Int.J.Curr.Microbiol.App.Sci (2021) *10*(01): 1118-1126

International Journal of Current Microbiology and Applied Sciences
***ISSN: 2319-7706* Volume 10 Number 01 (2021)**
Journal homepage: http://www.ijcmas.com

Original Research Article https://doi.org/10.20546/ijcmas.2021.1001.135

Noise and Its Impact on Health of the Workers in Spinning Industry

Spoorti Kallur* and Suma Hasalkar

Department of Family Resource Management, College of Community Science, University of Agricultural Sciences, Dharwad, Karnataka, India

**Corresponding author*

Keywords

Noise, Hearing loss, Perception of noise, Occupational health problems and Tinnitus

Article Info

Accepted:
12 December 2020
Available Online:
10 January 2021

A B S T R A C T

Noise is considered as a type of pollution that affects environmental physical quality in industrial work environment, airport, and traffic and for community as well. The sources of noise are transportation, festival and functions, household sources and industrial noise. One of the important problems of noise sources is industrial noise. High noise exposure in industries not only affects the communication among the workers, but also leads to the other psychological and physiological effects on the workers. Therefore, an effort was made to assess the noise and itd impact on health of the workers. The study was conducted in and around Banahatti and Gadag city. Total sample was 120 respondents. Data elicited through Structured interview schedule. Noise level meter. Hygrometer and lux metre was used to assess the environmental parameters in the spinning industry. Five point likert scale was used to assess the perception of noise and to know the severity of hearing loss among workers. The observed average noise from all sections was 82.30 dBA, temperature24.70˚C, humidity 32.30% and light 113.70 lux in spinning unit. One third (33.33%) belonged to age group of 31-40 years age group. Majority of workers (22.50%) had 10-15 years of work experience in spinning unit and 40.00 per cent workers worked in shift hours. Almost all workers perceived the noise always in all the sections of spinning industry. More than 30.00 per cent of workers had very severe hearing loss due exposure to high noise worker at high risk of developing hearing problems and other associated infirmities due to excessive occupational noise. Study strongly recommends provision of safety measures and personal protective tools like, ear plugs, dust mask and ear muffs to safeguard the worker.

Introduction

Noise is considered as a type of pollution that affects environmental physical quality in industrial work environment, airport, and traffic and for community as well. Noise is defined as any disagreeable or undesired sound.

"Noise is derived from Latin word "nausea" implying 'unwanted sound'. "Sound that is unwanted or disrupts one's quality of life is called as noise. When there is lot of noise in the environment, it is termed as noise pollution." (Raman, 2006). The sources of noise are transportation, festival and functions, household sources and industrial

noise. One of the important problems of noise sources is industrial noise. The general effect of industrial noise on the health of workers has been a topic of debate among scientists for a number of years. The large, medium and small scale hand tool manufacturers of developing countries are lagging far behind in implementing hearing conservation, noise control programs, occupational health and safety programs. These industries have a plenty of devices and machines that considered as a source of noise such as: rotors, cutting machines, motors, hand looms, power looms, compressors, electrical machines, internal combustion engines, drilling, crushing, fans and transportation resources. Consequently the workers of hand tool industrial are exposed to the noise levels overstep the permissible limits. High noise exposure in industries not only affects the communication among the workers, but also leads to the other psychological and physiological effects on the workers (Berivan and Dosky, 2014).

The textile industry, as a part of manufacturing sector has been one of the important sectors to Contribute towards country's economy. It contributes 14% to the industrial production, 3% to the gross domestic production, 8% to the total excise revenue collection, 17% to the country's export earnings and most importantly it provides direct employment to over 35 million people in India (The Manufacturing Plan, 2015; Textile and Jute Industry, 2015). Textile industry is closely related to the agricultural sector and has employed about 35 million people. If the employment in textile related agricultural sector is included, like ginning, spinning, pressing, cotton trading the employment is as high as 95 million people.

The handloom and power loom sectors are catering to 20 and 70 percent of the cloth production respectively in India. The power loom mainly accounts for low cost production and flexibility in changing the production pattern to suit the market demands (Talukdar 2001). The environmental degradation by way of pollution of air, noise and water occurs during the procurement and use of natural resources, industrial processes and activities, and the product use and disposal. Noise is one of the major pollution from textile industry which harms the worker and people in and around these industries and enterprises.

