



A STUDY OF OCCUPATIONAL HEALTH HAZARDS AMONG ASSIUT SPINNING FACTORY WORKERS

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ABSTRACT :

Cotton industry workers are exposed to various hazards in the different departments of textile factories. The major health problems associated with cotton dust are respiratory problems. The aims of the work are study the occupational health hazards among the workers in Assiut Spinning Factory and to assess the different protective measures used during working day to prevent the different hazards. This study was conducted in Assiut Spinning Factory. The total number of the studied sample was 550 workers out of 650 who worked in the productive and repair sectors. A questionnaire was constructed include two parts, one to assess the industrial hazards and their preventive measures and the second one included the information from the health record of the worker in Health Insurance included pre-placement examination and periodic medical examination. The data collection took about 6 months (from July to the end of December 2001).

Our study revealed that the vast majority of workers (96.9%) were males. About two thirds (65.8%) of workers have experience of work for 20-30 years (mean was 20.5 ± 5.3). 67.3% of the workers were mentioned that the mask is available and only 41.6% from them using it during work. 99.5% of workers mentioned about the availability of the emergency equipments. Moreover 99.3% of workers mentioned that there are no health education programs. The workers in the blending and picking department, carding and spinning department and combing and twisting department suffer from cough (68.3%, 60.2% and 73.7% respectively), chest pain (68.3%, 57.6%, and 64.9% respectively), and dyspnea (70.7%, 68.1% and 71.9% respectively). The difference from other departments was statically significant. Ear disease and ear secretion were common symptoms among more than half of the workers in the above mentioned departments in addition to winding and doubling departments and the differences from other departments were statistically significant ($P < 0.05$).

Only 63.8% of workers were performed periodic medical examination. It was found that 13.4%, 11.1% and 2.3% were suffering from chronic bronchitis, chronic bronchitis with emphysema and bronchial asthma respectively. 13.4% of workers have sensory deafness while 9.9% have sensory conductive deafness. The study recommend with improving of worker's health through: Periodic medical examination should be performed to all workers in the factory. Periodic inspection of working environment by industrial hygienist through regular measurement of noise level, illumination, ventilation and cotton dust concentration. Training and health education programs should be provided to all workers from the start of work. Emphasizing the correct use of personal protective measures. If possible, the factory should look into the possibility of replacing the old machines with new ones, which is less noisy.

INTRODUCTION:

The work is considered a basic part of our life. Most adults spend approximately one fourth to one third of their time at work and often perceive work as a part of their self identity (Rogers, 1994). Bureau of Labor Statistics (BLS, 1995) reported that every 5 seconds a worker is injured in the United States and every 1 second a worker is temporarily or permanently disabled. Center for disease control and prevention, 1996 reported that each day an average of 137 persons die from work-related diseases and an additional 17 die from injuries on the job. Each year 74000 require treatment in hospital emergency departments for work-related injuries (NIOSH, 1999).

In Egypt the total number of injuries and deaths were 246 cases during 1989, which represented a rate of 2.14 injuries per 100.000 workers (MMT 1991). The annual report of census and analysis of occupational illnesses reported that in the years 1985-1996, the total numbers of occupational illness ranged between 400 to 706 cases annually, then the number came up suddenly to 2026 in 1997 and jumped to 4784 in 1998. Reporting of occupational illness is still far less than expected, based on the size of the population and the documented shortage of occupational health services coverage of the working population (OHD, 1998).

Cotton industry workers are exposed to various hazards in the different departments of textile factories (Hafez *et al.*, 1998). Especially in the spinning and weaving sections which play a role in the high incidence of industrial health hazards (Allan, 1981).

The major health problems associated with cotton dust are respiratory problems, which include (byssinosis, bronchitis and bronchial asthma). The problems are highly prevalent in

mills of developing countries (Fantahum and Abebe, 1999).

The main goal of occupational safety and health promote the health and safety of people at work through prevention and early intervention (OSH 2000). Occupational health and safety affect not only the worker but also on his family and significant others` and his community (Salazar, 1997).

The occupational health nurses play an important role in maintaining the health and safety of employees by assessing the work site for hazards and potential hazards and reducing risk that could lead to disaster situation (Ossler *et al.*, 1996). More effort could be directed at integrating health promotion with health protection activities to provide an environment more conducive to the general worker's health specially, so that the work site offers an excellent setting to focus on both health protection and health promotion (Blix, 1999).

