

FREQUENCY OF OCCUPATIONAL HEALTH PROBLEMS AMONG COAL MINERS

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ABSTRACT

Background: Coal mining is considered as one of the dangerous occupations globally and poses many health problems to coal miners due to production and dispersion of fine coal dusts. This study was conducted with the objective to find the frequency of various occupational health problems and to recommend measures to reduce high morbidity and mortality among coal miners.

Material & Methods: This cross-sectional study was conducted at Department of Community Medicine, Pak International Medical College, Peshawar, Pakistan, among 400 coal miners of Cherat, district Nowshera of Khyber Pakthumkhwa, Pakistan from July 2012 to June 2013. Coal miners with more than six months job were included. Data collection through questionnaire was accompanied by history, general physical examination and investigations. The demographic variables were age, duration of coal mining, Job satisfaction, history of smoking and previous mine injuries and illness. Descriptive statistics were applied. SPSS version 17 was used for data analysis.

Results: More than half of coal workers suffered from signs and symptoms of various occupational health problems with varying frequencies including Musculoskeletal (n=243), respiratory (n=209), gastrointestinal (n=191), nervous (n=91), dermatological (n=167), ear (n=116), nose & throat (n=134) and eye problems (n=140).

Conclusion: The frequency of various occupational health problems is high among coal miners, involving almost every system of the body. It is suggested that education and training be provided to the coal miners, pre-placement and periodic medical examinations be arranged, dust control measures be adopted and their compliance be monitored.

KEY WORDS: Miners; Coal mining; Occupational health.

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INTRODUCTION

Coal mining is considered as one of the dangerous occupations globally and poses many health problems to coal miners due to production and dispersion of fine coal dusts, resulting in pneumoconiosis and other diseases. The health problems range from minor effects to devastating conditions which results in high morbidity and mortality. Heavy physical work, severity of the working conditions, work place injuries and combined occupational dust exposure are the major causes of occupational morbidity and mortality.¹ Injuries, resulting in death,

are one of the major occupational risks.² Various environmental epidemiological studies indicated that exposure to coal dust contributed to health risks.³ There is positive association between coal dust exposure years and respiratory health problems.⁴ Coal miners also develop myocardial infarction and there is increased risk of mortality from Ischemic Heart Diseases, associated with cumulative exposure to coal dust.⁵ The coal miners also complain of noise-induced hearing loss.⁶

This study was conducted with the objective to find the frequency of various occupational health problems and to recommend measures to reduce high morbidity and mortality among coal miners.

MATERIAL AND METHODS

This cross-sectional study was conducted at Department of Community Medicine, Pak International

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al Medical College, Peshawar, Pakistan, among 400 coal miners of Cherat, district Nowshera of Khyber Pakthumkhwa, Pakistan from July 2012 to June 2013 using convenient sampling technique. Coal miners with more than six months of job were included. Data collection through questionnaire was accompanied by history, general physical examination and investigations. The demographic variables were; age, duration of coal mining, job satisfaction, history of smoking and previous mine injuries and illnesses. Descriptive statistics were applied. Continuous variables were analyzed using means and standard deviations. Categorical variables were analyzed using frequencies and percentages. SPSS version 17 was used for data analysis.

RESULTS

Among 400 coal miners, 167 (41.8%) were ≤ 25 years, 117 (29.3) miners were in age range 26-35

Table 1: Frequency of demographic and research variables of coal miners of Cherat, Pakistan (n=400).

Age Distribution	Number	Percentage
≤ 25 years	167	41.8
26-35 years	117	29.3
≥ 36 years	116	29.0
Duration of Job		
1-4 years	112	28
5-8 years	112	28
9-14 years	68	17
≥ 15 years	108	27
Smoking History		
Smoker	288	72
Non-smoker	112	28
Number of cigarettes smoking/ Day		
1-5 cigarettes	108	37.5
6-10 cigarettes	92	31.9
11-15 cigarettes	64	22.2
≥ 16 cigarettes	24	8.3
Duration of smoking		
1-4 years	148	51.4
5-8 years	88	30.6
≥ 9 years	52	18.1
Previous injury / accidents		
Yes	130	28.3
No	270	71.7

Table 2: Frequency of Occupational Health Problems among coal miners of Cherat, Pakistan (n=400).

