

# Morbidity Profile of Workers in Scissors Manufacturing Industries in a City in Northern India

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## ABSTRACT

**Introduction:** The Meerut Scissors Industry clusters into 300 small-scale units employing around 6000 people. Meerut artisans manufacture scissors for tailors, barbers, paper and bangle designers. The working environment and living conditions of the scissors manufacturing workers are poor and often hazardous to their health leading to many serious illnesses. Thus a study was conducted to assess the morbidity profile of workers in Scissors manufacturing small scale industries in Meerut, UP. Study objective was to assess the morbidity profile of workers in Scissors Manufacturing Industries in Meerut, UP

**Material and Methods:** It was a community based, cross-sectional study conducted among 300 workers from Scissors manufacturing industries of urban slum, Meerut. They were randomly selected from every division of industry. Study was conducted using a pre-designed, pre-tested semi-structured interview schedule in Hindi. Socio-demographic profile and Health status was assessed by asking questions regarding their health problems followed by clinical examination by a physician. Data was compiled and analyzed using Microsoft Excel and the results were expressed as proportions.

**Results:** Among the total 300 workers, all were males, 78% were <45 years of age, 96% Muslims, 70% illiterates, 88% married, 70% were from upper lower class, 85% workers reported history of smoking and 22% used alcohol. 79% were assessed with respiratory disorders which included 40% persistent cough, 28% asthma, 05% tuberculosis, 4% allergies of Respiratory Tract and 02% COPD. Other prevalent morbidities included musculoskeletal disorders (45%), skin diseases (15%), eye problems (10%) and noise induced hearing loss (4%).

**Conclusion:** In this study various morbidities were detected, especially the high prevalence of respiratory and musculoskeletal problems which is alarming. Thus there is a need for sustained interventions towards health and safety of the workers in order to develop a safe working environment.

**Keywords:** Scissor Manufacturing Workers, Small Scale Industries, Social Problems, Health Problems

## INTRODUCTION

Scissors date from before the first century A.D. This can be seen in various forms in Egyptian art and have been the tools for tailors and barbers for at least 2,000 years. Scissors manufacturing cluster of Meerut is a 360 years old cluster. Before India's partition in 1947, scissors made in Meerut were exported to Burma and Singapore. Scissors are cutting devices which are used to cut various materials. It is made up of two blades which rotate on an axis against each other and divide the placed material in two parts. Scissors function

when the two blades under tension are closed against one another. Steel scissors exist in two basic forms. Carbon steel is used to make scissors in which the blade and the handle form one continuous piece. Carbon steel is manufactured from iron and about 1% carbon. It has the advantages of being strong and staying sharp. Scissors made from carbon steel are usually plated with nickel or chromium to prevent them from rusting. Stainless steel is used to make scissors in which a plastic handle is fitted to the metal blade. Stainless steel is manufactured from iron, about 1% carbon, and at least 10% chromium.<sup>1</sup>

Meerut is a city in the state of Uttar Pradesh in India. It is an ancient city located 70 km (43 mi)

northeast of the national capital New Delhi, and 453 km (281 mi) northwest of the state capital, Lucknow. It is the second largest city in the National Capital Region of India (the largest being Delhi) and 17th largest city in India. It ranked 242 in the list of largest cities and urban areas in the world (2010) and is the second fastest developing city in Uttar Pradesh (after Noida). The city covers an area of about 172 km<sup>2</sup> (66 sq mi) while the total metropolitan area is 198 km<sup>2</sup> (76 sq mi), third largest in Uttar Pradesh. It has the 2nd largest army cantonment in the country. Meerut has a monsoon influenced humid subtropical climate characterized by very hot summers and cool winters.

