RESULTS

Table-1

Distribution of workers in various departments.

Department	Number	Percentage
Administration	18	17.3%
Knitting	16	15.4%
Dyeing	18	17.3%
Finishing	14	13.45%
Sewing	20	19.23%
Generators	18	17.3%
Total	104	100%

The number of the participant workers in this study is expressed in table-1. The total number is 104 workers selected from six departments, administration 18, knitting 16, dyeing 18, finishing 14, sewing 20, and generators 18 workers.

Table-2

Departmental noise intensity levels.

Department	Noise intensity level(dB)
Administration	45-50
Knitting	66-88
Dyeing	90-95
Finishing	76-82
Sewing	77-85
Generators	96-100

The table-2 shows noise intensity level which was 45 to 50 dB. in administration department, 66 to 88dB. in knitting, 90 to 95 dB. in dyeing, 76 to 82 dB.in finishing, 77 to 85 dB. in sewing, and 96 to 100 dB in generators area.

Table-3

Exposure status per day.

Department	Hours of exposure per day
Administration	8
Knitting	8
Dyeing	8
Finishing	8
Sewing	8
Generators	8

The table-3 the average duration of exposure of each subject in the various departments was 8 hours per day.

Table-4

Distribution of NIHL among the departments

Department	Noise intensity	No. of workers	No. of NIHL	% of NIHL
Administration	45-50	18	0	0%
Knitting	66-88	16	2	12.5%
Dyeing	90-95	18	6	33.3%
Finishing	76-82	14	4	28.57%
Sewing	77-85	20	4	20%
Generators	96-100	18	8	44.4%
Total		104	24	

As shown in table-4, there were 24 workers having NIHL distributed among the different departments.

Table-5

Descriptive statistics of different contentious variables:

	N	Mean	SE of mean	SD	Skewness	SE of skeweness
Age	104	35.50	0.719	7.335	0.176	0.237
Years of employment	104	12.56	0.695	7.087	0.207	0.237
Mean of both ears hearing intenisty at 2000 Hz	104	19.7596	0.22793	2.32440	-0.249	0.237
Mean of both ears hearing intenisty at 4000 Hz	104	22.5962	0.53351	5.44080	2.209	0.237
Mean of both ears hearing intenisty at 8000 Hz	104	26.5865	1.12369	11.45939	1.592	0.237
Mean of hearing intenisty at 2000, 4000 and 8000 Hz	104	22.9808	0.51186	5.21994	1.296	0.237

N=number. SE=standard error. SD=standard deviation.

Table-6

Describing the correlation between Age and years of employment, and hearing intensity at different frequencies:

	n	Spearman's rho correlation coefficient	P value
Hearing intensity (2000 Hz) * Age	104	-0.023	0.819
Hearing intensity (2000 Hz) * Years of employment	104	0.001	0.995
Hearing intensity (4000 Hz) * Age	104	0.291	*0.003*
Hearing intensity (4000 Hz) * Years of employment	104	0.294	*0.002*
Hearing intensity (8000 Hz) * Age	104	0.441	*< 0.001*
Hearing intensity (8000 Hz) * Years of employment	104	0.405	*< 0.001*
Hearing intensity$_{(1)}$ * Age	104	0.367	*< 0.001*
Hearing intensity$_{(1)}$ * Years of employment	104	0.365	*< 0.001*

1 = Mean of hearing intenisty of both ears at 2000, 4000 and 8000 Hz.

Spearman's rho correlation coefficient test showing that highly significant +ve correlation between age and years of employment, and hearing intensity (threshold) at 4000 Hz with correlation

coefficient value 0.291 and 0.294 and P value 0.003 and 0.002 respectively.

The test also showing strongly significant +ve correlation between age and years of employment, and hearing intensity (threshold) at 8000 Hz with correlation coefficient value 0.441 and 0.405 and P value more than 0.001 and respectively

This strongly significant +ve correlation was found also between age and years of employment, and Mean of hearing intensity (threshold) of both ears at 2000, 4000 and 8000 Hz with correlation coefficient value 0.367 and 0.365 and P value more than 0.001 and respectively.

There was no significance between age and years of employment , and hearing intensity at 2000 Hz.

