

Occupational Exposure to Noise and Prevalence of Hearing Loss among Workers in Thamine Textile Mill, Myanmar

Aung Khin ZAW¹, Aung Min MYAT², Mya THANDAR³, Ye Minn HTUN⁴, Than Htut AUNG⁵, Kyaw Myo TUN⁶, Zaw Myo HAN⁷



¹ Department of Research and Development, Defence Services Medical School, Hmawbi, Myanmar
² Department of Public Health, Ministry of Health and Sports, Naypyidaw, Myanmar
³ Department of Environmental and Occupational Health, University of Public Health, Yangon, Myanmar
⁴ Outpatient Department, No.3 Military Hospital (300 bedded), Kyaing Tong, Myanmar
⁵ Department of Health Promotion, Health and Disease Control Unit, Naypyidaw, Myanmar
⁶ Department of Preventive and Social Medicine, Defence Services Medical Academy, Yangon, Myanmar
⁷ Defence Services Liver Hospital, Yangon, Myanmar



agkhnz86@gmail.com

Introduction

- In developing countries, occupational noise exposure is a second most self-reported occupational illness with functional, social, emotional and economic impacts on industrial workers.
- Hearing loss is an occupational hazard especially facing by textile workers.

Objectives

Main objectives of this study -

- to explore level of noise exposure
- to determine factors associated with hearing loss among textile workers

Materials and method

- A cross-sectional descriptive study was conducted at Textile Mill (Thamine), Yangon Region from April to December 2018.
- In total, 226 workers were selected using simple random sampling from three weaving sections and interviewed face-to-face by two interviewers using structured questionnaires.
- Noise exposure level was measured by a hygiene officer using digital sound level meter (Model – 407732) as a mean value of 15 measurements hourly during working time for eight hours and 8-hr TWA was recorded. Then, average noise exposure level of 8-hr TWA on five separate days was taken.
- The assessment of hearing loss was done by using pure-tone audiometer (Model – AS5-AOM, 08026 Barcelona-Spain, Sibelmed). Audiometric test was performed by a trained technician.
- To identify hearing loss, an otolaryngologist assessed the audiograms, and then an occupational physician confirmed the diagnosis of hearing loss.
- Logistic regression analysis was performed to determine the associated factors of hearing loss.

