

ASSESSMENT OF THE KNOWLEDGE AND TREND OF HEARING PROTECTION DURING ROUTINE FIRING AMONG TROOPS AT BAHAWALPUR GARRISON

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ABSTRACT

Objective: To assess the knowledge and trend of hearing protection during routine firing among troops at Bahawalpur garrison.

Study design: Cross sectional study.

Place and Duration of Study: The study was carried out at Bahawalpur in Aug 2015.

Material and Methods: This study was carried out in Bahawalpur Garrison in Aug 2015. Three hundred and eighty eight soldiers of an infantry unit were included in the study. Structured questionnaire were distributed among soldiers and information regarding the knowledge and trends of hearing protection during routine practice firing were gathered. The information included age, gender, education, use of ear protection measures during routine firing, types of hearing protection techniques, reasons for not using protection measures (if any), availability of ear protection measures, knowledge about hearing protection from noise of firearms and feeling decreased hearing & tinnitus. The data gathered were assessed and analyzed with help of SPSS version 20. Simple descriptive statistics were used to express results in terms of frequencies.

Results: Out of 388 individuals under study, 136 used hearing protective measures regularly during routine firing, 103 did not use any measures and 149 soldiers used protective measures off and on (irregularly). Three hundred and fifty five individuals knew the association between noise and hearing loss but remaining 33 did not know about it. When asked about the measures to protect hearing from noise trauma of firing, 151 individuals mentioned ear plugs/muffs and 237 mentioned cotton balls. When enquired about the efficacy of hearing protection during firing that whether they should be used or not, 316 responded in affirmative, 53 individuals replied in negative and 15 soldiers did not know about its efficacy. When enquired about the reasons of not using hearing protection, 264 soldiers said that they do not have the protectors, 96 individuals attributed it to inability to hear warning sounds, and 28 subjects said that it causes pain in ears.

Conclusion: The trend of hearing protection during routine firing was not satisfactory among troops, consequent to lack of adequate and optimum knowledge of fire arm noise induces hearing loss. Thus they should be educated to enhance their knowledge about hearing protection from fire arm noise and should be encouraged to use hearing protective measures during routine firing.

Keywords: Ear Muffs, Ear Plugs, Hearing protection devices.

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INTRODUCTION

Firearms are a common cause of hearing loss. Military persons are commonly exposed to firearm noise. Depending on the requirements, this noise exposure can be intermittent as in training or continuous as in deployed operational

areas in our country. They can potentially damage the hearing organs.

The intensity of noise created by firearms is high enough to cause hearing impairment, for instance a Greek study showed sound intensity from firearms to reach 160.2 dB SPL¹. In a study carried out in Brazil, almost 20.8% of military persons had sensorineural hearing loss which is higher than civilians². The association between recreational firearm use and adult hearing loss has long been established as shown by study of

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Beckett et al 2000³. Exposure to loud noise causes initially a temporary threshold shift, which becomes permanent after repeated exposure to loud impulsive sounds as in case of fire-arms. The mechanism of hearing loss includes metabolic and mechanical factors. Noise causes cochlear hair cell damage and also causes hypoxia through noise induced capillary vasoconstriction^{4,5}. Audiometric findings of such noise induced hearing loss show an initial typical dip/notch at 4000dB, but later on adjacent frequencies are also involved. Pure tone audiometry is a very helpful modality which picks up and detects any hearing loss in adults. With advent of new technology, high frequency audiometry and otoacoustic emissions have been devised which pick up noise induced hearing impairment ever earlier than pure tone audiometry.

The treatment of noise induced hearing loss is limited to hearing aids for amplification of sound which is also quite unsatisfactory in presence of background noise. Hearing aids act through amplification of residual hearing ability; however the best hearing aids available are no match to natural hearing. Secondly, they are costly and require maintenance and great care. Hearing protection is of utmost importance. It is the single most effective method for hearing loss prevention. Hearing protection measures include ear muffs, ear plugs which are collectively called hearing protection devices. Ear plugs are the ear inserts which occlude external auditory meatus when fitted in it. Ear plugs are commercially available and are of different shapes and sizes to fit the individual external auditory meatus. Ear muffs cover the entire outer ear and make an ear tight seal to block the ear canals. If the noise exceeds 105dB then both of them should be used in combination. Simple cotton balls and tissue paper wads are very poor protectors as they only decrease the noise by around 7dB. In our present study we have assessed the knowledge of army personnel for hearing protection and the trends & rationale of use of hearing protective measures during firing.