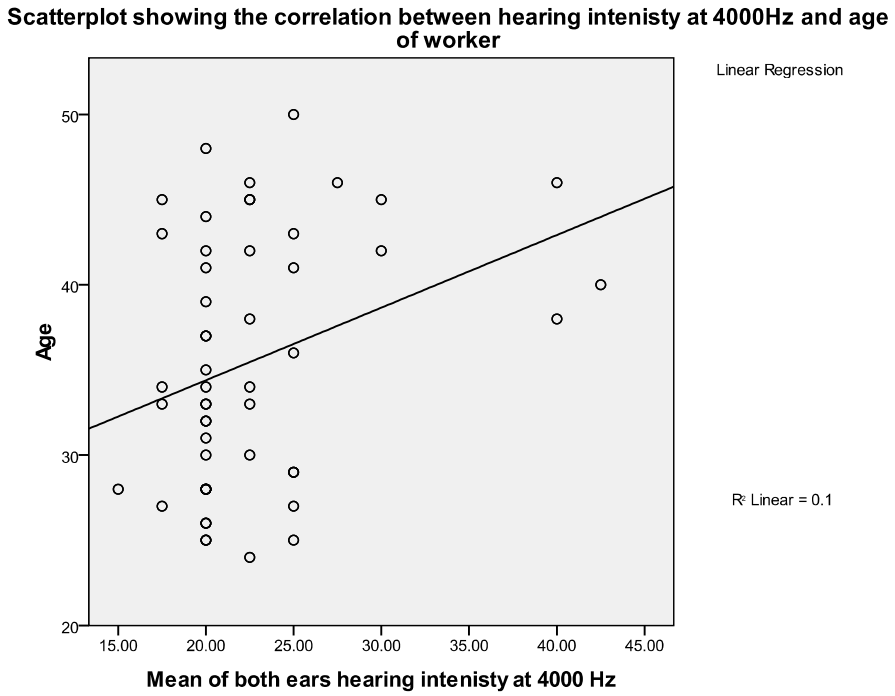


Figure-1 : Correlation between hearing intensity at 4000 Hz. and age of workers.

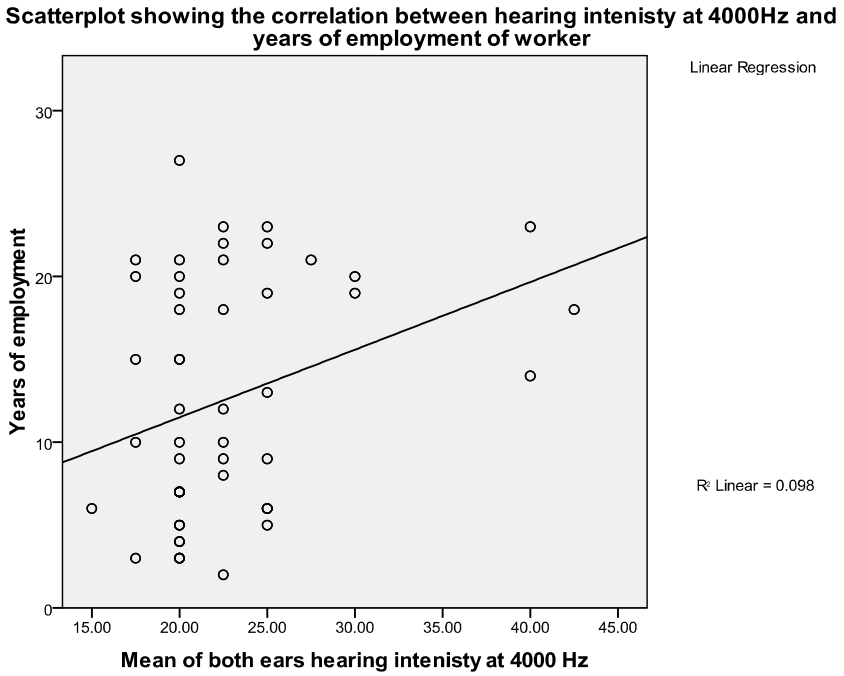


Figure-2 : Correlation between hearing intensity at 4000 Hz. and years of employment of workers.