As per the reviews the noise level in the spinning section is more and it is beyond the standard limits so highlighting more on section.

The Noise Level in spinning industry

Sections	Noise Level dBA
Spinning unit**:**	
Blow room	84-86
Roving	87-88
Carding	89-90
Ring frame	99-100
Drawing	90-91
Cone	89-90
Comber	87-88

Source: Gurusamy:(2016)

Occupational Noise exposure has been linked with a range of negative health effects by various researchers. People are unaware of Health & safety is due to ignorance and management is not given due importance to promote OHS (occupational Health Safety) in textile industry. Some of the studies have shown that the noise produced in the ring frame section is harming the ears to the extent of deafness.

It is observed that machineries used in textile industries have significant impacting on the workers health as well as on their family members. Therefore, a field study is essential to measure the level of sound in different spinning industry and health problems of

workers needs to be explored with objectives like occupational details and perception of noise and its impact on health of the workers in spinning industry.

Materials and Methods

The present study was conducted during the year 2019-2020, in Banahatti and Gadag. The investigation, exploratory and experimental research design was used. Purposive random sampling technique was used to select 120 respondents for the study. Keeping in view objects and the variables of study, self structured interview schedule was formed to collect information on occupational problems experienced by workers in spinning industry. Pre-testing was done to cheek the reliability. After pretesting certain modifications were made in self structured interview schedule. Data was collected through self structured interview schedule and it was coded, tabulated and interpreted using suitable statistical parameters like frequency and percentage.

Assessment of different environmental parameters in the spinning industry

The environmental parameters like noise, light, temperature and humidity were measured in different sections of spinning industry. These were measured with suitable instruments at 3 intervals and considered the average value. This has done because to check the parameter has deviated from the recommended value and its impact on the workers health in the spinning industry.

Experimental instruments	Purpose
Digital hygrometer	To record the temperature (^{0}C) and relative humidity (%).
Digital sound level meter	To measure the noise (dBA)
Lux metre	To measure the illumination level (lux)

Perception of noise

The perception of noise was assessed by using 5 point likert scale with scores starts with 1 to 5.

Scores	Perception of noise
1	Never
2	Seldom
3	Sometimes
4	Often
5	Always

C) Severity of hearing loss

The severity of hearing loss was assessed by using 5 point likert scale with scores starts with 1 to 5.

Scores	Severity of hearing loss
1	Very mild
2	Mild
3	Moderate
4	Severe
5	Very severe

Results and Discussion

Table 1 indicated the average environmental parameters in different sections of the selected spinning units. The different sections of spinning unit where the environmental parameters were measured were blow room, carding, drawing & combing, speed frame, ring frame, laboratory, winding, doubling, auto winding, reeling and packaging. The observed average noise from all sections was 82.30 dBA, temperature24.70˚C, humidity 32.30% and light 113.70 lux in spinning unit. The highest noise level of 95.20dBA was found in ring frame section followed by reeling (87.00dBA), drawing & combing (96.90dBA) and auto winding (86.30dBA) sections of spinning unit. Almost similar range of noise was observed in carding (84.75dBA), doubling (84.45 dBA), winding (84.30dBA) and speed frame sections (83.00

dBA) of the spinning units. Lowest noise was recorded in laboratory section (64.30 dBA) in spinning unit. The noise found in spinning unit has deviated from the recommended value. The noise measured in the ring frame section was very high. The twisting of yarn and doubling of yarn takes place in the ring frame section. The reasons may be machines used in all section were old and produce heavy noise. The similar result was observed in the study conducted by Chaudhry *et al.*, (2014) who observed 93-95 dBA noise in ring frame unit and packaging department.