S. No.	Health Problems	Frequency
1	Musculoskeletal System	243
2	Respiratory System	209
3	Gastro Intestinal Tract	191
4	Foot/ Skin & Nail	167
5	Eye	140
6	Nose & Throat	134
7	Ear	116
8	Central Nervous System	91
9	Cardio Vascular System	41
10	Miscellaneous Health	39
11	Urinary System	29

years, and 116 (29%) miners were ≥ 36 years. The mean age was 30 ± 1.26 years. Twenty-eight percent of the coal miners had 1-4 years, 28% had 5-8 years, 17% had 9-12 years and 27% had 13 or more years of working experience in the coal mines. Mean job duration was 8 ± 1.12 years. Smoking status among 400 coal miners was analyzed as 288 (72%) smokers while 112 (28%) miners were not smokers. Among 288 smokers 108 (37.5%) miners were having 1-5 cigarettes per day, 92 (31.9%) miners were having 6-10 cigarettes per day, 64 (22.2%) miners were having 11-15 cigarettes per day, and 24 (8.3%) miners were having 16 or more than 16 cigarettes per day. Mean number of cigarettes was 10 cigarettes per day with standard deviation ± 2.36 . Duration of smoking among 288 miners was analyzed as 148 (51.4%) miners were smoking from 1-4 years, 88 (30.6%) miners were smoking from 5-8 years, and 52 (18.1%) miners were smoking from 9 years and above. Mean number of smoking years was 8 years with standard deviation ± 0.86 . Previous injury or mine accident status among 400 coal miners was analyzed as 130 (28.3%) miners had mine accidents, while 270 (71.7%) miners gave no history of any mine accidents or injuries. (Table 1) The frequency of occupational health problems among coal miners were shown in Table 2.

DISCUSSION

In our study, respiratory health problems among coal miners like chest pain, dry cough, coughs with sputum/ blood, dyspnoea and shortness of breath were reported in 52.25 % of workers. According to study by Baur, coal miners had high prevalence of cough, dyspnoea, chest

pain and other respiratory health problems.⁷ In a study conducted by Kang & Kim⁸ in 2010 and by Vearrier & Greenberg⁹ in 2011 revealed high prevalence of respiratory health problems among coal miners. According to study conducted by Graber et al¹⁰ the coal miners also gave history of cough and shortness of breath. In another study 52.9% obstructive disease pattern was found.¹¹ The prevalence of pneumoconiosis was found to be 7.5% and 2% in other studies.¹² Another study showed prevalence of pneumoconiosis in 3 states as: Kentucky 9%; Virginia 8% and West Virginia 4.8%.¹³

There were 10.25% cardiovascular problems in our study, while Vearrier & Greenberg also pointed out high frequency of hypertension, palpitations and other cardiovascular problems among coal miners.⁹

Coal miners were exposed to different kinds of noises due to the various operations in the coal mines, the workers had 11.6% of ear problems including hearing impairment, ear block, ear pain/Otalgia ear discharge and tinnitus which are comparable to the findings of Viljoen et al.⁶

Our study showed 35% of ocular problems which are comparable to the findings of Vearrier & Greenberg.⁹

About 41.75% coal miners had nail, foot problems, skin allergy and skin discoloration/vitiligo while in a study conducted by Wood et al coal miners had skin infections due to exposure to toxic chemicals of coal and rock dust.¹⁴

Coal miners were exposed to heavy manual work during coal mining like loading and unloading, therefore musculo-skeletal health problems showed high prevalence of 60.75% and these findings were supported by Vearrier & Greenberg.⁹ The major musculoskeletal problems as reported by coal miners were body aches, knee joint, upper limbs/shoulder pain, backache, and lower limbs pain as were previously studied by Gallagher et al¹⁵, Bhattacharjee et al¹⁶ and Widanarko et al.¹⁷

Urinary tract System problems were 7.25% in our study and were comparable to the studies by Hendryx¹⁸ and Vearrier & Greenberg among coal miners.⁹

CONCLUSION

The frequency of various occupational health problems is high among the coal miners, involving almost every system of the body. It is suggested that education and training be provided to the coal miners, pre-placement and periodic medical examinations be arranged, dust control measures be adopted and their compliance be monitored.

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CONFLICT OF INTEREST

Authors declare no conflict of interest.

GRANT SUPPORT AND FINANCIAL DISCLOSURE

None declared.