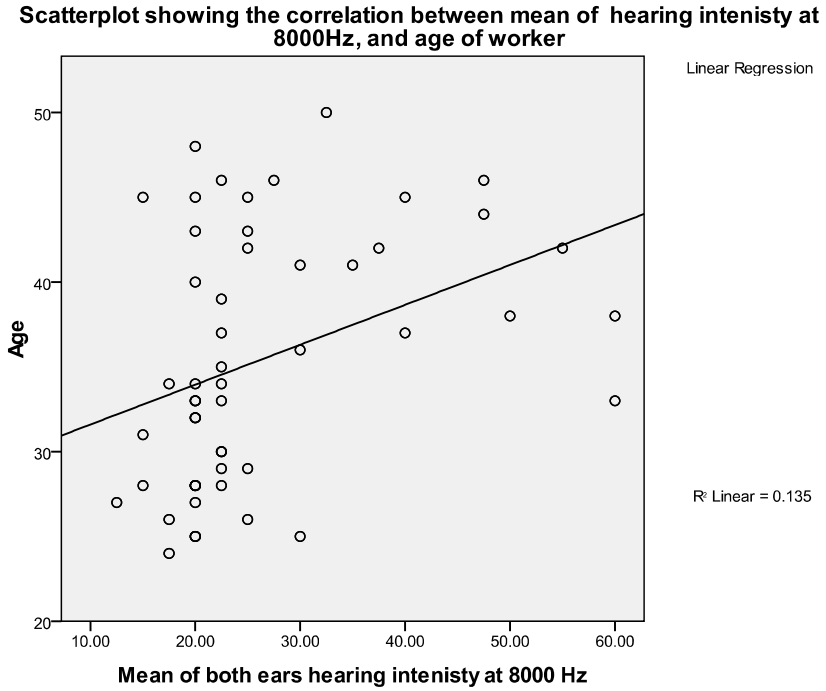


Figure-3: Correlation between mean of hearing intensity at 8000Hz and age of workers.

Figure-4: Correlation between mean of hearing intensity at 8000Hz and years of employment workers.

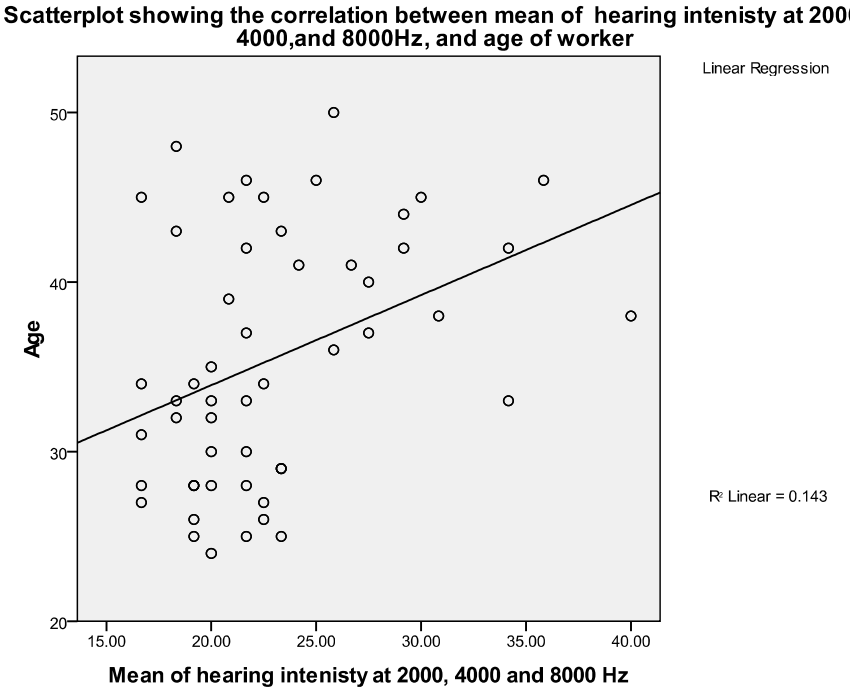


Figure-5: Correlation between mean of hearing intensity at 2000, 4000, and 8000Hz, and age of workers.

Figure-6: Correlation between mean of hearing intensity at 2000, 4000, and 8000Hz, and years of employment of workers.

