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Respiratory Problems among Workers at A Cement Factory in Beni-Suif City .

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ABSTRACT

Background Respiratory problems represent one of the most leading causes for morbidity and mortality worldwide. Occupational agents are one of the major and most important modifiable risk factors for these problems. **The aim** of this study was to assess respiratory problems among workers at a cement factory in Beni-Suef city and to study risk factors of respiratory problems among the workers. **Design**: A descriptive exploratory research design was utilized in this study. **Setting:** the study was conducted at Misr Beni-Suef cement factory, Beni-Suef City. **A convenience** sample was used, and it composed of150 workers. Three **tools** were utilized; 1-an interviewing questionnaire composed of 3 parts; personal data, occupational history and medical history, 2-respiratory symptoms questionnaire, 3-Environmental health checklist. **Results:**the prevalence of respiratory problems among studied workers were; 37.3% of them suffered from cough, followed by phlegm (35.3%), breathlessness (32.7%), wheezes (30.7%), chest tightness (28.7), runny itchy nose (26.7%), whereas chronic bronchitis was reported by only 22.0% of the workers. This study **concluded** that advancing age, duration of exposure, smoking habits, level of education, poor compliance in using protective equipments and poor ventilation in the workplace seen as major risk factors affecting the prevalence of respiratory problems. The present study recommended that pre-placement and periodic medical examination to all the workers and health education programs tailored to improve healthy practices of workers about the occupational safety measures and prevention of respiratory problems.

Key words: Respiratory problems, Workers, Cement

INTRODUCTION

Workers in the sector factories constitute an important productive aggregate in the community but they are exposed in their working environment continuously to either potential or actual hazards which have an impact on their health whether by acute or adverse serious effects **(Shafik. & Abd El-Mohsen, 2012)**. Globally, there are more than 2.6 billion workers who are exposed to hazardous risks in their work places. Approximately 75% of these workers are in developing countries, where workplace hazards are more severe. If one includes occupational illnesses, an estimated 1.1 million people worldwide die each year. Annually, an estimated 160 million new cases of work- related diseases occur worldwide **(Mckenzie, Pinger & Kotecki, 2012).**

Cement industry is one of the 17 most polluting industries listed by the central pollution control board **(Mehraj, et al., 2013)**. Exposure to hazardous air pollutants at sufficient concentrations and durations may increase cancer risk or cause toxicity to the immune, neurological, reproductive,

developmental, and respiratory systems **(El-Abssawy, et al., 2011)**. The number of people who work in dusty environments on a daily basis remains alarming. These workers are exposed to different types of health hazards such as fume, gases and dust, which are implicated in the development of occupational lung diseases **(Douglas & Alasia, 2012)**. Individuals working in dusty environment face the risk of inhaling particulate materials that may lead to adverse respiratory effects **(Mariammal, Jaisheeba &Sornaraj, (2012)**.

Respiratory tract problems are the most important group of occupational health problems in the cement industry as the result of inhalation of airborne dust **(El Jabale, 2015).** The most frequentlyreported clinical features in cement workers are chroniccough and phlegm production, impairment of lung function chest tightness, obstructive and restrictive lung disease, skinirritation, conjunctivitis, stomach ache, headache, fatigueand carcinoma of lung **(Ramakrishnan, 2011). Sharma and Atri (2010)** reported several risk factors that responsible for the causation of the respiratory problems, some of them are non-modifiable, that cannot be changed and others are modifiable, which means they can be changed or can be reduced or eliminated through lifestyle changes **(Parlikar, 2015).** Non-modifiable risk factors of respiratory problems including age, sex, genetic susceptibility and low functional status, impaired immunity and underlying illness (**Ajuwon, 2012)**. The modifiable risk factors includes behavioral or lifestyle factors (diet, physical inactivity, tobacco use and excessive alcohol consumption), societal factors, which include a complex mixture of interacting socioeconomic, cultural and environmental parameters **(Myers ,Moorman & Salgado, 2013).**

Prevention of occupational diseases, fatalities, corrective and preventive action must be taken. The amount of dust can be reduced by performing certain precautions such as; using of wet surfaces before cutting or drilling to prevent dust from rising, wear protective clothes and equipment as musk and goggles, wash hands and face before eating, drinking, or smoking, and through and when work (**Agrawal & Jain, 2014).** The occupational health nurse plays a multi-faceted role in influencing, maintaining or improving a worker's daily workplace health using protection, prevention and pro-active health interventions, creating productive healthy workers in a healthy workplace, acts for collection of data, assists companies in understanding legislation and regulation pertaining to workplace liability, compliance in providing health education, management of injured and ill employees and emergency preparedness (**Columbus& Georgia, 2014**).