The temperature observed in reeling section was 33˚C followed by packaging (32.50˚C) and auto winding section (32.00˚C). More than 20˚C temperature was recorded in carding, drawing & combing, ring frame & speed frame section and blow room (25.00˚C, 23.90˚C, 23.50˚C, 23.00˚C and 23.00˚C respectively). The lowest temperature was observed in laboratory section (17.00˚C) followed by doubling section (19.50˚C) and winding section (19.50˚C),

Highest percentage of humidity (51.50%) was recorded in drawing & combing section and speed frame section. The humidity range of 35-36 per cent was observed in carding section and laboratory section in the spinning unit. The 27.50 percentage of humidity was observed in packaging room and 27.00 percentage humidity was recorded in ring frame section. The similar humidity (26.50 %) was recorded in winding section, doubling section and reeling section respectively. In auto winding section 25.00 percentage of humidity was observed and the lowest humidity was recorded in blow room (21.50%) section of the spinning unit as presented in the table 1. These results were supported by the study conducted by Swati and Renuka (2014) who reported that temperature ranged between 26-27 ˚C and humidity ranged between 32.50-34.40 per cent in textile industry. Padmini and Venmathi (2012) reported that the temperature in the working place was 28°C to 37°C and humidity was 44.50 per cent, which may be due to the locality and season of the study conducted.

Maximum light intensity was recorded in laboratory (203.00 lux). More than 110 lux of light was observed in ring frame section (117.00 lux), speed frame section (117.50 lux) and drawing & combing section (111.50 lux). In carding, winding, auto winding and doubling section 102 to 106 lux light was observed. Less than 100.00 lux was found in blow room (99.50 lux), reeling section (94.50lux) and in packaging room (92.00lux) of the spinning unit.

Demographic profile of the workers in spinning industry is depicted in table 2. One third (33.33%) belonged to age group of 31-40 years and an equal per cent (22.50%) were of less than 30 years and 41-50 years. About 21.00 per cent were above 50 years. Around 54.17 per cent were male workers and 45.83 per cent were female workers.

It is clear from the table 2, maximum percentage (45.00%) \were illiterate followed by having primary school (28.33%) and high school (19.17%) education. Only 7.50 per cent had middle school education. Majority (89.17%) of the selected workers belonged to Hindu religion and only 9.17 per cent were Muslim. Almost one third of selected respondents 34.17 per cent were belonged to OBC caste followed by Nekara (28.33%), SC (20.00%) and ST (17.50%) category.

In spinning unit, 89.17 per cent of respondents were married and only few workers (05.00%, 03.33% and 02.50%) were widow, unmarried and separated respectively. The study conducted by

Around 74.17 per cent of selected respondents were having nuclear family and rest had joint family (25.83%). More than fifty (57.50%) of respondent belonging to medium income group with an annual income between Rs 42,001/- to Rs 50,001/- followed by nearly one fourth (27.50%) in low income range of less than Rs 40,001/- and high income range of more than than Rs 50,000/- (15.00%) per year.

Table 3 indicates the occupational details of the selected workers in spinning industry. With regard to number of years of experience, around one fourth (27.50%) had more than 20 years of experience and 11-15 years experience (22.50%) followed by less than 5 years (20.00%), 6-10 years (17.50%) and 16-20 years (12.50%) experience. The reason may be the wage is good when compared with other activities in the selected areas. In spinning units, prevents the unemployment and provide the job opportunity to the workers in the selected areas, so workers were continued their work in same industry from so many years.. The results are coinciding with results reported by Jahida and Rekha (2009), that half of the respondents had 11-20 years of work experience in textile industry.

Table.1 Assessment of average environmental parameters in selected spinning unit

Different sections of spinning unit	Average parameters of both mills			
	Noise (dBA)	Temperature (˚C)	Humidity (%)	Light (Lux)
Blow room	78.50	23.00	21.50	99.50
Carding	84.75	25.00	35.50	106.00
Drawing & combing	86.90	23.90	51.50	111.50
Speed frame	83.00	23.00	51.50	117.50
Ring frame	95.20	23.50	27.00	117.00
Laboratory	64.30	17.00	36.00	203.00
Winding	84.30	19.50	26.50	104.00
Doubling	84.45	19.50	26.50	102.00
Auto winding	86.30	32.00	25.00	104.00
Riling	87.00	33.00	26.50	94.50
Packaging	70.65	32.50	27.50	92.00
Overall average	**82.30**	**24.70**	**32.30**	**113.70**

Table.2 Demographic profile of the selected workers in textile industry N=120

Particulars	Frequency	Percentage
Age(years)		
less than 30 Years	27	22.50
31-40 years	40	33.33
41-50 years	27	22.50
More than 50 years	26	21.67
Sex		
Male	65	54.17
Female	55	45.83