The Meerut Scissors Industry cluster has 150 small-scale units employing around 6000 people. In addition, the cluster has around 300 household units employing another 1000-1500 people. The cluster is located around Peeramal market, Islamabad, Shyamnagar, Kanchka pool, Khair Nagar, Ghantaghar, Kareem Nagar, Kotla and Karamali areas. Scissor manufacturers are also present in nearby villages like Mawana, Vahasuma, Parikhitarhadi, Bara Gaon and ChotaGaon etc.

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Meerut artisans manufacture scissors for tailors and barbers, designers, paper cutting and even for cutting bangles. They are so perfect that they can make exact replica of any type of scissors. The Meerut scissor manufactures use scrap steel bought from the railways or automobile industries as these are cheaper than buying fresh metal stocks. The scrap metal is collected and roller-machines are used to make them into plates. These metal plates are then used for either Press cutting, or hand-forging. The brass handles have to be added for increasing the weight and give finishing. The handles are casted, and the steel blade ends are fitted into the moulds.

According to the World Health Organization (WHO) report 2016, occupational health risks are one of the leading causes of morbidity and mortality in the world in general and developing countries in particular.<sup>2</sup> According to WHO (2016), over 1000 million people worldwide are employed in small scale industries.<sup>3</sup>

In India, there is a lack of awareness about occupational safety and environmental hazards that adversely affect the vulnerable and marginalized working population; more so in the unorganized sector where the protection of rules and regulations hardly ever reaches the proletarian class.

Scissors manufacturing workers are part of unorganized industrial units in India that are mainly run by private establishments. These workers usually do not benefit from occupational health-and-safety provisions. The working environment and living conditions of the scissors manufacturing workers are poor and hazardous to their health. Long working hours coupled with unsafe and risky working environments predispose them to serious health problems. Dust particles produced during processes like heat treatment, processing, grinding, polishing, plating, edging, buffing, packing and various other factors may lead to respiratory problems. The working environments often lack adequate ventilation, sanitation, water supply, electricity, natural and/or artificial lighting, noise control; as a result of which these workers are likely to suffer from serious illnesses such as respiratory problems, musculoskeletal problems, eye diseases, skin problem, and hearing loss. The ill health is compounded by socio-economic factors such as poverty, lack of education, poor diet, addictions, poor working conditions and extended working hours.<sup>4</sup>

This led to plan of this study to assess the morbidity profile of workers in Scissors' Manufacturing Industries in Meerut, UP and highlight the neglected yet an important part of disease burden in the community among workers of small scale industries; and thereby to recommend specific and pragmatic remedial measures for the same.

## MATERIAL AND METHODS

It was a Community based cross-sectional study conducted among 300 Scissors manufacturing workers of small scale Scissor manufacturing industries of urban slums of Meerut. The sample size was calculated on Basis of expected prevalence of morbidity among workers as 60% and minimum prevalence as 50% with a 95% confidence interval using

simple random sampling. Workers were stratified according to their division in order to achieve adequate randomization. From each workstation, participants were selected using a random numbers' table. Subjects were interviewed by using a pre-designed, pre-tested semi-structured questionnaire in Hindi. Questionnaire was validated and internal consistencies of items were obtained through a Cronbach's alpha coefficient (0.90). Questionnaire included items to record socio-demographic characteristics, lifestyle practices and health status assessment. The questionnaire was divided into 3 sections.

The first section- socio demographic profile of workers followed by second section – Lifestyle practices including addiction to smoking and alcohol and the third section consisted of 16 questions to screen for their health status by enquiring about health problems in past 2 months.

Verbal informed consent was obtained from each participant before initiating the study after explaining clearly the purpose and method of the study. The interviewers took approximately 25 - 30 minutes to complete the questionnaire. The questionnaires were scrutinized at the end of interview and if any information was missing, workers were asked again for that information to be completed. All the workers of both sexes, aged between between 18 years to 60years, who had been working in the industry for at least 1 year, free from any pre-diagnosed physical disease, no history of neurological or psychiatric diseases and no drug addiction were included in the study. The workers who did not give the consent, who were not willing to complete the interview and individuals not oriented to time, place and person were excluded.