Significance of the study

The global burden of diseases associated with occupational factors was estimated at 4- 10 million cases per year, with approximately 3-9 million in several developing countries per year **(Theodore et al., 2014).** The International Labor Association (I LA) and the United Nations agency, has estimated that industrial workers, on a global scale suffer around hundred and sixty million occupational diseases, and two million deaths per year. Fatalities due to respiratory diseases represent around 140,000 of these **(Mandal & Majumder, 2013)**. An estimated 12 percent of chronic obstructive respiratory diseases deaths are from occupational exposure to airborne particulates **(Health & Safety International, 2013).**

According to **Meo et al. (2013)** the worldwide community, especially the people in developing countries as in Egypt, is facing increasing risks of respiratory diseases due to production of smoke and dust in different occupational and industrial sectors. Cement industry is one of the biggest dust producing industries in Egypt. One kilogram of cement

manufactured daily generates about 0.07 kilograms of dust in the atmosphere **(El-Abssawy, et al, 2011)**. **Erhabor et al. (2013)** reported that, exposure to cement dust is even a larger problem in developing countries as well as in Egypt as personal protection equipment is often limited and as well as occupational issues, safety and occupational health regulations are compromised. So it is important to study the workers' industrial problems that affect their health because a healthy worker is the key factor for maintainable social and economic growth **(Asad, Jubeen & Iqba, 2013)**. So the study was conducted to assess respiratory problems among cement workers and to study risk factors of respiratory problems among the workers.

Aim of the study:

- To assess the respiratory problems among workers at a cement factory in Beni-Suef city.
- Study the risk factors of respiratory problems among the workers.

Research question: To fulfill the aim of the study, the following research questions were formulated:

Q1- What are the respiratory problems that occur among cement factory workers?

Q2-What are the modifiable and non-modifiable risk factors for respiratory problems among cement workers?

Methodology

Research Design: A descriptive research design was utilized in the current study.

Setting: The study was conducted at Misr Beni-Suef cement factory**.**

Subjects: the total number of workers in the factory was 426 included production departments and non-production departments. A sample of convenience of 150 workers from production departments that included five sections crusher, raw materials mills, cement mills, cement kiln and packing section were selected because workers in non-production departments their work nature have no direct contact with cement dust. Workers with the following criteria were excluded.

Exclusion criteria

1- Workers with Past medical history of serious respiratory illness before joining the job.

2- Workers with cardiac illness, chest injuries or operation.

3- Workers who had working experience less than one year.

5- Workers who were refused to participate in the study.

2.4 Tools of data collection: to achieve the aim of the study, data collected by the following tools:

I- Structured Interviewing Questionnaire was developed by the investigator and include:

A- Personal data which include 10 questions, and was designed to collect data about (age, level of education, marital status, residence, income, family number, sleeping, exercise and smoking habits)

B- Occupational history; consisted of 37 questions about working department, mean hours of the daily work, work experience, number of days worked per week, previous occupations, in addition to reported training courses and

personal protective equipment's in the factory.

C- Medical history of the workers

A- Family medical history.

It consists of 4 questions related to hypertension, heart diseases, diabetes mellitus and respiratory diseases.

B- Personal medical history about respiratory diseases after employment in the factory. It consists of 9 questions related to chronic bronchitis, emphysema, silicosis, pneumonia, bronchial asthma, COPD, tuberculosis, tracheitis and recurrent chest infection.

II-Respiratory symptoms questionnaire was developed by the researcher by modifying previous questionnaires from the literature (British Medical Research Council's questionnaire on respiratory Symptoms). It composed of 17questions related to different respiratory complaints in the past 12 months.

Scoring system: Each item was scored 1 for yes and 0 for No.

III- Observational checklist for environmental health: developed by the investigator and the items of this checklist were filled once by the investigator with the assistance of the safety engineers. It composed of 17 questions related to safety& health measures in the working department.