AIM OF THE STUDY:

The aims of the work are to study the occupational health hazards among the workers in Assiut Spinning Factory and to assess the different protective measures used during working day to prevent the different hazards.

SUBJECTS AND METHODS:

This study was conducted in Assiut Spinning Factory. This factory was established at El-Hamra about 5km south to Assiut City. There are about 1000 workers and employees. The work system in the factory is divided into three shifts (day, afternoon, night). Each shift is 8 hours to be changed every week. The work is continuous 24 hours /day and 7 days/week. The factory consists of five sectors. The factory produces about 4000 tons of the most types of cotton and mixture threads every year.

The total number of the sample studied was 550 workers out of 650 who worked in the productive and repair sectors with a percentage of 84.6%. These sectors are the highest risky areas because the workers are exposed directly to the cotton dust and noise. The workers were interviewed during the morning shift.

A questionnaire was constructed include two parts, one to assess the industrial hazards and their preventive measures including demographic data, occupational history, present health symptoms, past history of illness, industrial hazards and preventive measures. The second one was include the information from the health record of the worker in Health Insurance included pre-placement examination and periodic medical examination.

The official letter was sent to the director of Assiut Spinning Factory and other letter was sent to the Occupational Health and Injuries Center in the Health Insurance to facilitate the use of data in the records of periodic medical examination for workers which were preformed in 2001. A pilot study was carried out on subsample of workers to check the validity of the questionnaire and accordingly some modifications were done. The data collection took about 6 months (from July to the end of December 2001). Three visits were conducted to the factory every week and two visits to the Assiut Health Insurance Center.

Data were revised, coded for computerized data entry using EPI 5 Info program. Statistical methods were applied including descriptive statistics (i.e. frequency percent, mean, standard deviation) and tests of significance (Chi-square). P-values were considered as statistically significant when less than 0.05.

RESULTS:

Table (1) shows that the total number of workers was 550. The vast majority of workers (96.9%) were males. The mean age was 41.25 ± 7.44 . Nearly half of them (44.5%) were at the

age group 40-49 years. The majority of workers (94.4%) were married. 50.9% of workers can read and write and 25.6% had basic education. About two thirds (65.8%) of workers have experience of work for 20-30 years (mean was 20.54 ± 5.32).

Table (1): Demographic characteristics of the workers in the Assiut Spinning Factory, 2001.

Variables	Total No. (550)	%
Sex:		
Male	533	96.9
Female	17	3.1
Age (years):		
20 -	43	7.8
30 -	186	33.8
40 -	245	44.5
50-60	76	13.8
Mean	41.25 ± 7.44	
Residence:		
Rural	272	49.5
Urban	278	50.5
Marital status:		
Single	30	5.4
Married	519	94.4
Widow	1	0.2
Level of education:		
Illiterate	101	18.4
Read & Write	280	50.9
Basic education	141	25.6
Technical	25	4.5
University	3	0.5
Years of experience:		
5-	18	3.3
10-	67	12.2
15-	103	18.7
20-	210	38.2
25-30	152	27.6
Mean	20.54 ± 5.32	

As regard to the availability of preventive measures, table (2) shows that 67.3% of workers were mentioned that the mask is available and only 41.6% from them using it during work. 99.5% of workers mentioned about the availability of the emergency equipments (Fire protection, Apparatus of early warning, Rapid means of communication). Moreover 99.3% of workers mentioned that there are no health education programs.

Table (2): Distribution of the availability of preventive measures among workers in Assiut Spinning Factory, 2001.

Preventive measures	Total No. =550	%
Safety equipment: (mask)	370	67.3
Using mask	154	41.6*
Emergency equipments	547	99.5
No health education.	546	99.3

* The percent calculated from the total number of safety equipment's (370).

Table (3) illustrates that the workers in the blending and picking department, carding and spinning department and combing and twisting department suffer from cough (68.3%, 60.2% and 73.7% respectively), chest pain (68.3%, 57.6%, and 64.9% respectively), and dyspnea (70.7%, 68.1% and 71.9% respectively). The difference from other departments was statistically significant. Ear disease and ear secretion were common symptoms among more than half of the workers in the above mentioned departments in addition to winding and doubling departments and the differences from other departments were statistically significant ($P < 0.05$). The workers in different departments suffer also from hear disturbance, headache and blurring of vision but without significant difference.