## STATISTICAL ANALYSIS

Data were entered in Microsoft Excel and transferred into SPSS version 17 for analysis. Findings were presented as group proportions, and difference in proportions for a given factor was assessed by the Chi-square test. Factors which were significantly associated ( $P < 0.05$ ) with morbidity in univariate analysis were further analyzed in Binomial Logistic regression analysis.

## RESULTS

All (300) scissors manufacturing workers interviewed, were males (100%), of which (78%) were <45 years of age, 96% were Muslims, 70% were illiterate, 88% were married and 70% were from upper lower class according to Modified Kuppaswami socioeconomic scale. The mean monthly income of the workers was Rs 2512 +268.78 (SD). Among them 85% workers were smokers while 22% workers reported alcohol use. (Fig 1)

On univariate analysis (Table 1), independent variables like age, marital status, education and socio economic status were found to be statistically significant (0.05) along with lifestyle factors like smoking and alcohol use which were also found to be statistically significant (<0.05).

Table 2 depicts the distribution of various illnesses among scissor manufacturing workers.

Among the health problems, majority of the Scissors

		n	%	OR	95%CI	P value
Gender	Male	300	100%	0.93	0.37-2.34	1.26
	Female	00	00%			
Marital status	Married	264	88%	4.31	1.88-9.89	0.002
	Unmarried	36	12%			
Age	<45 years	234	78%	0.30	0.10-0.90	0.001
	>45 years	66	22%			
Religion	Muslim	288	96%	1.05	0.48-2.31	0.09
	Hindu	12	04%			
Education	Illiterate	210	70%	0.86	0.81-0.91	0.01
	Literate	90	30%			
Socio-economic status	Lower middle	75	25%	6.6	2.40-18.05	0.003
	Upper Lower	225	75%			
Mean Monthly Income	Rs 2512 (268.78)					
Smoking use	Present	255	85%	3.66	1.54-8.71	0.02
	Absent	45	15%			
Alcohol use	Present	66	22%	0.92	0.79-1.08	0.03
	Absent	234	78%			

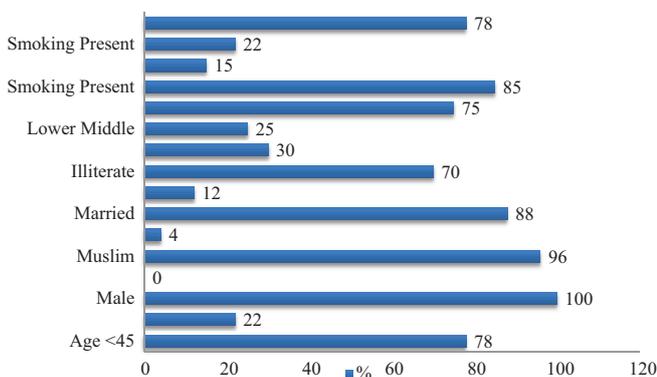
**Table-1:** Univariate analysis and distribution of socio-demographic profile and lifestyle practices of scissors manufacturing workers in Meerut UP

	N	%
Respiratory problems		
Persistent cough	120	40
Asthma	84	28
Tuberculosis	15	5
Rhinitis	12	4
COPD	06	02
Total	237	79
Other Health Complications		
Musculoskeletal problems	75	25
Skin Diseases	45	15
Eye Problems	30	10
Hearing loss	12	04
Others	33	11
Total	192	64

**Table-2:** Distribution of presence of illness among Scissors Manufacturing workers.

	coefficient	S.E	Wald	d.f	P value	Odds Ratio	95% Confidence Interval	
							Lower	Upper
Smoking	-1.399	0.549	6.489	1	0.01	0.24	0.84	0.72
Socio economic status	1.188	0.509	5.458	1	0.01	3.28	1.21	8.89
Constant	1.105	0.729	2.297	1	0.13	3.019		