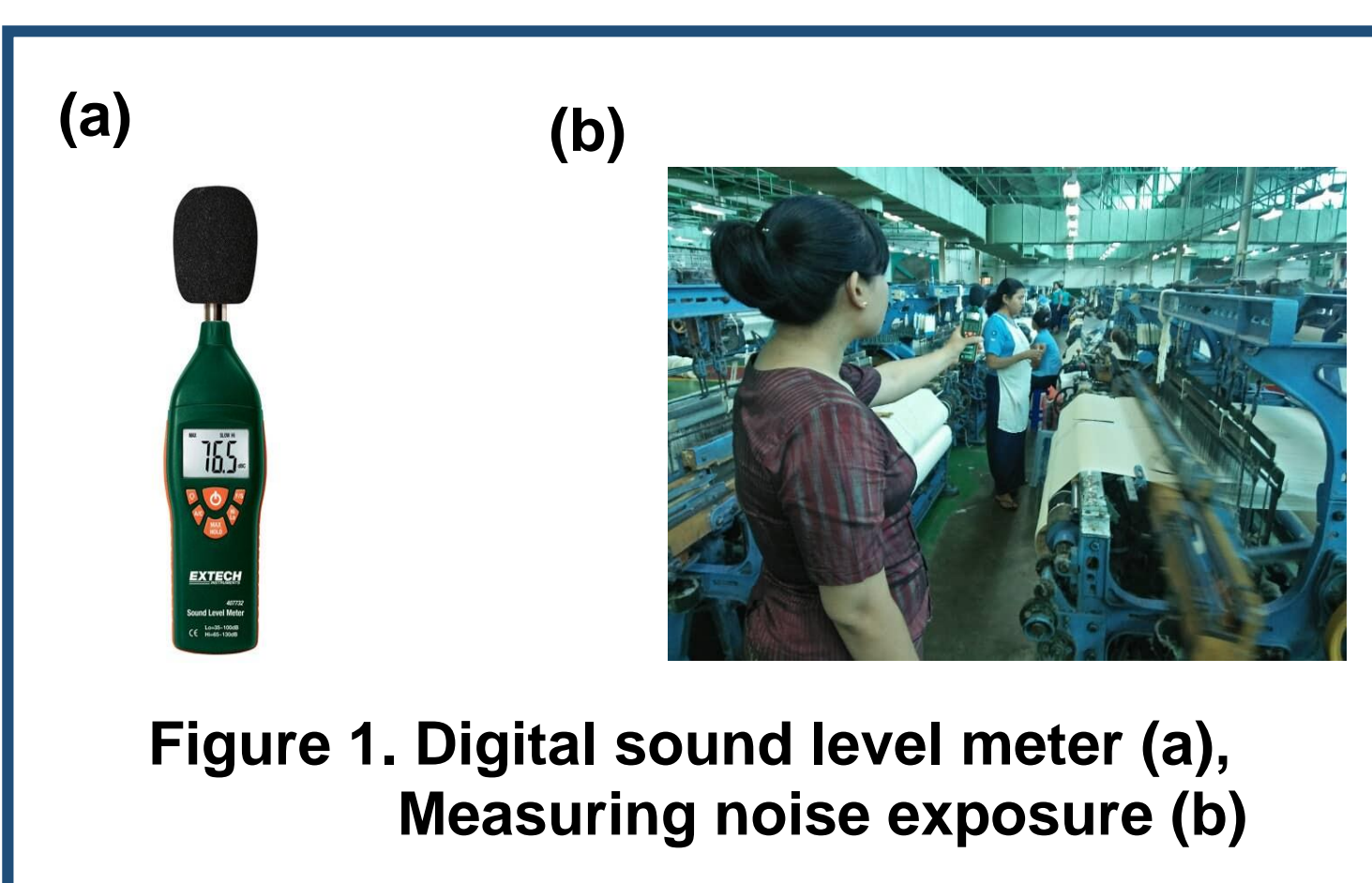


Figure 1. Digital sound level meter (a), Measuring noise exposure (b)