Table-7

Association between age and years of employment, and hearing intensity (normal/NIHL) at different frequencies by using Mann-Whitney test:

	Hearing Intenisty				**Mann-Whitney U value**	**P value**
		n	Mean rank	Sum of ranks		
Hearing intensity (2000Hz)*Age	Normal	82	54.40	4461.00	746.00	0.214
	NIHL	22	45.41	999.00		
Hearing intensity (2000Hz)*Y. Emp.	Normal	82	54.06	4433.00	774.00	0.307
	NIHL	22	46.68	1027.00		
Hearing intensity (4000Hz)*Age	Normal	58	44.47	2579.00	868.00	*0.002*
	NIHL	46	62.63	2881.00		
Hearing intensity (4000Hz)*Y. Emp.	Normal	58	44.16	2561.00	850.00	*0.002*
	NIHL	46	63.02	2899.00		
Hearing intensity (8000Hz)*Age	Normal	44	39.86	1754.00	764.00	< *0.001*
	NIHL	60	61.77	3706.00		
Hearing intensity (8000Hz)*Y. Emp.	Normal	44	41.82	1840.00	850.00	*0.002*
	NIHL	60	60.33	3620.00		

By using Mann-Whitney test we found that age and years of employment in NIHL group is more than that in normal hearing group when hearing intensity measured at 4000 Hz and 8000Hz frequencies with Mann-Whitney U value 868.00, 850.00, 764.00, and 850.00 respectively and P value 0.002, 0.002, less than 0.001 and 0.002 respectively.

Table-8

Association between age and years of employment and NIHL at different frequencies (no NIHL/NIHL at one frequency/ NIHL at two frequencies/NIHL at three frequencies) by using Kruskal Wallies test:

	NIHL at different frequencies			χ^2	**df**	**P value**
		N	**Mean rank**			
NIHL*Age	No NIHL	32	42.13	12.783	3	*0.005*
	NIHL at one Hz	24	44.50			
	NIHL at two Hz	40	65.35			
	NIHL at three Hz	8	53.75			
NIHL*Years of employment	No NIHL	32	40.94	16.720	3	*0.001*
	NIHL at one Hz	24	45.83			
	NIHL at two Hz	40	67.60			
	NIHL at three Hz	8	43.25			

Kruskal Wallies test showing there is significant difference between NIHL and age with chi square 12.783, degree of freedom 3 and P value 0.005, also this significant difference was found between NIHL and years of employment with chi square 16.720, degree of freedom 3 and P value 0.001.

Figure-7: Difference of workers' age between normal and NIHL at 4000 Hz.

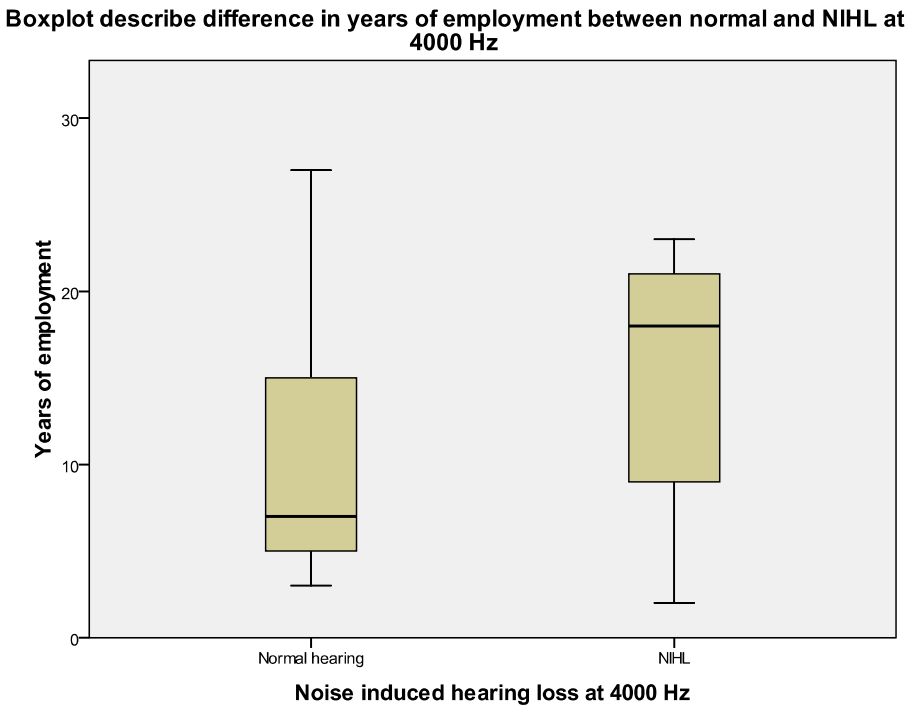


Figure-8: Difference in years of employment between normal and NIHL at 4000Hz.