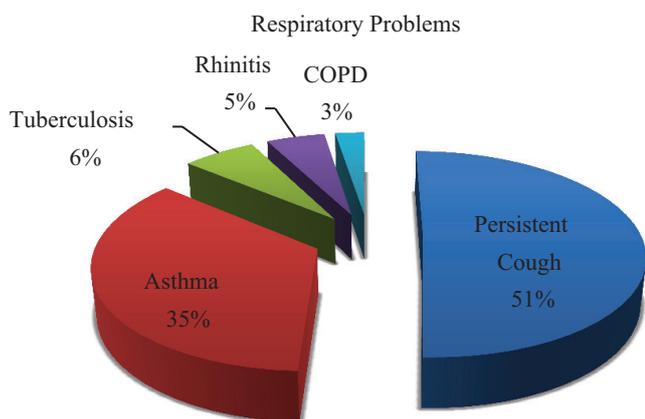
**Table-3:** Binomial Logistic Regression analysis of Morbidity Profile of Scissors Manufacturing Workers in Meerut, UP.



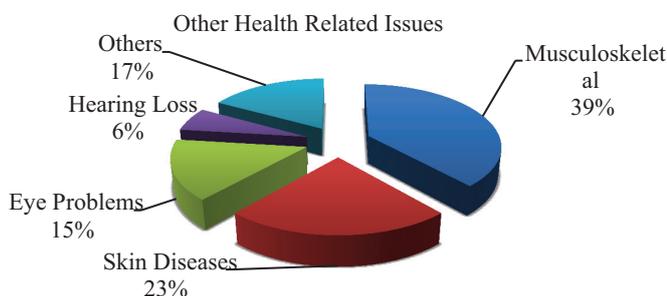
**Figure-1:** Depicts the graphical presentation of sociodemographic profile and lifestyle practices of Scissors manufacturing workers.

manufacturing workers suffered from respiratory diseases 79%, of which persistent cough 40%, asthma 28%, tuberculosis 05% rhinitis 04%, and COPD 02%. Other health complications found musculoskeletal problems (45%), skin diseases (15%), eye diseases (10%) and noise induced hearing loss (04%) respectively

To understand the association of various risk factors with the current morbidities among scissor industry workers, logistic regression analysis was done (Table 3). The outcome variable was presence or absence of Morbidity. Independent variables with  $P < 0.05$  in univariate analysis were entered into the model. The Binary Logistic regression analysis using LR backward likelihood ratio showed the model was



**Figure-2:** Represents the respiratory problems prevalent among Scissors manufacturing workers.



**Figure-3:** Represents other illnesses prevalent among Scissors manufacturing workers

statistically significant,  $p < 0.005$ . The model explained 52.5% (Nagelkerke R<sup>2</sup>) of the variance in morbidity and correctly classified 78.7% of workers. Among all the factors smoking and socioeconomic status were found to be associated for Morbidity among scissor industry workers which was proven with statistical significance ( $p$  value  $< 0.05$ )

## DISCUSSION

This study aimed to evaluate the morbidity profile of the people employed in the scissors manufacturing industry. To the best of our knowledge, this is the first study which highlights the morbidities associated in scissors manufacturers and has tried to elicit association of socio-demographic characteristics with occupational morbidity among these workers.

Moreover, very few studies have been published about the living conditions and other

demographics of the scissors industry in Meerut. Chavada VK et al.<sup>5</sup> conducted a study on the health status of the people engaged in the tailoring occupation. We herein discuss the possible

aspects that we encountered in our survey. The possible reason for the people in Meerut resorting to this field as their occupation is most definitely due to lack of proper education and learning facilities available and/or affordable to them. In addition, migration, monetary constraints, hierarchy from their ancestors also add up to taking up this job. 75% of the workers belonged to upper-lower socio-economic status and 70% of the scissors manufacturing workers were illiterate.