Table (4) shows that all clinical symptoms were increased as the duration of work increase. 67.8% of hear disturbance cases, 69% of headache cases and 70% of cases suffering from blurring of vision had duration of work between 20-30 years. These differences from other duration of work were statistically significant.

Table(5) shows the presence of occupational hazards in the different departments as 92.4%, 98.7%,70.7%,10.2%,4.7% of workers mentioned about the presence of noise, cotton dust, accidents, bad ventilation and insufficient light in the factory respectively. There is no statistical difference among different departments.

Table (6) illustrates that 59.1% from those who were exposed to noise complain from hear disturbance compared to 33.3% of non exposed to noise. This difference was statistically significant ($P < 0.01$). Also, it was found that

61.8% from those who exposed to noise complains from ear disease while 31.0% of non-exposed to noise complains from ear disease. This difference was statistically highly significant ($P < 0.001$).

Table(7) reveals that 2.4% of workers were exposed to injury, only 38.5% from them were receiving training at the start of work and this was statistically significant ($P < 0.05$).

As regards the outcomes of periodic medical examination among the workers, table (8) shows that 63.8% of workers were performed periodic medical examination, 99.4% from them were performed chest x-ray and 98.0%, 97.2% and 42.5% were performed audiogram, pulmonary function tests and clinical examination respectively. As regard the respiratory diseases, it was found that 13.4%, 11.1% and 2.3% were suffering from chronic bronchitis, chronic bronchitis with emphysema and bronchial asthma respectively. 13.4% of workers have sensory deafness while 9.9% have sensory conductive deafness. As regard the degree of deafness it was found that 41.9% were moderate deafness while 31.1% were moderate severe and severe deafness.

Table(9) shows that 27.7%, 33.3% and 62.5% from cases of chronic bronchitis, chronic bronchitis with emphysema and bronchial asthma respectively were working in carding and spinning department. There was no statistical significant differences from other departments of work ($P > 0.05$).

Table (10) shows that 37.6%, 30.6%, 39.2%, 30.4% from the cases of mild, moderate, moderate severe and severe deafness respectively were working in carding and spinning department. Also in winding & doubling department there was 15.1%, 22.2%, 11.8%, 21.4% of mild, moderate, moderate severe, and severe cases of deafness respectively without statistical significant difference from other departments.

Table (6): Relation between exposure to noise and complaining from hear disturbance and ear disease in Assiut Spinning Factory, 2001.

Complain	Noise						X ²	P
	Yes		No		Total			
	No.	%	No.	%	No.	%		
Hear Disturbance								
Yes	300	59.1	14	33.3	314	57.1	10.48	P< 0.01
No	208	40.9	28	66.7	236	42.9		
Ear Diseases								
Yes	314	61.8	13	31.0	327	59.5	15.32	P< 0.001
No	194	38.2	29	69.0	223	40.5		
Total	508	100	42	100	550	100		

Table (7): Relationship between injury of workers and training program at the start of work in Assiut Spinning Factory, 2001.

Injury	Training at the start of work					
	Yes		No		Total	
	No.	%	No.	%	No.	%
Yes	5	38.5	8	61.5	13	2.4
No	351	65.4	186	34.6	537	97.6
Total	356	64.7	194	35.3	550	100.0

X² = 4.02 P< 0.05

Table (8): Distribution of the outcomes of periodic medical examination among the workers working in the Assiut Spinning Factory from Health Insurance records, 2001.

Variable	Total No. = 550	%
Periodic examination:	351	63.8
Clinical Exam	149	42.5*
Chest X-ray	349	99.4*
Pulmonary function test	341	97.2*
Audiogram	344	98.0*
Blood analysis	-	-
Respiratory diseases:		
Chronic bronchitis	47	13.4*
Chronic bronchitis with emphysema	39	11.1*
Bronchial asthma	8	2.3*
Normal	232	66.1*
No diagnosis	25	7.1*
Types of deafness:		
Sensory deafness	46	13.4**
Sensory conductive deafness	34	9.9**
Not diagnosed	264	76.7**
Degree of deafness:		
Mild	93	27.0**
Moderate	144	41.9**
Moderate severe	51	14.8**
Severe	56	16.3**

* The percent calculated from those who perform periodic examination (351).

** The percent calculated from those who perform audiogram (344).

DISCUSSION:

Cotton spinning industry is the most important industry in Egypt. With rapid industrialization and mechanization in textile industries occupational health hazards are becoming more prominent. Respiratory tract diseases represent the most important group of occupational diseases in spinning factories as a result of inhalation of cotton fibers and dust in work place. In addition to excessive noise-induced hearing impairment were present as an occupational health hazards too.