Figure-9: Difference of workers' age between normal and NIHL at 8000Hz.

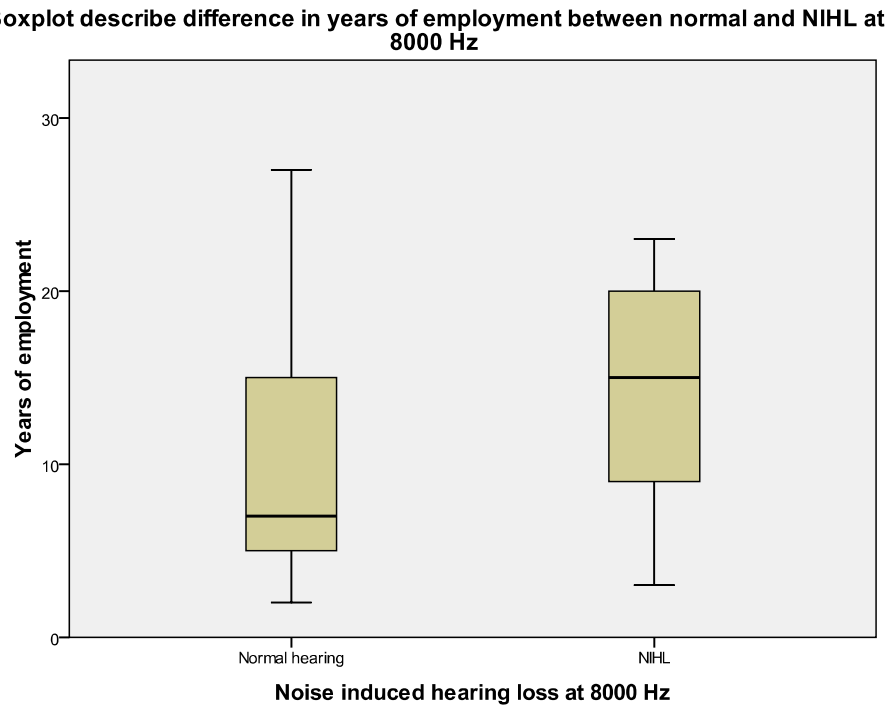


Figure-10: Difference in years of employment between normal and NIHL at 8000Hz.

Table-9

Cross tabulation showing the frequencies distributions of age, years of employment and noise intenisty level, and Hearing intenisty (normal/NIHL) at 2000, 4000 and 8000Hz:

		2000 Hz		4000 Hz		8000 Hz		Total
		normal	NIHL	Normal	NIHL	Normal	NIHL	
Age (years)	≤35	44 (53.7%)	12 (54.5%)	40 (60.0%)	16 (34.8%)	34 (77.3%)	22 (36.7%)	56
	>35	38 (46.3%)	10 (45.5%)	18 (31.0%)	30 (65.2%)	10 (22.7%)	38 (63.3%)	48
	Total	82	22	58	46	44	60	104
Years of employment	≤10	40 (48.8%)	12 (54.5%)	36 (62.1%)	16 (34.8%)	30 (68.2%)	22 (36.7%)	52
	>10	42 (51.2%)	10 (45.5%)	22 (37.9%)	30 (65.2%)	14 (31.8%)	38 (63.3%)	52
	Total	82	22	58	46	44	60	104
Noise intenisty level (dB)	≤8 5	38 (46.3%)	14 (63.6%)	28 (48.3%)	24 (52.2%)	20 (45.5%)	32 (53.3%)	52
	>85	44 (53.7%)	8 (36.4%)	30 (51.7%)	22 (47.8%)	24 (54.5%)	28 (46.7%)	52
	Total	82	22	58	46	44	60	104

NB: Percents for columns.