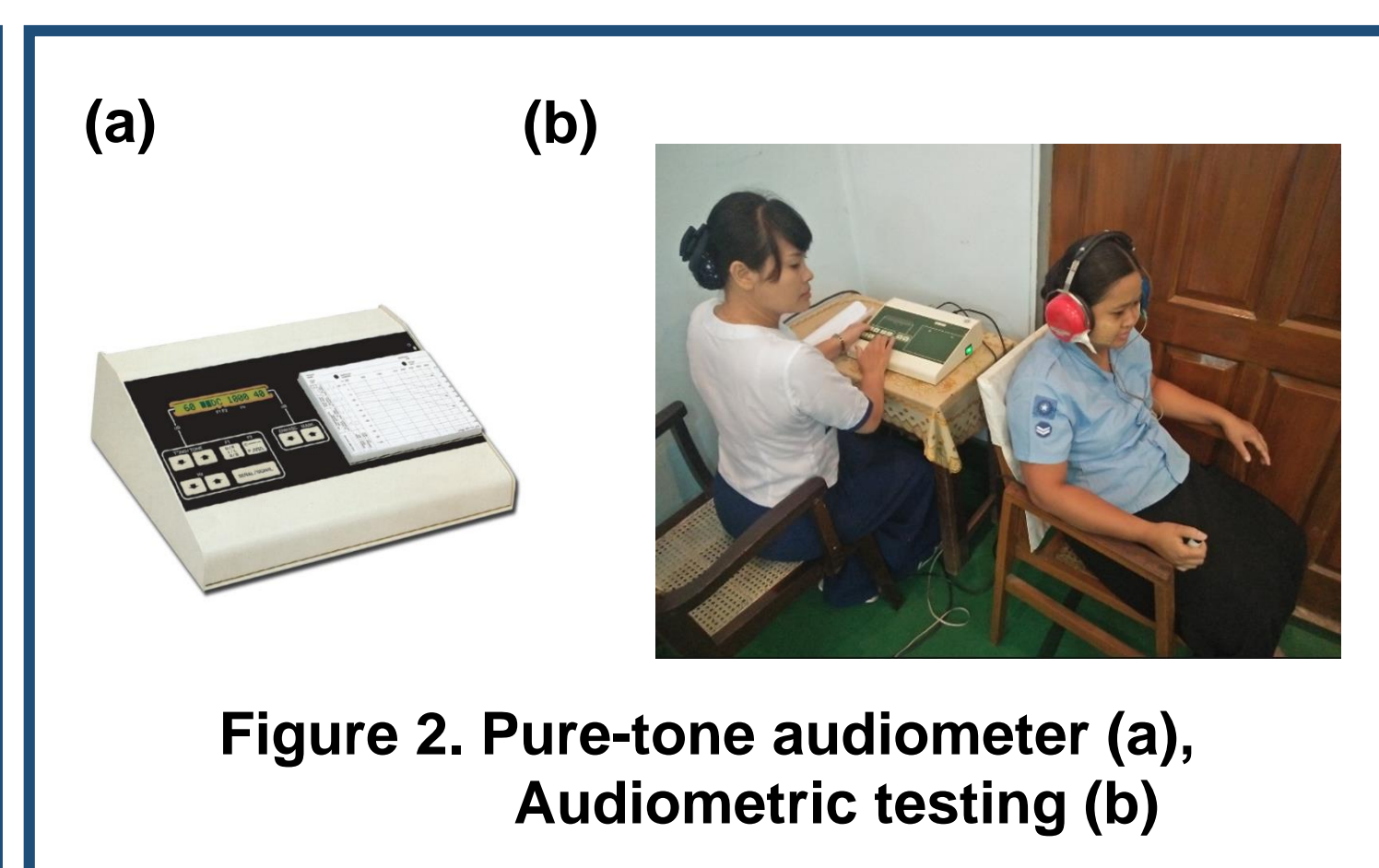


Figure 2. Pure-tone audiometer (a), Audiometric testing (b)