This study was conducted in Assiut Spinning Factory. The total sample was 550 workers, most of them were males (96.9%). The low percentage of females was due to unacceptance to work three shifts. Cotton mill workers are susceptible to respiratory diseases. The present study shows that the workers in spinning industry are exposed to high levels of cotton dust. The most frequent complaint reported by the workers, were symptoms related to the respiratory system. The most common respiratory health problems were cough, chest pain and dyspnea. In a case control study carried by Abdel Rahman *et al.*, (1990) on the effect of exposure to cotton dust on the health of workers, showed higher prevalence of chest symptoms among exposed workers than controls.

In the present study 64.2%, 56.0%, 50.7% of workers suffering from dyspnea, cough and chest pain respectively. There is no statistical difference among age groups. This attributed to all workers at any age were exposed to hazards of cotton dust. This disagree with Ahmad (1988) in Egypt and Jiang *et al.*, (1995) in China who stated that respiratory symptoms increased with increasing age.

The present study showed that the prevalence of respiratory symptoms significantly increased in some departments as

blending & picking, spinning & carding and combing & twisting as these departments had high dust concentration than other departments. These agree with many studies conducted in Assiut by El-Shinawi *et al.*, (1994), who reported that respiratory symptoms increase in preparatory and spinning departments (cough 26.1%, 24.7% respectively, dyspnea 12.3%, 11.1% respectively and chest tight 6.9%, 6.5% respectively), in Alexandria by Ahmad (1988) who reported that 67.7% and 58.8% of workers who working in Bale opening and spinning departments respectively suffer from chest symptoms and also in Ethiopia by Fantahum and Abebe (1999) who reported that respiratory symptoms increase in spinning department (59.7%).

According to periodic medical examination of the workers in Assiut Spinning Factory from Health Insurance records, the workers who were performed medical examination were 63.8% only from the studied sample. As regard to respiratory diseases it was reported that 13.4% were chronic bronchitis, 11.1% were chronic bronchitis with emphysema and 2.3% were bronchial asthma. These results are agree with many researches done by El-Shinawi *et al.*, (1994) who reported that 6.3% were chronic bronchitis, 4.8% were bronchial asthma, Hafez *et al.*, (1998) who reported that 11.3% were chronic bronchitis, 5.3% were bronchial asthma and 7.3% were chest tightness, Ahasan *et al.*, (2000) who reported that 5.7% were chronic bronchitis and 4.3% were chest tightness. Also Fishwick *et al.*, (1996) and Raza *et al.*, (1999) who reported that the prevalence of chest disease attributed to the exposure to cotton dust.

Byssinosis is a chronic respiratory disease seen among workers exposed to cotton dust. In the last few years the disease has shown a declining trend due to the introduction of dust control in the textile mills of developed

countries. In our study the report of periodic medical examination, 2001 reported that there are no cases of byssinosis in Assiut Spinning Factory. This result agrees with the studies conducted in Egyptian Textile Factories [El-Sobkey (1975) and Hafez *et al.*, (1998)]. In contrast, many studies disagree with our finding as El-Shinawi *et al.*, (1994) in Egypt who reported that byssinosis was 4.9%, Fishwick *et al.*, (1996) in United Kingdom who reported that 3.5% of workers had byssinosis, Raza *et al.*, (1999) in United Kingdom who reported that byssinosis was present in only 0.3% of workers.

To reduce the health hazards of exposure to cotton dust, workers should wear orinasal mask for protection against cotton fibers. General ventilation of the work room and wetting of dusts by water sprays for prevention of air contamination with dust, the medical examination of workers frequently.

Noise is a serious occupational health hazards in the spinning factory. The major risk factors for noise induced hearing loss were the duration and the level of noise exposure (Abdel Aziz *et al.*, 1975 and Belachew & Berhane, 1999). The Occupational Health Department reported that the noise level in different departments of Assiut Spinning Factory range from 85-105dB. Another study was done in one of Egypt's biggest textile factories by Hafez *et al.*, (1998) reported that the level of noise in spinning departments range from 95-105 dB. In 1998, Gitaue, *et al.*, mentioned that the noise level in Eldoret, Kenya Textile industry in spinning department range from 91-97 dB.