MATERIAL AND METHODS

This study was carried out in Bahawalpur Cantt in Aug 2015. It is a cross sectional study. All the individuals of an infantry unit stationed at Bahawalpur, who were present in the unit and did regular practice firing exercise, were included in this study. Total 388 soldiers of that infantry unit were included in the study. Structured questionnaire were distributed among soldiers and information regarding the knowledge and trends of hearing protection during routine practice firing was gathered. The information included age, gender, education, use of ear protection measures during routine firing, types of hearing protection techniques, reasons for not using protection measures (if any), availability of ear protection measures, knowledge about hearing protection from noise of firearms and also about feeling decreased hearing & tinnitus. The data gathered were assessed and analyzed with help of SPSS version 20. Simple descriptive statistics were used to express results in terms of frequencies, percentages etc.

RESULTS

Total 388 individuals of an infantry battalion participated in the study. Age range of individuals was from 18 to 45 years. There were 28 (7.2%) individuals who were under matric, 252 were matriculate (64.9%), 84 (21.6%) were intermediate qualified and 24 (6.1%) were graduates (fig-1).

There were 52 (13.4%) smokers and rest 336 (86.6%) nonsmokers. Out of 388 individuals 136 (35.1%) used hearing protective measures regularly during routine firing, 103 (38.4%) did not use any measures and 149 (26.5%) soldiers used protective measures off and on (fig-2).

When enquired about the effect of noise on hearing ability, 355 knew it but remaining 33 did not know about it. When asked about the measures to protect hearing from noise trauma of firing, 151 mentioned ear plugs/muffs and 237 mentioned cotton balls. 75 individuals complained of tinnitus, 302 soldiers negated about tinnitus and rest 11 responded that they do not know. Upon asking about possession of ear

plugs/muffs, none of them had any. When enquired about the efficacy of hearing protection during firing that whether they should be used or

routine practice firing saves them from early hearing impairment. When enquired about the reasons of not using hearing protection, 239 said

Table: Frequencies of the response of the study population.

Q/N		Yes	No	Use irregularly
1.	Do you use ear protective measures during routine firing?	136 (35.1%)	103 (26.5%)	149 (38.4%)
Q/N		Yes	No	Don't know
2.	Do you feel any ringing or hissing sound in your ears (tinnitus)?	75 (19.3%)	302 (77.8%)	11 (2.8%)
Q/N		Yes	No	Don't know
3.	Do you feel that you have started hearing TV and radio loud?	87 (22.4%)	301 (77.6%)	
Q/N		Yes	No	Don't know
4.	Do you know that exposure to loud noise causes hearing loss?	355 (91.5%)	33 (8.5%)	0
Q/N		Ear plugs/ear muffs	Cotton balls	Other means
5.	Which protective measures are helpful in protecting ears from noise during firing?	151 (38.9%)	237 (61.1%)	0
Q/N		Yes	No	Don't know
6.	Do you have ear plugs or ear muffs to prevent noise damage?	0	388 (100%)	
Q/N		Yes	No	Don't know
7.	Are ear plugs and ear muffs etc effective in preventing hearing loss?	316 (81.4%)	53 (13.7%)	19(3.9%)
Q/N		Yes	No	Don't know
8.	Do you feel that your hearing ability is decreasing?	81 (20.9%)	263 (67.8%)	44 (11.3%)
Q/N		Unavailable	unable to hear warning signal	Discomfort in ear
9.	What are the reasons of not using ear protective measures during firing?	239 (61.6%)	96 (24.7%)	53 (13.6%)
Q/N		Yes	No	
10	Do your seniors advise and teach to use hearing protective devices during firing?	267 (68.8%)	121 (31.1%)	

not, 316 responded in affirmative, 53 replied in negative and 19 soldiers did not know about its effectiveness i.e. they were ignorant of the knowledge that use of hearing protection during

that they do not have/possess the hearing protectors, 96 attributed it to inability to hear warning sounds, and 53 said that it causes pain in ears. When enquired about the self awareness of

any hearing loss, 81 responded in affirmative, 263 negated and 44 replied that they do not know. Upon enquiring that whether seniors advocate use of hearing protection during routine firing 267 replied in affirmative and 121 refuted it. The response of soldiers to all the questions has been shown in the table, along with frequencies and %ages of different types of responses.