Scoring system: Each item was scored 1 for yes and 0 for No

Field work

An official permission to conduct the proposed study was obtained from the officials of both Faculty of Nursing Cairo University and the Head Sector of cement factory. The protocol of this study was approved by the Ethical Committee of the Faculty of Nursing, Cairo University. The purpose, specific objectives, anticipated benefits and the method of the study were carefully explained to each worker. When the workers agreed to participate in the study, they were assured that they could withdraw at any time if they want to and they would not be identified in the report of the study.

The investigator emphasized that participation in the study is entirely voluntary; and their rights were secured; anonymity and confidentiality will be assured through coding of the data. Written consents were taken from workers who accepted to be included in the study.

Validity and Reliability

Content validity: Five experts (Professor of occupational and industrial medicine at the faculty of medicine, El-Minia University, Professor of community health nursing at Cairo University, Assistant professor of community health nursing at Ain Shams University, lecturer of community health nursing at Beni-suef University, lecturer of chest at the faculty of medicine, Beni-Suef University) were asked to check the tool for its content validity, and modifications were done based on their opinions.

Reliability: The internal consistency of the instrument was tested using cronbachs alpha for the whole questionnaire was (0.78).

Pilot study:

A pilot study was conducted on 10% of the sample (15) workers to assess the feasibility of the study as well as clarity of data collection tools and to determine the needed time for application of the study tool. The necessary modifications were done. Workers participated in the pilot study were excluded from the study sample.

Ethical consideration:

An official permission to conduct the proposed study was issued from the faculty of nursing Cairo University to the director of a cement factory requesting approval for conducting this study. The protocol of this study was approved by the Ethical Committee of the Faculty of Nursing, Cairo University. The purpose, specific objectives, anticipated benefits and the method of the study were carefully explained to each worker. When the workers agreed to participate in the study, they were assured that they could withdraw at any time if they want to and they would not be identified in the report of the study.

Data collection procedure:

Oral consent was taken from the director of a cement factory. An official permission to conduct the proposed study was issued from the faculty of nursing Cairo University to the director of a cement factory requesting approval for conducting this study. Workers were interviewed individually to explain the purpose and the nature of study and a written informed consent was obtained. The investigator informed them that participation was voluntary, and the possibility of withdrawing at any time. Confidentiality of the information was assured. The period of conducted interview questionnaire was maximally 20 minutes. Data collection was conducted within 6 months from November, 2014 to April, 2015.

Limitations of the study

1-Health records don't contain data about respiratory problems that occur among workers so the data regarding respiratory problems among them obtained by worker self reporting.

2- Some workers told that they have some fear to lose their jobsif they admitted to have health problems so they may not give accurate information about their respiratory problems.

Statistical Analysis

Data were coded, scored, tabulated, and analyzed by computer using "Statistical Package for Social Science" (SPSS windows) version 20. Numerical data were expressed as mean ± SD, and range. Qualitative data were expressed as frequency and percentage. Relations between different numerical variables were tested using Pearson correlation. For qualitative data, comparison between two variables was done by using r & p. Probability (p-value) equal to or less than 0.05 was considered significant and less than 0.001 was considered as highly significant.

RESULTS

Table (1) shows that, 38.0% of the studied workers aged from 30 to less than 40 years old and only 4.0 % of workers aged more than50 years old with a mean age of 34.84±7.712years. Concerning the workers' level of education, about 52.0% of the workers have secondary education, While 28.0 % are illiterate and only 6.7% of them have university education. As regards the marital status, about 74. 7% of the workers are married, while 22.0% of the workers are single and only 1.3% are divorced. Related to the family size , about 75.3% of the workers have moderate family size (3 – 5), while23.3% of the workers have (> 5 persons) and only1.3% have <2 persons. The majority of the workers (77.3%) belong to rural areas. As for the home site, 80.0% of workers reside far from workplace and 20.0% reside near to the factory.

Figure (1) clarified that ,52.7% of the workers attended training courses; about occupational health hazards (63.3%) that might occur during the work, while27.8 % of them attended courses about first aid measures and only 8.9% attended courses

about application of preventive measures against dust hazards.

Figure (2) illustrated that the prevalence of respiratory problems among studied workers were 37.3%of workers suffered from cough, followed by phlegm (35.3%), breathlessness (32.7%), wheezes (30.7%), chest tightness (28.7%) and runny itchy nose (26.7%), whereas chronic bronchitis was reported by only 22.0% of the workers.