Table-10

associations of age, years of employment and noise intensity level, and Hearing intensity (normal/NIHL) at 2000, 4000 and 8000Hz by using χ^2 tests:

	n	χ^2	df	P value	OR [95%CI]
Hearing intenisty (2000 Hz) * Age	104	0.005	1	0.941	-
Hearing intenisty (4000 Hz) * Age	104	12.062	1	*0.001*	4.167 [1.829-9.490] (≤35/>35 years old)
Hearing intenisty (8000 Hz) * Age	104	16.842	1	*< 0.001*	5.873 [2.438-14.146] (≤35/>35 years old)
Hearing intenisty (2000 Hz) * Years of employment	104	0.231	1	0.631	-
Hearing intenisty (4000 Hz) * Years of employment	104	7.640	1	*0.006*	3.068 [1.371-6.869] (≤10/>10 years)
Hearing intenisty (8000 Hz) * Years of employment	104	10.085	1	*0.001*	3.701 [1.624-8.433] (≤10/>10 years)
Hearing intenisty (2000 Hz) * Noise intenisty level	104	2.075	1	0.150	-
Hearing intenisty (4000 Hz) * Noise intenisty level	104	0.156	1	0.693	-
Hearing intenisty (8000 Hz) * Noise intenisty level	104	0.630	1	0.427	-

Chi square test showing that group of workers aged less than or equal to 35 years old is more among normal hearing workers than whom with NIHL when hearing assessed at 4000 and 8000 Hz.by chi square value 12.062 and 16.842, P value 0.001 and less than 0.001 and Odds ratio 4.167 and 5.873 respectively.

The test also showing that group of workers with years of employment less than or equal to 10 years is more among normal hearing workers than whom with NIHL when hearing assessed at 4000 and 8000 Hz.by chi square value 7.640 and 10.085, P value 0.006 and 0.001 and Odds ratio 3.068 and 3.701 respectively.

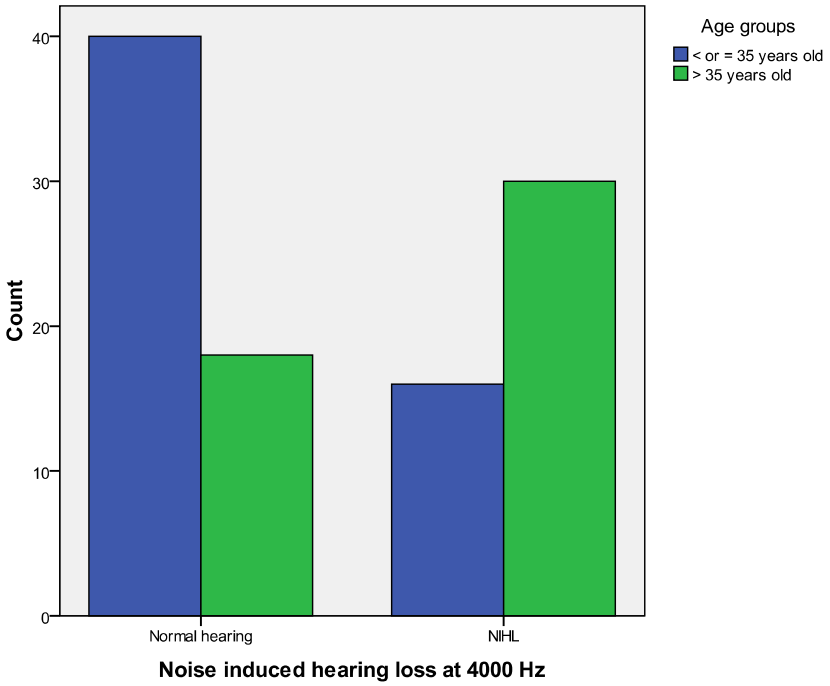


Figure-11: Bar chart showing frequencies of age groups in between workers with normal hearing and NIHL at 4000 Hz.