Education level		
Illiterate	54	45.00
Primary	34	28.33
Middle school	9	7.50
High school	23	19.17
Religion		
Hindu	107	89.17
Muslim	11	9.17
Caste		
Nekara	34	28.33
SC	24	20.00
ST	21	17.50
OBC	41	34.17
Marital status		
Unmarried	4	3.33
Married	107	89.17
Separated	3	2.50
Widow	6	5.00
Type of family		
Nuclear	89	74.17
Joint	31	25.83
Annual income of the family		
Low income 41,001	33	27.50
Rs 42,001- 50,001	69	57.50
High income 50,001	18	15.00

Table.3 Occupational details about the selected workers in spinning section N=120

Particulars	Frequency	Percentage
Year of experience		
Less than 5 years	24	20.00
6 to 10 years	21	17.50
11 to 15 years	27	22.50
16-20 years	15	12.50
More than 20 years	33	27.50
Work in Shifts		
Yes	48	40.00
No	72	60.00
Working hours		
8 hours	72	60.00
16 hours (II shift)	48	40.00
Duration of the break		
45 min	58	48.33
1 hour	62	51.67

Table.4 Perception of noise annoyance in different sections of spinning section N=120

Sections	Always	Often	Sometimes	Seldom	Never
Mixing room	76 (63.33)	34 (28.33)	10 (8.33)	-	-
Blow room	67 (55.83)	48 (40.00)	5 (4.17)	-	-
Carding	97 (80.83)	23 (19.17)	-	-	-
Ring frame	117 (97.50)	3 (2.50)	-	-	-
Winding	1 (0.83)	98 (82.35)	20 (16.81)	1 (0.84)	-
Warping	111 (92.50)	9 (7.50)	0	-	-
Riling	85 (70.83)	34 (28.33)	1 (0.83)	-	-

Table.5 Impact of noise on the selected workers in spinning section N=120

Particulars	Frequency	Percentage
Difficult to communicate while working		
Yes	98	81.66
No	22	18.33
Hearing Declined		
Yes	120	100
No	0	0
Severity of decline in hearing		
Very mild	20	16.66
Mild	2	1.60
Moderately	16	13.33
Severely	39	32.50
Very severe	43	35.83
Tinnitus		
Yes	120	100
No	0	0
Duration of tinnitus		
15-30min	52	43.33
31-45min	11	9.17
46min -1 hour	1	0.83
> 1 hour	56	46.67
tinnitus (Years)		
< 5 years	26	21.67
6-10 years	59	49.17
11-20 years	29	24.17
More than 21 years	6	5.00

Majority of the workers (60.00%) did not work in shifts and only 40.00 per cent workers worked in shifts. About 60.00 per cent did work for 8 hours per day and 40.00 per cent worked for 16 hours per day i.e two shifts. The reason for extra work may be they will earn extra money to support their family economically. Sometimes the worker will be

absent for one shift and his work will be continued by the other worker who is already into the working hours. Because the management pressurize the worker to continue the work to reach per day out come. These results are in line with results observed by Jahida and Rekha (2009) who reported that more than 30 per cent workers were working 5-10 times overtime in a month and 11.11 per cent of respondents were doing more than 10 overtimes in a month.

In spinning unit, half of the workers (51.67%) took 1 hour break and another half of the workers (48.33%) took 45 minutes break for lunch.

Table 4 highlighted that perception of noise annoyance by the selected workers in spinning industry. More than 90.00 per cent respondents always felt noise annoyance in ring frame (97.50%) and warping section (92.50%) followed by carding section (80.80%). As high as 70.83 per cent workers in reeling section, 60.33 per cent workers in mixing room and 55.83 per cent workers in blow room experienced noise annoyance always. The workers experienced noise annoyance always except in the blow room and winding room. Blowing is the starting of the spinning operation where the fibres get opened, cleaned, mixed, micro dust removed and passed to carding. This activity was not carried out daily so the machines are off, when it is required they switch on and perform the blowing operation. In winding section, machines create less noise because the machines wrapping string, twine, cord the thread. The machines were not heavy which are used in winding section, creates less noise annoyance.

Whereas in winding section 82.35 per cent workers perceived noise annoyance often. In blow room 40.00 per cent of the respondents experienced noise annoyance often followed by 28.33 per cent respondents in mixing room and reeling room and 19.77 per cent in carding room experiencing noise annoyance often. Less than 10.00 per cent of the respondents expressed that they had noise annoyance in ring frame section (2.50%) and warping section (7.50%). None of the respondents in spinning unit expressed that they never or seldom had noise annoyance in any of the sections in spinning unit.