Table (2) showed that, the percentage of respiratory problems increase by age, the respiratory problems are more prevalent among workers who have more than 40 and 50 years old. While the least percentage is among workers who have age 20 and less than 30.The difference is statistically significant $p<0.05$.

Table (3) demonstrated that, the percentage of respiratory problems decreases with education, the percentages of respiratory problems are more prevalent among illiterate workers and the least percentage of respiratory problems is found among educated workers. These differences are statistically significant as regards cough, phlegm, breathlessness, chest tightness and chronic bronchitis ($p<0.05$), and insignificant as regards wheezes, runny itchy nose ($p>0.05$).

Table (4) demonstrated that, respiratory problems are more prevalent among workers who do not attend work training courses. These differences are statistically significant as regards cough, phlegm, breathlessness, and chronic bronchitis ($p<0.05$), and insignificant as regards wheezes, chest tightness and runny itchy nose ($p>0.05$).

Table (5) shows that, the percentage of respiratory problems is more prevalent among workers who have a family history of chest disease. There is no statistically significant difference as regards respiratory problems and family history of chest disease ($p>0.05$).

Table (6) shows that, all respiratory problems were more prevalent among smokers than the nonsmokers. The differences were statistically significant for all of them, except chest tightness ($P=.300$).

Table (7) revealed that, the prevalence of respiratory problems increases with work experience, the highest percentage of respiratory problems was more prevalent among workers who had got 10years of work experience and more. The difference was statistically significant ($P<0.05$).

Table (8) illustrated that, the percentage of respiratory problems was more found among workers who do not use protective equipment than those who use them. These differences were statistically significant as regards cough, phlegm, wheezes, and chronic bronchitis ($P<0.05$), and insignificant as regards breathlessness, chest tightness and runny itchy nose ($P>0.05$).

Table (9) illustrated that, workers who were working in poorly ventilated areas were more reported cough, phlegm, breathlessness and chronic bronchitis , compared to who were working in well- ventilated areas and the difference was statistically significant ($p<0.05$). Other reported wheezing, chest tightness, runny, itchy nose were reported and the difference was not statistically significant ($p>0.05$).

Table (1): Distribution of studied workers regarding their personal characteristics

Personal characteristics	Total Sample (N=150)	
	Number	%
Age		
20-	56	37.3
30-	57	38.0
40-	31	20.7
50 -53	6	4.0
Mean ±SD	34.84±7.712	
Level of education		
Illiterate	42	28.0
Read &write only	20	13.3
Secondary	78	52.0
University	10	6.7
Marital status		
Married	112	74.7
Single	33	22.0
Widow	3	2.0
Divorced	2	1.3
Family size		
<2 persons	2	1.3
3 - 5 persons	113	75.3
> 5 persons	35	23.3
Residence		
Rural	116	77.3
Urban	34	22.7
Home site		
Near the workplace	30	20.0
Far from workplace	120	80.0

Figure (1):Distribution of studied workers according types of training courses (n=79)

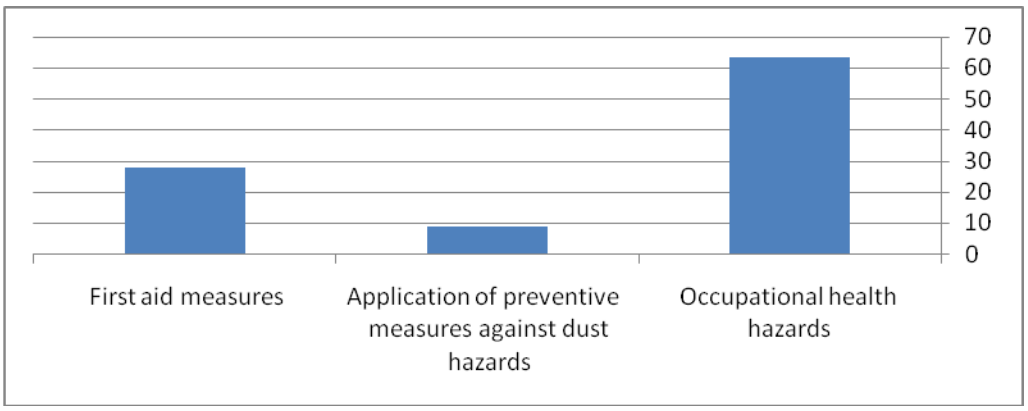

Figure (2):Prevalence of respiratory problms among studied workers (n=150)