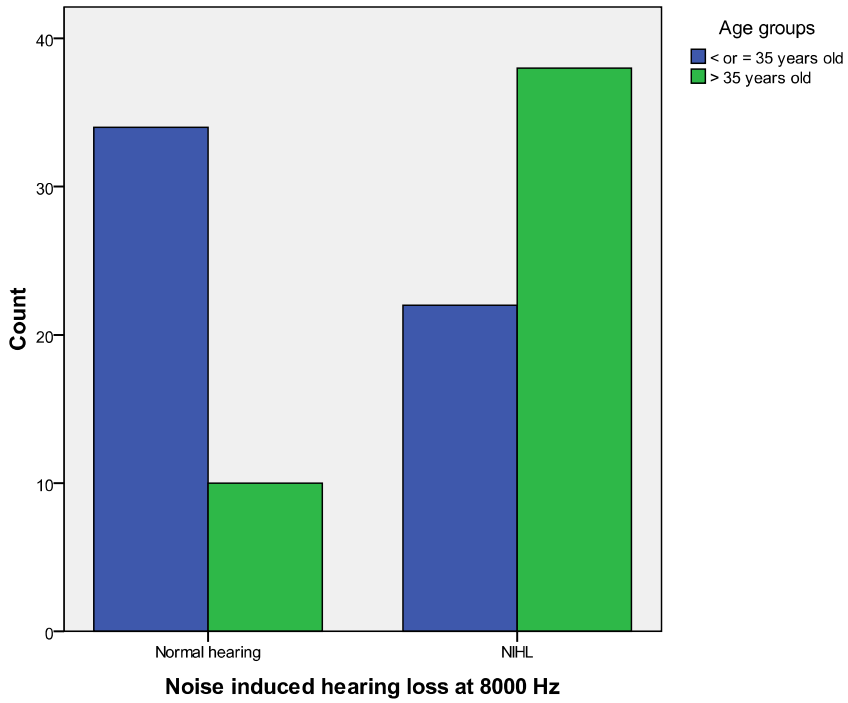


Figure-12: Bar chart showing frequencies of age groups in between workers with normal hearing and NIHL at 8000 Hz.

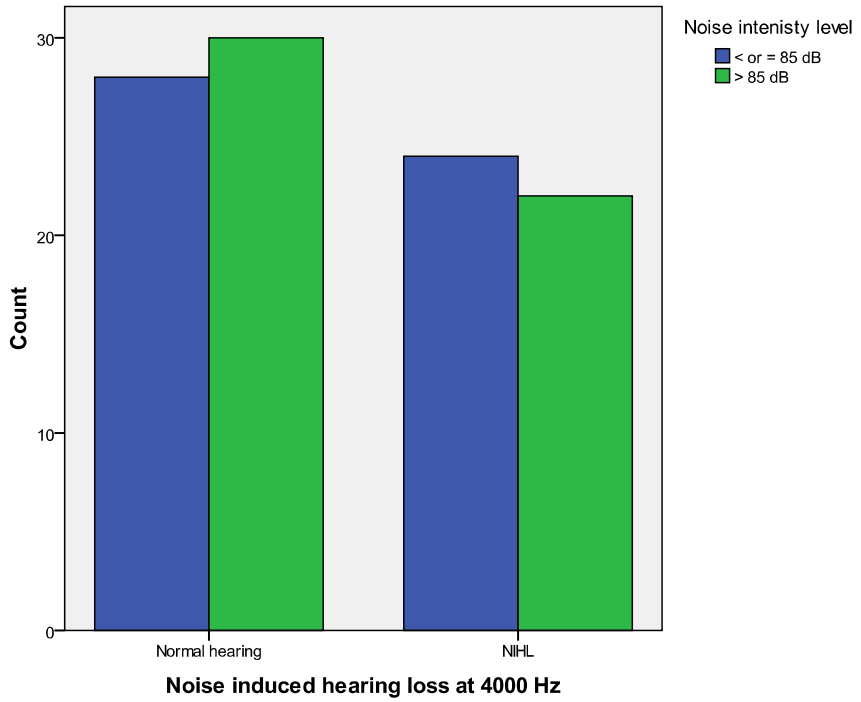


Figure-13: Bar chart showing frequencies of noise intensity level in between workers with normal hearing and NIHL at 4000 Hz.