International Labor Organization (ILO) (1981) mentioned that the maximum noise level in textile lies in the range 80-95 decibels depending on the nature of the process. The present study showed that hearing disturbance was found among 57.1% of workers. No significant differences between hear disturbance

and different departments of spinning sector. This attributed to high levels of noise in all departments in the spinning factory.

The periodic medical examination of the workers, 2001 from health insurance records reported that 27%; 41.9%, 14.8%, 16.3% from those who perform audiogram (344) were diagnosed mild, moderate, moderate severe and severe deafness respectively. The levels of hearing impairment increase in carding and spinning department than other departments. This could be due to high levels of noise in this department than others. This study agree with many studies conducted in kenya by Gitau *et al.*, (1998), who reported that the levels of hearing impairment increase in weaving (60.0%) and in spinning (37.1%) departments than other departments, in Egypt, by Hafez *et al.*, (1998) who reported that hearing impairment was very common among workers in the weaving (96%) and spinning (94%) departments and also in Ethiopia by Belachew and Berhane (1999).

Gitau,*et al.*, (1998) mentioned that prevention of hearing damage occur by examination of all workers in the factory who are exposed to high noise levels when first employed in the factory and records kept by the personnel office. The new employee should be examined again after 3 months to see if he may have sensitive ears. If his ears show signs of a threshold shift towards hearing loss, he should be moved to a quieter area.

Workers in the spinning factory must be given adequate instruction and training at the start of their employment to enable them to fit the earplug correctly (Ahmad 1988). Many of the machines are old machines that have been present since 1970. If possible the factory replacing these machines with new ones that are environmental friendly with low noise levels.

The present study revealed that 70.7% of workers mentioned that accident may occur in

all different departments. There is no significant difference among different departments and occurrence of accidents. The most common accident in spinning process was hand injuries. In Alexandria, study conducted by El-Sabaawi (1978) revealed that hand injuries depended on the nature of occupation among textile workers in spinning process. It was found that 27.25% of workers exposed to hand injuries. Our study illustrated that 2.4% from workers were exposed to injury and only 38.5% from them were receiving training before starting work. This difference was statistically significant ($P < 0.05$). This is attributed to the importance of training program before using any machines or equipments and the importance of using safety equipments in the factory.

Health staff and industrial safety personnel team are required to use the professional judgment in the assessing risks to workers and selecting protection methods (Baker, 1986). James & William (1985) suggested that risks could be achieved through observation of the work being done, weathering condition, checking of the condition of equipment used, use personal protective equipment and workers health records.

The present study stated that 67.3% of workers reported that the safety equipments were available, 41.6% from them were using masks while other workers don't use it because they believe that the mask interfere with respiration. However industrial safety personnel should be responsible for encouraging and training workers to wear and use personal protective equipment to all workers in the factory to minimize exposure to hazards. Nearly all workers (99.5%) mentioned that the emergency equipments were available.

The finding reported that nearly all of the workers mentioned that there is no health education program in the factory. Health

education services should be toward workers health and their safety and integrated with workers training, appropriate with workers level and real life problem and situation.

The periodic medical examination in Assiut Spinning Factory conducted every two years. According to the periodic medical examination 2001, it was found that the periodic medical examination is not available to all workers. The periodic medical examinations were done for only 63.8% of workers. The medical examination including clinical examination, chest X-ray, pulmonary function tests and audiogram. Occupational Safety and Health Administration (OSHA, 1995) reported that employees must provide free annual medical examination including breathing tests to workers employed in dusty areas. If workers show significant physical change, more frequent examination must be done to workers. Results of medical examination should be given to the worker.

The role of the nurse is very important in any factory. Davis (1985) competent nursing care, treatment, follow up, referral and first-aid services and maintain and update as necessary accurate recording and reporting of facts include evaluation of the total health care of the employee. Teach and motivate workers about good health and safety practices. Moreover, the physician and the nurse are working in occupational health department can be grouped under prevention, helping workers adjust to their jobs and treatment.

Our study concluded that respiratory tract diseases were the most important group of occupational disease in spinning factories as a result of inhalation of cotton fibers, dust in work place. The hearing impairments documented among the spinning workers were attributed to the exposure to high level of noise. Periodic medical examination was not available

to all workers in the factory. There was shortage of health services to workers and nursing services in the factory were not present. There was shortage of safety equipment. Mask only was provided for the exposed workers. Training and health education programs about occupational health hazards and prevention are not available.