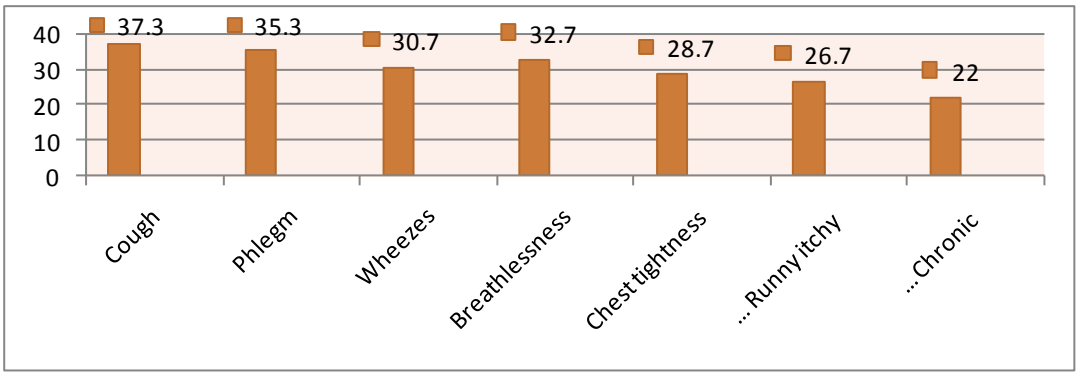

Table (2): Relation between age of the studied workers and respiratory problems

Respiratory problems	Age (yrs)								X2	P
	20-30 N=56		31-40 N=57		41-50 N=31		>50 N=6			
	No.	%	No.	%	No.	%	No.	%		
Cough	10	17.9	18	31.6	23	74.2	5	83.3	33.316	.000*
Phlegm	9	16.1	17	29.8	23	74.2	4	66.7	32.917	.000*
Wheezes	7	12.5	18	31.6	19	61.3	2	33.3	22.408	.000*
Breathlessness	8	14.3	23	40.4	14	45.2	4	66.7	15.486	.001*
Chest tightness	8	14.3	16	28.1	15	48.4	4	66.7	15.806	.001*
Runny itchy nose	20	35.7	17	29.8	3	9.7	0	0.0	9.392	.025*
Chronic bronchitis	3	5.4	5	8.8	21	67.7	4	66.7	59.626	.000*

*Statistically significant

Table (3): Relation between workers, level of education and respiratory problems

Respiratory problems	Level of education								X2	P
	Illiterate (N=42)		Read & write only (N=20)		Secondary (N=78)		University (N=10)			
	No.	%	No.	%	No.	%	No.	%		
Cough	23	54.8	7	35.0	24	30.8	*2*	20.0	8.220	.042*
Phlegm	28	66.7	6	30.0	19	24.4	*0*	0.00	27.871	.000*
Wheezes	18	42.9	6	30.0	22	28.2	*0*	0.00	7.585	.055
Breathlessness	15	35.7	10	50.0	24	30.8	*0*	0.00	7.888	.048*
Chest tightness	17	40.5	7	35.0	19	24.4	*0*	0.00	7.983	.046*
Runny itchy nose	7	16.7	5	25.0	23	29.5	5	50.0	5.278	.153
Chronic bronchitis	18	42.9	4	20.0	11	14.1	*0*	0.00	16.349	.001*

*Statistically significant

Table (4): Relation between work training courses and respiratory problems

Respiratory problems	Work training courses				X2	P
	Yes (79)		No (71)			
	No.	%	No.	%		
Cough	22	27.8	34	47.9	6.418	.011*
Phlegm	18	22.8	35	49.3	11.502	.001*
Wheezes	21	26.6	25	35.2	1.309	.252
Breathlessness	18	22.8	31	43.7	7.410	.006*
Chest tightness	20	25.3	23	32.4	.916	.339
Runny itchy nose	18	22.8	22	31.0	1.286	.257
Chronic bronchitis	9	11.4	24	33.8	10.944	.001*

*Statistically significant

Table (5): Relation between workers family history of chest disease and respiratory problems