DISCUSSION

Soldiers are routinely employed on sentry duties and few also are employed at sensitive communication, therefore sound hearing is a pre-requisite to all these. Secondly post retirement compensation for hearing loss also adds to the economical burden on the institution. It is also established through studies that hearing impairment adds up chances of injuries eg during driving, crossing roads as the individual is unable to hear horns, sirens and warning shouts. Hearing impairment results in both physical and psychological stress as it affects their daily life, modes of entertainment are reduced and post retirement employment is also affected. In severe cases, it can cause social isolation and ultimately depression^{6,7}. To prevent noise induced hearing loss, hearing protection usage should be improved^{8,9}. The use of such hearing protection measures is under influence of factors like education, work experience and perceived hearing loss¹⁰. Other studies also have shown that practice firing during professional training causes hearing loss¹¹. Once noise induced hearing loss sets in there is no significant treatment except providing hearing aids which are not at all substitute to normal natural hearing. Secondly hearing aids add significantly to the economic burden on the country and society.

Pakistan Army is exposed to various operations through out the country and noise during active operations can not be prevented however during routine practice firing, care can be taken and hearing protection can be helpful to great extent. In the subject study 91.5% soldiers were aware of the association between noise and hearing loss. But the knowledge about the

measures to protect hearing from noise caused by firing was poor showing that 61.1% indicated cotton balls as the right measure and only 38.9% indicated ear plugs/ear muffs as the right measure. In present study, only 31.5% soldiers used hearing protection regularly, and 38.4% use them irregularly. In a study by Heupa et al in Brazil showed around 91.5% of study subjects

Education Status of Subjects

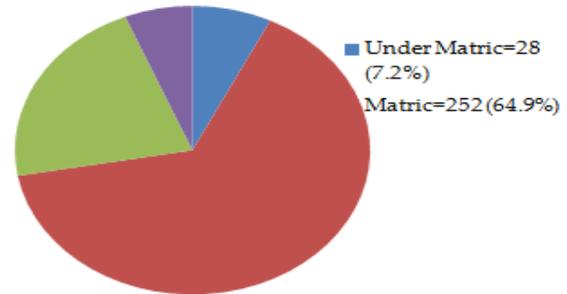


Figure-1: Education status of subjects among the study group.

used hearing protection which is quite high as compared to our study¹². Heupa also showed that 32.3 % of study subjects were never taught how to use hearing protection measures which is similar to that in our study. When enquired about

Use of Hearing Protection

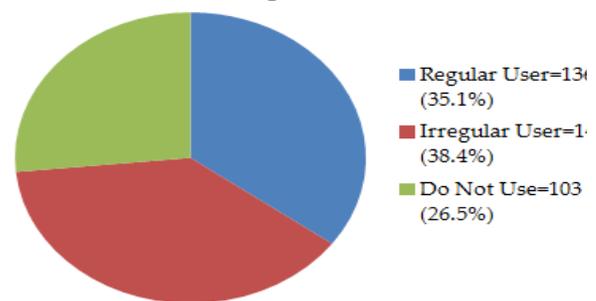


Figure-2: Use of hearing protective measures by troops.

the reasons of not using hearing protection, 239 (61.6%) said that they do not have/possess the hearing protectors, 96 (24.7%) attributed it to inability to hear warning sounds, 53 (13.6%) said that it causes pain in ears.

These findings show that hearing protection education is vital for hearing conservation in

soldiers. These protective devices including ear muffs and ear plugs attenuate the impulse noise reaching the middle and inner ears. Various modes of educating troops in the subject purpose include lectures, seminars and provision of hearing protective devices including ear plugs and muffs to all soldiers. Such ear plugs and muffs should ideally be included in the compulsory soldier kit at all the military units. Seniors especially officers are role models for young soldiers; they should practice the routine use of hearing protection themselves and should advise the young soldiers and others the same. In the present study, upon enquiring that whether seniors advocate use of hearing protection during routine firing 267 (68.8%) replied in affirmative and 121 (31.1%) refuted it. Needless to say the seniors should be asked to be vigilant and should ensure their use during routine practice firing. Regular training and demonstrations for correct use of hearing protection devices, ear plugs and ear muffs should be carried out, imparting practical knowledge to the troops about their use. Each soldier should be trained on how to use and fit hearing protection device. As mentioned above, the main excuses for not using hearing protection were unavailability, inability to hear warning sounds, discomfort in ears. But adequate education and regular emphasis can make the individuals realize the utmost importance of hearing protectors.

CONCLUSION

The trend of hearing protection during routine firing was not satisfactory among troops, consequent to lack of adequate and optimum knowledge of fire arm noise induced hearing loss.

Thus they should be educated to enhance their knowledge about hearing protection from fire arm noise and should be encouraged to use hearing protective measures during routine firing.

CONFLICT OF INTEREST

This study has no conflict of interest to declare by any author.

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