Results and discussion

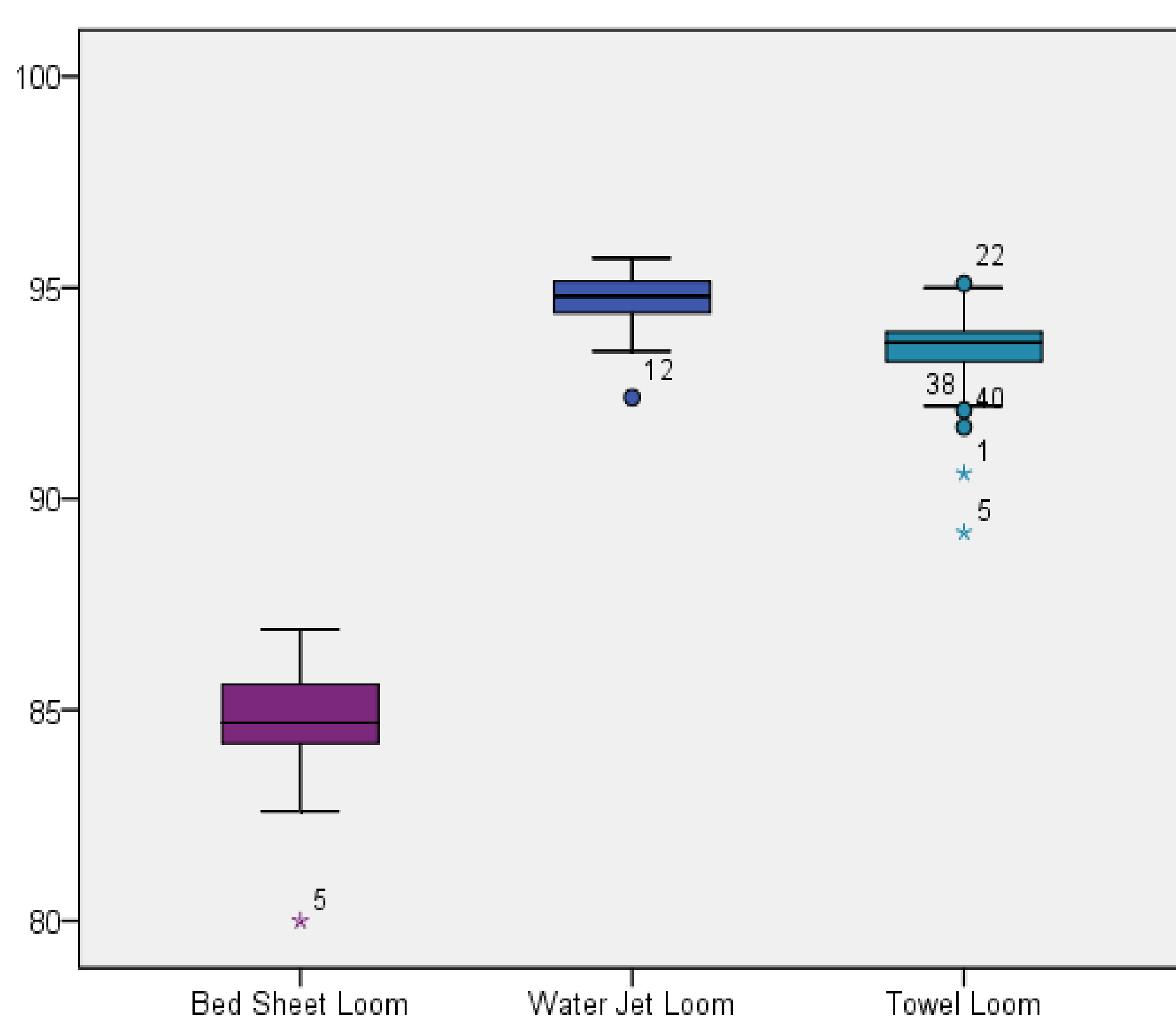


Figure 3. Sound Level in weaving sections

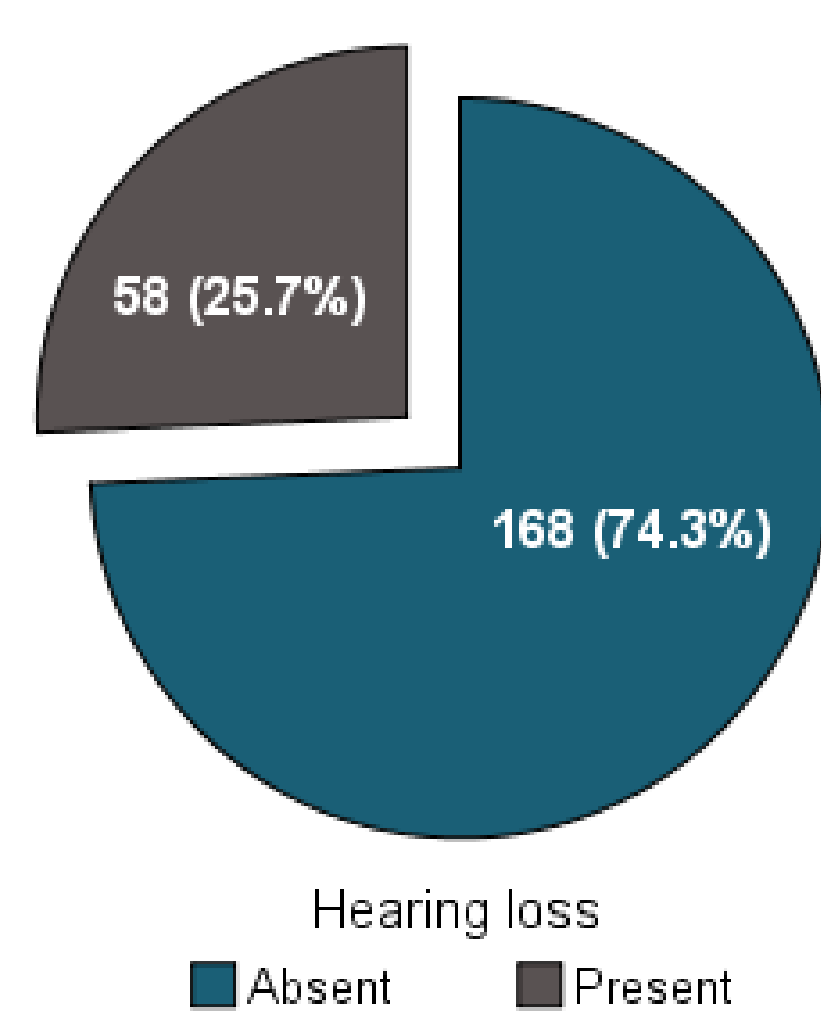


Figure 4. Hearing loss among workers (n=226)

- The workers had poor awareness on NIHL and self-protective measure by using personal protective device (PPD) at workplace.
- Age related hearing loss was one of the most common causes of high frequency hearing loss and its effect began around the age of forty. A phenomenon of presbycusis which was loss of hearing that gradually occurs in older age.

Acknowledgements

First of all, we would like to express our appreciation to all participants from textile mill. We sincerely thank Dr. U Than Htut (Honorary Professor) from Department of Occupational Health and Environmental Health, University of Public Health for his encouragement and advice. We would like to express our thanks to Dr. Kay Khine Aye (Deputy Director), Daw San San Lwin (Hygiene Officer), Daw Po Po Chit and Daw Chaw Chaw (Staff Nurses) from Occupational and Environmental Health Division, Department of Public Health, Ministry of Health and Sports for provision of technical advice and supports.