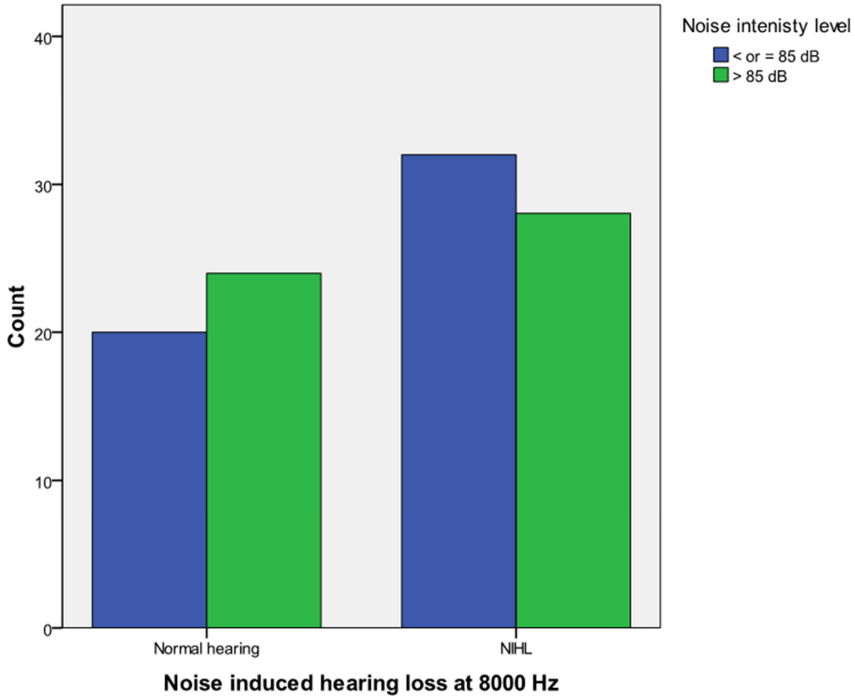
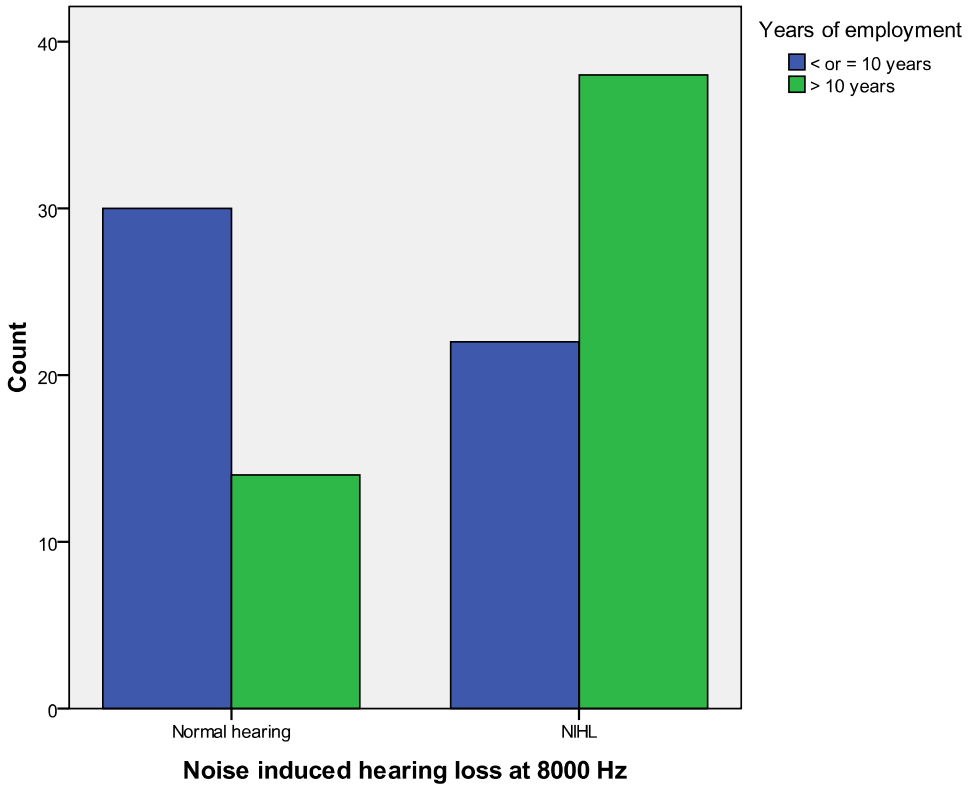


Figure-14: Bar chart showing frequencies of noise intensity level in between workers with normal hearing and NIHL at 8000 Hz.



Figur-15: Bar chart showing frequencies of years of employment in between workers with normal hearing and NIHL at 8000 Hz.