Table 5 presents impact of noise on the selected workers in spinning industry. Majority of workers (81.66%) faced difficulty to communicate while working in spinning industry and very few (18.33%) reported that they did not have problem to communicate while working. Cent per cent of workers had hearing declined. About 35.83 per cent of workers experienced very severe hearing loss followed by severe (32.50%), very mild (16.66%) and moderate (13.33%) hearing loss. Similar results found by Kane (2011), who depicted that, workers exposed to noise were potentially damaging quality and intensity of hearing, suffered from impairment of hearing capacity of several degrees and other physiological disorders or stress.

Only 1.60 per cent of workers had mild hearing loss. Cent per cent of workers experienced tinnitus among workers of spinning unit. The results evidence that, 46.67 per cent experienced tinnitus for more than one hour followed by 43.33 per cent for about 15 to 30 minutes. Tinnitus is the perception of sound, where workers always hear the sound of machines after coming from the work also they perceive the machines sound till 15-30 min. The results are line with study conducted by Aung *et al.*, (2020), who showed that, majority of the workers (88.90%) experienced tinnitus. Nearly one fourth of the workers had hearing loss and 74.00 per cent workers were normal.

Less than 10.00 per cent of textile workers experienced tinnitus for 30 mins to one hour. More than 45.00 per cent of workers said that they had tinnitus from 6-10 years in the spinning unit followed by 11 to 20 years (24.17%) and less than 5 years (21.67%). Only 5.00 per cent of workers revealed that they had tinnitus problem from more than 21 years in spinning unit.

In conclusion the study showed that workers exposed to high noise level in spinning industry. Most of the workers worked more than 8 hours and had 10-15 years of work experience in spinning industry. This study highlights that worker at high risk of developing hearing problems and other associated infirmities due to excessive occupational noise. Study strongly recommends provision of safety measures and personal protective tools like, ear plugs, dust mask and ear muffs to safeguard the worker. Timely lubrications of machines in very much necessary to avoid high noise at industry level.

References

Aung. K.Z., Aung. M., M., Mya. T., Htun. M., Than. H., A., Kyaw. M., T. And Zaw. M., H., (2020), Assessment of noise exposure and hearing loss among workers in textile mill, Myanmar, *Safety and Health at work.*, 11(2):199-206

Berivan, H. M. And Dosky, A.L., (2014), Noise level and annoyance of industrial factories in Duhok city, *Journal. Of Environmental. Science, Toxicology and food techno.*, 8(5):1-8

Choudary. M.P. & Islam. S., (2017), Assessment of environmental impacts during operational phase of a textile industry. IRJET: 4(1): 22-26.

Gurusamy, P. G., (2016), An effective study on risk assessment in south Indian textile sectors. *Submitted to Kalasalingam University*, Anand Nagar: 45-61.

Jaidhar, K. and Rekha, D., (2009), Assessment of occupational stress among textile industrial workers in Kanpur Nagar. *Asian. Journal. of Home Science.*, 4(1): 160-162.

Kane, C. D., (2001), Environmental and health hazards in spinning industry and their control. *Indian. Journal. of Fibre & Textile. Research.* 32(1):39-45.

Padmini, D., S. and Venmathi, A., (2012), Unsafe work environment in garment industries, Tirpur, *J. Environmental. Research. & Development.*, 7(1):569-575

Raman, B., (2006), Evaluation of occupational environment in two textile plants in Northern India with specific reference to noise, *Industrial health.*, 44(2):112-116

Swati and Renuka., (2018), Impact of Environmental Parameters on Women Workers Health in Ginning Mills of Dharwad Taluk. *International. Journal. Pure Applied. Bio Science.*, 6(2): 202-207

Talukdar, M. K., (2001), Noise pollution and its control in textile industry, *Indian. Journal. Fibre and Textile Research.*, 26(2):44-49

How to cite this article:

Spoorti Kallur and Suma Hasalkar. 2021. Noise and Its Impact on Health of the Workers in Spinning Industry. *Int.J.Curr.Microbiol.App.Sci.* 10(01): 1118-1126.
doi: https://doi.org/10.20546/ijcmas.2021.1001.135