The overall prevalence of tobacco use was 85% among the workers. According to NFHS III, in India, 55.8% males in the age group of 12-60 years have been found to be consuming tobacco.<sup>6</sup> The reasons of increased tobacco consumption may be due to occupation involving hard labour work, doing nightshifts and low educational and socio-economic status. The reported respiratory problems were 79% among the scissors manufacturing workers in the present study. In the study done among scissor industry workers, it was found that in Polishing, Edging and Buffing division, an astounding 100% of the workers were suffering from lung diseases, while it was 75-85% in Processing and Plating division and 50% in Heat treatment and Packing.<sup>7</sup> It could be due to the reason that the workers working in the scissors industry come in direct contact with the iron sparkles, suspended particles of metal (Si, Fe, Cr, Ni and Brass etc.), iron and cotton dust, and fumes of acids, kerosene oil, Mobil oil.<sup>7</sup> Although upper respiratory infections are common among all industries including textile, steel pipe production, construction workers, spinning mill, stone crushing, gems polishing etc but the morbidity of respiratory problems is not as high as among scissors manufacturing industry workers<sup>8,9,10,11,12,13</sup> except as reported by Qurratul et al. Other health problems included musculoskeletal problems (25%), skin diseases (15%) and noise induced hearing loss (4%). Mismatch between man and machine is one of the major factors contributing to musculoskeletal problems leading to postural strains which was found consistent with other studies as well.<sup>14,15,16</sup> Heavy metals like lead, mercury, arsenic, cadmium, corroded iron particles have proven fatal to human life although some heavy metals such as zinc, copper, chromium, iron and manganese are required by the body in small amount, but have proven to be toxic in larger quantities by interfering with organ system functions. Workers engaged in scissors manufacturing often develop musculoskeletal, dermal, gastrointestinal, ocular, and psycho-social problems due indirect consumption of heavy metals.<sup>17,18</sup> Musculoskeletal disorders are far the commonest occupational related morbidity both in organized as well as unorganized sectors.

## CONCLUSION

In this study population, the variety of morbidities detected among scissors manufacturing workers, and especially the high prevalence of respiratory and musculoskeletal problems, is alarming. This might be due to their inadequately ventilated, overcrowded and poorly illuminated working environments. The lifestyle and socioeconomic milieu acts synergistically with the poor working conditions and affects the health of the workers ultimately decreasing the work efficiency and hence productivity. It is necessary to monitor the occupational environment and health status of the workers periodically. It is also necessary to create awareness regarding the ill effects of industrial hazards. Exhaust systems should be provided for Scissors manufacturing workers which ensure proper ventilation and regular supply of fresh air in group work spaces. First aid facilities and trained personnel are important components

of health and safety arrangements. Every work place should have at least the minimum first aid facilities and access to emergency medical care. Safety measures should be checked periodically for ensuring their utility during emergency situation. Periods of rest in between their long hours of work and seats with adjustable backrest that provide support for the lumbar region would go a long way to reduce postural strain and low back pain.<sup>19</sup> Use of personnel protective equipments (PPE) like masks or respirators with mechanical filters or with oxygen or air supply, earplugs, earmuffs should be made mandatory wherever threat to workers health and safety is anticipated. All workers using PPE should be trained in their use and maintenance. All workers must be given periodic medical examination.<sup>20</sup> Medical check-ups at periodic intervals should be facilitated at the workplace with increased emphasis on preventing health problems rather than curing them. Regular rotation of jobs should be compulsory, so that exposed workers are able to reduce the duration and intensity of their exposure. These occupational related health problems and morbidities require a multidisciplinary action. All the above mentioned interventions are warranted so as to reduce the morbidities among the scissors manufacturing workers. Health education and training of personnel may form the back bone of the cure. There is an immediate need to sensitize the management of the organizations and/or individuals employing these workers about their problems and enforce suitable measures to prevent them.

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