Respiratory problems	Family history of chest disease				X2	P
	Yes (40)		No (52)			
	No.	%	No.	%		
Cough	14	35.0	18	34.6	.663	.718
Phlegm	16	40.0	17	32.7	.558	.756
Wheezes	16	40.0	13	25.0	2.474	.290
Breathlessness	15	37.5	18	34.6	1.195	.550
Chest tightness	11	27.5	16	30.8	.172	.918
Runny itchy nose	8	20.0	18	34.6	2.779	.249
Chronic bronchitis	10	25.0	10	19.2	.448	.799

Table (6): Relation between smoking habits of the workers and respiratory problems (n=150)

Variables	Smoker (106)		Non Smokers (44)		X^2	P
	No.	%	No.	%		
Cough	45	42.5	11	25.0	4.048	.044*
Phlegm	43	40.6	10	22.7	4.330	.037*
Wheezes	39	36.8	7	15.9	6.378	.012*
Breathlessness	40	37.7	9	20.5	4.222	.040*
Chest	33	31.1	10	22.7	1.074	.300
Runny nose	23	21.7	17	38.6	4.562	.033*
Bronchitis	29	27.4	4	9.1	6.047	.014*

* Statistically significant

Table (7): Relation between work experience of the studied workers and respiratory problems (n=150)

Respiratory problems	Work experience						X^2	P
	1-5 years (n=54)		6 -10 years (n=65)		>10 years (n=31)			
	N	%	N	%	N	%		
Cough	9	16.7	26	40.0	21	67.7	22.308	.000*
Phlegm	8	14.8	21	32.3	24	77.4	34.241	.000*
Wheezes	7	13.0	25	38.5	14	45.2	12.881	.002*
Breathlessness	10	18.5	21	32.3	18	58.1	14.009	.001*
Chest- tightness	4	7.4	24	36.9	15	48.4	19.997	.000*
Runny, itchy nose	31	57.4	5	7.7	4	12.9	41.064	.000*
Chronic bronchitis	3	5.6	12	18.5	18	58.1	32.481	.000*

Table (8): Relation between using of personal protective equipment and respiratory problems

respiratory problems	Yes (112)		No (38)		X^2	P
	No	%	No	%		
Cough	32	28.6	24	63.2	14.507	.000*
Phlegm	24	21.4	29	76.3	37.410	.000*
Wheezes	25	22.3	21	55.3	14.481	.000*
Breathlessness	35	31.2	14	36.8	.403	.525
Chest	29	25.9	14	36.8	1.663	.197
Runny nose	32	28.6	8	21.1	.820	.365
Bronchitis	12	10.7	21	55.3	32.815	.000*

* Statistically significant

Table (9): Relation between ventilation of the workplace and respiratory problems (n=150)

Variables	Work in well- ventilated areas (102)		Work in poorly ventilated areas (48)		X^2	P
	No	%	No	%		
Cough	32	31.4	24	50.0	4.841	.028*
Phlegm	29	28.4	24	50.0	6.646	.010*
Wheezes	33	32.4	13	27.1	.426	.514
Breathlessness	27	26.5	22	45.8	5.564	.018*
Chest tightness	28	27.5	15	31.2	.230	.631
Runny itchy nose	29	28.4	11	22.9	.508	.476
Chronic bronchitis	17	16	16	33.3	5.284	.022*

Discussion

Exposure to cement dust has been demonstrated to have adverse effects on human health. Because of the volatility of cement dust, the main targets in the human body are the respiratory system, skin, and eyes **(Hong et al., 2014).**

RQ_1" What are the respiratory problems that occur among cement workers?"

The result of the current study indicated that, 37.3% of workers represented with cough, 35.3% of workers represented with phlegm, 32.7% of workers represented with breathlessness, 30.7% of workers represented with wheezes, 28.7% of workers represented with chest tightness, 26.7% of workers represented with runny itchy nose, whereas chronic bronchitis was reported by 22.0% of the workers .The present percentage in the current study was lower in comparison with the study results of **Sheikh et al., (2013)**, they carried study on 100 worker about peak expiratory flow rates values in workers of Zeal-Pak cement factory Hyderabad, Pakistan, stated that, the prevalence of respiratory symptoms among the workers were cough 58%, dyspnea 69%, chest tightness especially at work place 33%. Also results in the current study lower than study conducted by **Kakooei et al., (2012)** (15)who conducted study in Iran about dust exposure and respiratory health effects in cement production, stated that ,respiratory symptoms among their studied workers were cough 60%,sputum 37%,dyspnea 44%,wheezing 41%. The reason of the lower percentages in current study results may be related to differences in the environmental ventilation and sanitation from workplace to another, attending training courses. more than fifty percent of studied workers had less than 5 years work experience so they had less exposure to the hazard of cement dust, also three quarters of them younger than 40 years old so they have good immunity can fighting against disease.

