mobile conversation during driving.

Keywords: Loud music, reaction time, Dental Students.

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INTRODUCTION

Noise has become an inevitable yet preventable problem in the present world. We experience sounds from radio, television, traffic, household appliances, etc; in everyday life. These sounds when in safe levels don't damage our hearing or would not lead to any accidents on road while on driving or when at work. Sounds prove to be dangerous and harmful when played too loud even for a shorter period or long lasting. It may cause the distraction and may affect the concentration of an individual at work further affecting the human performances and may also lead to accidents on road. Loud sounds can damage the sensitive structures in the inner ear and causes noise-induced hearing loss (NIHL) [1]. A study by Button et al. stated the effect of industrial noise on muscle contractions on complex and simple vigilance. It demonstrated that industrial noise with greater intensity caused impaired movement and reaction times with corresponding to the simple vigilant tasks and showed a decrease in the performance while performing complex vigilant tasks [2]. This implies that loud music can also possess detrimental effect on the concentration, listening skills, memory and may also affect the human performance [3-5]. It is said that music has the positive effects in improving the concentration and cognitive abilities of an individual but, it is also noticed that music when played loud does losses the smoothening effects and may have a negative effect and distractive mode which may impair the human performances at various tasks [6,7]. It is to be noted that about 91% of the musical exposure occurs during automobile transit and there are mixed outcomes reported by the studies of researchers in finding out the effect of loud music during driving [8,9]. The studies stated that moderate levels of music facilitate safest driving conditions by stimulating the driver's awareness and loud rock music was observed to improve the driving performance by enhancing the awareness and reaction time. Contradictory results were reported in the study conducted by Matthews et al. wherein loud volume within a range of 70-90dB had increased the driving performance and stability. These when increased beyond the range led to distraction in driving leading to accidents proves due to poor concentration and loss of control while driving [10]. It is reported that most of the accidents occurring are due to the over use of smart phones. Mobile texting, calling, using smartphones for internet use, eating, drinking, talking to passengers, grooming, reading includes maps, using navigation systems, watching a video, adjusting a radio, adjusting CD player and taking selfie are few reasons for increase in accident rates. This clearly states that loud music causes distraction and reduces the concentration at work. The present study is taken up to understand the effect of loud music on simple reaction time of the dental students while on telephonic conversation.

MATERIALS AND METHODS

Study design: Cross-sectional study

Study participants: A total of 90 apparently healthy, male and female participants within the age group of 18-24 were part of the study after obtaining the written informed consent. Participants under medication or therapy and those with any serious disorders and unwilling participants were excluded from the study.

Study setting: The present study was conducted at Department of physiology, Vishnu dental college, Bhimavaram.

After recruiting the participants were randomly grouped into control and distraction groups with 45 participants in each group.

Control group (n=45): No distraction during reaction time assessment

Distraction group (n=45): Loud music through speakers and the participant was made to be in active telephonic conversation with their parents while assessing the reaction time.

Assessment of reaction time: Auditory and visual reaction time for red light was assessed using RT apparatus, manufactured by Anand agencies, Pune. All the participants were subjected to practice reaction time well in advance of actual recording.

Ethical consideration: The study protocol was approved by institutional research committee.

Data Analysis: Data was analyzed by using SPSS 20.0. Student test was applied to observe the difference between the variables. Data was presented as mean and SEM. Probability value less than 0.05 was considered as significant.

RESULTS

There was significantly higher auditory reaction time both right and left responses in the distraction group when compared with the control group ($P < 0.0001$). There was significantly higher visual reaction time both right and left responses in the distraction group when compared with the control group ($P < 0.0001$).

Parameter	Control group (n=45)	Distraction group (n=45)	P value
ART right response (m sec)	0.242 ±0.00089	0.522 ±0.020	<0.0001***
ART left response (m sec)	0.261 ±0.0007	0.725 ±0.034	<0.0001***
VRT right response (m sec)	0.283 ±0.0006	0.626 ±0.026	<0.0001***
VRT left response (m sec)	0.327 ±0.0007	0.788 ±0.039	<0.0001***

ART-Auditory Reaction Time, VRT-Visual Reaction Time, n-number of participant's
P- Probability. Data was presented as mean and SEM. *** $p < 0.0001$ is significant.

DISCUSSION

Loud noise at a work can cause loss of hearing which could be temporary i.e after leaving the work place or permanent on prolonged exposure to loud noise. Temporary hearing loss could be recovered with hours but shouldn't be ignored as such. But the fact about hearing loss is that it occurs only when there is prolonged exposure of an individual to loud noise. This may further lead to tinnitus (buzzing, humming or whistling in the ears). This is a distressing condition which could lead to sleep disturbances too. Loud music while driving is known to be the major reasons for road accidents. Road traffic deaths have been steadily increasing in many low- and middle income countries particularly where rapid motorisation has not been accompanied sufficiently by improved road safety strategies [11]. The use of a mobile phone can impair performance on a number of driving tasks, leading longer RTs to detect and respond to unexpected driving related events, impaired ability to maintain correct lane position, slower breaking reactions with more intensive breaking and shorter stopping distances, impaired ability to maintain an appropriate speed (i.e., usually driving slower), slower reactions to traffic signals/missed signals, reduced field of view (i.e., drivers more likely to look straight ahead and not at periphery or in mirrors), shorter following distances, accepting gaps in traffic streams that do not give sufficient time for the driver to safely maneuver the vehicle into the traffic flow, increased mental work load, resulting in higher levels of stress and frustration, and reduced driver awareness of what is happening around them. Further listening to loud music also adds further effect in reducing the reaction time that may lead to the road accidents.

Mobile phones commonly used electronic gadget for communication when compared to other modes of communication and these product is increasingly pervasive and has become unavoidable part of the public setting and in the system. Telephonic conversation with the loud music on could make a person likely to speak loudly. Data retrieved from the present study states that high volume or loud music irrespective of their types whether classical or western have a negative impact on reaction time of the students involved in telephonic conversation with loud music on. These results are in accordance with the previous studies stating high volume music or noise showing negative impact on the simple and complex vigilant activity [12]. It has become a trendy ritual for the present generation to listen to the loud, annoying volume of music while driving. This act has an effect on the concurrent tasks those involved in automobile control wherein it is noticed that the reaction time is reduced leading to the accidents due to loss of control over the vehicle. Hence, the present study states that loud music causes distraction and deprives the individual's concentration, hindering in efficient completion of the tasks given.

CONCLUSION

Our study recommends of not using either phone or loud music during the driving. We recommend further detailed studies in this area to support stoppage of using the loud music and mobile conversation during driving.

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