Based on the findings in this study we recommend with improving of worker's health through: Periodic medical examination should be performed to all workers in the factory not only sample from them, the physician must be present daily in out patient factory clinic to provide medical services to workers at any time, qualified nurse must be present in out patient factory clinic to help in worker's health promotion and improve health services, first aid measures should be available at any time of day and the managing director, safety department and health authorities should provide protective measures to workers such as ear plugs, disposable mask, worker clothes, fire protection and observation for using it. Periodic inspection of working environment by industrial hygienist through regular measurement of noise level, illumination, humidity, ventilation and cotton dust concentration. Training and health education programs should be provided to all workers from the start of work and regularly carried out to assist the worker adjustment to the working environment. Emphasizing the correct use of personal protective measures. If possible, the factory should look into the possibility of replacing the old machines with new ones, which is less noisy.

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دراسة المخاطر الصحية المهنية بين العاملين بمصنع الغزل بأسسيوط

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يتعرض العاملين فى صناعة القطن إلى مخاطر صحية فى مختلف الأقسام بمصانع الغزل والنسيج ومعظم هذه المشاكل الصحية خاصة بالجهاز التنفسى نتيجة التعرض لأتربة القطن.

والهدف من هذا البحث هو دراسة المخاطر الصحية المهنية بين العمال بمصنع غزل أسسيوط وتقييم وسائل الوقاية والأمان التى تستخدم أثناء العمل للوقاية من هذه المخاطر.

أجريت هذه الدراسة فى مصنع الغزل بأسسيوط، وشملت ٥٥٠ عاملاً من العاملين فى أقسام الإنتاج والصيانة. وقد تم جمع البيانات من خلال المقابلة الشخصية مع العمال باستخدام استمارة جمع البيانات وكذلك من واقع سجلات مركز إصابات العمل بالتأمين الصحى بأسسيوط. واستغرق جمع البيانات حوالى ستة أشهر (من شهر يوليو إلى نهاية شهر ديسمبر ٢٠٠١م).

وقد أظهرت الدراسة أن معظم العمال (٩٦.٩%) كانوا من الرجال، وحوالى ثلثى العمال (٦٥.٨%) كانوا يمارسون هذا العمل من ٢٠-٣٠ سنة (متوسط 20.5 ± 5.3 سنة). وقد أشار ٦٧.٣% من العمال إلى وجود الكمامة ولكن ٤١.٦% منهم فقط كانوا يستعملونها أثناء العمل و ٩٩.٥% من العمال أشاروا أيضاً إلى وجود أجهزة الإنذار فى حالات الطوارئ ولكن لا توجد برامج للتثقيف الصحى.

وقد ثبت إحصائياً أن العاملين بأقسام الخلطة والتنظيف، الكرد والغزل، التمشيط والذوى يعانون من الأعراض الخاصة بالجهاز التنفسى أكثر من بقية الأقسام مثل الكحة (٦٨.٣%، ٦٠.٢%، ٧٣.٧% على التوالى) وألم فى الصدر (٦٨.٣%، ٥٧.٦%، ٦٤.٩% على التوالى) وضيق فى التنفس (٧٠.٧%، ٦٨.١%، ٧١.٩% على التوالى).

كما وجد أن أكثر من نصف العاملين بالأقسام المذكورة سابقاً بالإضافة إلى قسم السحب والبرم يعانون أيضاً من أمراض بالأذن.

كما أوضحت الدراسة أن الفحص الدورى تم إجراؤه على ٦٣.٨% فقط من العمال، وتم تشخيص ١٣.٤% التهاب شعبى مزمن، ١١.١% التهاب شعبى مزمن مصحوب بإيمفيزيم، وكذلك ٢.٣% أزمة شعبية، كما وجد أن ١٣.٤% من العمال يعانون من صمم حسى بينما ٩.٩% يعانون من صمم حسى وتوصيلى.

وقد أوصت الدراسة بتحسين صحة العمال عن طريق إجراء الفحص الدورى لجميع العمال فى المصنع وملاحظة جو بيئة العمل بواسطة متخصص لقياس تركيز الأتربة ومستوى الإضاءة والتهوية والضوضاء بالمصنع، كما يجب تطبيق برامج تدريب وتثقيف صحى لكل العاملين بالمصنع منذ بداية التحاقهم بالعمل وتشجيعهم على الاستخدام الصحى

لوسائل الوقاية الشخصية. كما توصى الدراسة بمحاولة استبدال الآلات القديمة الموجودة بالمصنع بأخرى حديثة أقل
ضوضاء.