Variables	Hearing Loss n (%)		Bivariate analysis		Multivariate analysis †	
	Absent	Present	p value	COR (95% CI)	p value	AOR (95% CI)
Demographic factors						
Gender						
Male	9 (60.0)	6 (40.0)		1.00		
Female	159 (75.4)	52 (24.6)	0.20	0.49 (0.17-1.44)		
Age						
< 35 years	118 (89.4)	14 (10.6)		1.00		1.00
≥ 35 years	50 (53.2)	44 (46.8)	0.001	7.42 (3.73-14.73)	0.001	6.90 (3.45-13.82)
Educational level ‡						
≥ High school education level	132 (78.6)	36 (21.4)		1.00		
< High school education level	36 (62.1)	22 (37.9)	0.01	2.24 (1.18-4.27)		
Current weaving sections						
Water jet loom	55 (73.3)	20 (26.7)		1.00		
Towel loom	54 (72.0)	21 (28.0)	0.86	1.07 (0.52-2.19)		
Bed sheet loom	59 (77.6)	17 (22.4)	0.54	0.79 (0.38-1.67)		
Risk behaviours						
Smoking						
No	163 (75.1)	54 (24.9)		1.00		
Yes	5 (55.6)	4 (44.4)	0.20	2.42 (0.63-9.32)		
Alcohol drinking						
No	167 (74.9)	56 (25.1)		1.00		
Yes	1 (33.3)	2 (66.7)	0.15	5.96 (0.53-67.04)		
Loud music listening						
No	138 (73.0)	51 (27.0)		1.00		
Yes	30 (81.1)	7 (18.9)	0.31	0.63 (0.26-1.53)		
Health problems						
Hearing difficulty						
No	162 (77.1)	48 (22.9)		1.00		
Yes	6 (37.5)	10 (62.5)	0.001	5.63 (1.95-16.27)		
Tinnitus						
No	156 (77.6)	45 (22.4)		1.00		1.00
Yes	12 (48.0)	13 (52.0)	0.01	3.76 (1.60-8.80)	0.03	2.88 (1.13-7.37)
Headache						
No	155 (74.5)	53 (25.5)		1.00		
Yes	13 (72.2)	5 (27.8)	0.83	1.13 (0.38-3.30)		
Earache						
No	160 (75.1)	53 (24.9)		1.00		
Yes	8 (61.5)	5 (38.5)	0.28	1.89 (0.59-6.02)		
Hypertension						
No	147 (79.9)	37 (20.1)		1.00		
Yes	21 (50.0)	21 (50.0)	0.001	3.97 (1.97-8.03)		
Diabetes Mellitus						
No	166 (75.1)	55 (24.9)		1.00		
Yes	2 (40.0)	3 (60.0)	0.10	4.53 (0.74-27.80)		
Factors related with noise exposure						
Duration of service in textile mill						
≤ 9 years	103 (89.6)	12 (10.4)		1.00		
> 9 years	65 (58.6)	46 (41.4)	0.001	6.07 (2.99-12.32)		
Duration of service in current section						
≤ 9 years	120 (77.9)	34 (22.1)		1.00		
> 9 years	48 (66.7)	24 (33.3)	0.07	1.77 (0.95-3.28)		
Noise exposure level						
< 85 dB(A)	59 (77.6)	17 (22.4)		1.00		
≥ 85 dB(A)	109 (72.7)	41 (27.3)	0.42	1.31 (0.68-2.49)		

† Only significant variables after bivariate analysis (age, education level, hearing difficulty, tinnitus, hypertension, and service duration in factory) were included in multivariate regression model.

‡ Education level - categorized as ≥ High school education level (high school education, and graduate and above) and < High school education level (read and write, primary school education, and middle school education)

- Exposure to loud noise can develop tinnitus, and then it can progress hearing loss. The workers with hearing loss will not notice changes in hearing ability until a large threshold shift has occurred.

Conclusion

- A hearing conservation program should be immediately implemented for effective prevention and control of hearing loss when the workers exposed to equal and exceed 85 dB(A).
- Installing quieter equipment in work process, enforcing usage of PPD in workplaces, and applying work practices are the critical elements for noise control.
- Local national authority should focus on noise monitoring, occupational safety policies, providing education for NIHL, periodic audiometric assessments and follow up evaluation for hearing threshold shift.

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