RQ2 "What are the modifiable and non modifiable risk factors of respiratory problems among cement workers?

In our study, results showed that age factor had significant effect on respiratory problems, the percentage of respiratory problems increases by age, Similarly **Stambuli (2013)**, presented that in more aged people the body immunity start to go down and less fighting for diseases. These results were supported by study of **Siyoum, Alemu and Kifle (2014)**who studied Respiratory Symptoms and Associated Factors among Cement Factory Workers and Civil Servants in Ethiopia, they reported that, the prevalence of respiratory symptoms among cement factories workers were increase with age. In contrast to the current study results, study in other cement factories of Ethiopia studied Lung function reduction and Chronic respiratory symptoms among workers in the cement industry, showed that even though cleaners were youngers **(Zeleke, Moen & Bråtveit, 2011)**, the prevalence of respiratory symptoms were higher among them. The difference with this study might be that cleaners were exposed to the high concentrations of dust in the working environment due to their working nature of cleaning.

Regarding relation between educational levels of studied workers and respiratory problems, the current study results indicated that, the percentage of respiratory problems decreases with increased level of education. This result is consistent with **Siyoum et al. (2014)**, they stated that higher education status was protective for respiratory symptoms among cement factory workers and without education they are not able to understand the significance of occupational health and not conscious nor aware to adopt occupation health measures and practices. **Similarity Adebola (2014)** studied the

Knowledge, Attitude and Compliance with Occupational Health and Safety Practices among Pipeline Products and Marketing Company (PPMC) among Staff in Nigeria, stated that, high level of education increases the awareness of occupational safety. On the other hand this result in consistent with study of **Laima, Banda, and Siziya (2012),** who studied Prevalence and Correlates of Lung Function Impairment among Miners at Nchanga Open-Pit Copper Mine in Chingola, they stated that, educational level was not statistically significantly associated with lung function impairment. The finding of these studies might be due to most of the sample have the same level of education.

The current study results demonstrated that, respiratory problems were more prevalent among workers who didn't attend work training courses than those who attended work training courses. This result consistent with **Siyoum et al. (2014)** stated that, training on occupational health and safety related to dust health effect was reduced respiratory problems .Also this result is consistent with follow up study done in Tanzania by **Tungu et al. (2014),** they illustrated that, after follow up of exposed cement workers with administration of health and safety training; significant reduction of respiratory problems was recorded among exposed workers. In addition to study conducted by **Ahmed andNewson-Smith (2010)** to assess knowledge and practices related to occupational hazards among cement workers in United Arab Emirates, they pointed that, receiving information about the job-associated hazards, and attending a training course about occupational safety were the most important predictors of the workers' knowledge about the occupational hazards and reduced their effects and prevent health risks.

The current study revealed that, there was no statistically significant difference as regards respiratory problems and family history of chest disease. This result consistent with **Sundararaj (2012),** who studied the prevalence of respiratory morbidity and the risk factors associated among the workers of cement industry in South India, stated that, the family history which has been implicated in adulthood lung diseases was not associated with respiratory morbidity. Also, this result agreed to study done by **Poornajaf, et al. (2010)** about the effect of cement dust on the lung function in a cement factory in Iran, they found that, there were no significant differences in family history and increased prevalence of respiratory symptoms.

Concerning smoking habit and respiratory problems, the result of the current study indicated that, all respiratory problems were more prevalent among smokers than non-smokers. This result consistent with study conducted in India by **Mandal and Majumder, (2013)** found that, smokers of both the higher and lower age group indicated more restrictive and combined respiratory diseases than non smokers, Moreover, **Ahmed and Abdullah (2012)**conducted study about dust exposure and respiratory symptoms among cement factory workers in the United Arab Emirate, they found that smokers were higher prevalence of respiratory symptoms than nonsmokers in both exposed and unexposed groups .In the same line **Forey, Thornton and Lee (2011)** conducted study about systematic review with meta-analysis of the epidemiological evidence relating smoking to chronic bronchitis and emphysema, considered that, smoking is a proven risk factor in developing of chronic respiratory illnesses. In contrast **Dawood et al. (2013)** studied pulmonary function test among cement workers in Iraq reported that lung functions were found to be not affected with smoking. Also **Asuah-kwasi (2013)** conducted study about Self report health status of Ghana cement company workers and found that there was no significant association between smoking history and health status of study participants. The difference in these findings than current

study results might be due to small frequency of smokers, or they might be light smokers or recent smokers, thus reducing smoking related risk of symptoms.

The result of the current study showed that, the duration of exposure was found to be a significant risk factor. The study result revealed that, the prevalence of respiratory problems increases with work experience. These results were supported by **Shaikhet al., (2013)** mentioned that the impairment in lung function was markedly affected with increase of duration of exposure in cement factory. On the other hand **Dawood et al., (2013)** stated that, lung function were found to be not affected with increasing duration of exposure to cement dust. The differences might be due to the studied workers in the previous studies might have short duration of work, enough training courses about prevention of dust hazards or follow the instructions of safety precautions.

Regarding relation between using of personal protective equipment and respiratory problems, the current study illustrated that, the percentage of respiratory problems was more found among workers who do not use protective equipment than those who use it. These results are in agreement with data have been reported by **Asuahkwasi (2013)** that, there was a significant association between the use of protective overall and their health status of the study participants, which is evident that the regular use of protective overall is effective. Also other studies about effects of exposure to Portland cement dust on lung function in Iran showed that, the consistent use of personal protective equipments is essential in protecting cement workers from cement related health problems (**Mirzaee & Kebriaei (2008); Zeleke, Moen & Bråtveit (2010)**. In the same line **Thepaksorn et al. (2013)** studied Respiratory Symptoms and Patterns of Pulmonary Dysfunction among Roofing Fiber Cement Workers in the South of Thailand, they reported that the use of proper PPE by the exposed workers would help to protect them from developing more severe chronic respiratory diseases in the future. These result in contrast with **Siyoum et al. (2014)** found that respiratory symptoms as general was not significant difference with using PPE. This finding might be due to poor compliance of workers in wearing protective equipment all the time or might be that the exposed group used poor quality and not effective PPE and continue to work without additional measure taken to reduce dust exposure.

Additionally results of the current study illustrated that, workers who were working in poorly ventilated areas were more reported, cough, phlegm, breathlessness and chronic bronchitis, compared to who were worked in well- ventilated areas and the difference was statistically significant. This result consistent with study by **Ganyarut (2010)** who studied working environment and respiratory problems among employee in 2 garment factories in Thailand, it found that there was statistically significant association between absence of ventilation devices in the workplace and the prevalence of respiratory problems. Similarly, **Siziya and Munalula (2005)**studied respiratory conditions among workers in a cotton spinning mill in Zambia, they reported that using adequate ventilation measures more important than wearing masks on the reduction of the prevalence rates of the respiratory conditions.

Conclusion

Based on the result of the current study; it can be concluded that:

- The prevalence of respiratory problems among studied workers were; 37.3%of workers suffered from cough, followed by phlegm (35.3%), breathlessness (32.7%), wheezes (30.7%), chest tightness (28.7) and runny itchy nose (26.7%), whereas

chronic bronchitis was reported by only 22.0% of the workers.

- The modifiable and non modifiable risk factors of respiratory problems among cement workers were age, level of education, years of experience, smoking habits, poor compliance in using personal protective equipments and poor ventilation in the workplace.

Recommendations

Based on findings of the present study, the followings are recommended:

- Pre-placement and periodic medical examination should receive more emphasis to detect and take action for workers at risk of occupational health hazards.
- Occupational health and safety should be included in any training course before employment for newly-hired workers.
- Health education programs should be developed regularly for cement workers about the hazards of smoking, occupational safety measures and prevention of respiratory problems.
- Periodic inspection of working environment should be performed.
- Further researches are needed to produce more accurate estimates of prevalence of respiratory problems among cement industry workers in Egypt.

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