PREVALENCE OF OCCUPATIONAL OBSTRUCTIVE DISEASES AMONG CHERAT COAL MINERS OF DISTRICT NOWSHERA PAKISTAN

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ABSTRACT

BACKGROUND: Coal mining is considered as one of the dangerous occupation though out the world, and poses many work related health problems to coal miners. It is reported that overall situation of occupational safety and health is not encouraging and thus coal miners' work under hazardous conditions, resulting in unnecessary morbidity and mortality. The occupational problems are on rise and cause hazardous impacts on coal miners as well as affect the economic status of the country. The objective of this study was to assess the prevalence of occupational obstructive diseases among coal miners.

MATERIAL & METHODS: This cross-sectional study was conducted at Cherat; among 400 coal miners, from January 2013 to July 2013. To estimate the prevalence of occupational obstructive diseases; coal miners of more than six months were included and pulmonary function tests & CXR were conducted.

RESULTS: The coal miners showed an increased prevalence of occupational obstructive diseases. The medical examinations of coal miner's revealed that approximately 17% i.e. 15.75% on PFTs and 18% on CXR had findings of occupational obstructive diseases.

CONCLUSION: The prevalence of the occupational obstructive diseases was high among the Cherat coal miners.

KEY WORDS: Prevalence, Occupational Obstructive Diseases, Pulmonary Function Tests, Chest X-rays, Coal Miners.

INTRODUCTION

Mining, especially underground coal mining has always been a dangerous occupation¹. Injuries, resulting in death, are one of the major occupational risks². Various environmental epidemiological studies indicated that exposure to coal dust contributed to health risks³. Coal miners had mostly disordered pulmonary ventilation and thus have high prevalence of restrictive and obstructive diseases⁴. The chest x-rays of coal miners showed hyper inflated lung fields on CXRs^{5,6}.

Studies were conducted nationally and internationally^{6,7}, which showed that coal miners also had obstructive pattern of respiratory diseases. There is airway obstruction and

resistance to respiratory air flow in obstructive pattern of PFTs⁸. The hyper-inflated lung fields were labeled as COPD, emphysema or asthma⁶. In Pakistan, there are around 185 billion tons of coal reserves, out of which KPK contributes about 90 million tons; i.e. from Hangu/Orakzai and Cherat/Nowshera⁹. The coal miners of Cherat were one of the neglected sectors and this study was carried to assess the prevalence of occupational obstructive diseases.

MATERIALS AND METHODS

It was a cross-sectional study conducted in Shakot, Jaba Tar, Jaba Khushk and Dak Ismail Khel at Cherat, District Nowshera, KPK, Pakistan; from February 2013 to July 2013; in which 400 male coal miners were selected and then examined for

pneumoconiosis. Nowshera is one of the largest cities and located about 27 Miles East of Peshawar on Grand Trunk Road¹⁰, at 34°0'55N, 71°58'29E, as shown in Figure No-1. **Cherat**, a hilly area, near the village of Saleh Khana and Dak Ismail Khel, at an elevation of approximately 4500- 5000 feet. In total there are 95-90 coal mines and about 900-1000 coal miners were working in coal mines of Cherat, Nowshera, Khyber Pukhtunkhwa¹¹. A detailed structured questionnaire was formulated to collect data for important variables like age, duration of coal mining job, smoking history, years of smoking and number of cigarettes per day. Medical examinations of 400 coal miners were conducted to estimate the prevalence of occupational obstructive diseases among coal miners. Continuous variables were analyzed using means and standard deviations for example: age etc; categorical variables were analyzed using percentages.

RESULTS

The demographics of the coal miners included in the study were shown in Table No. 1.

Table No. 1 Demographics of Coal Miners of Cherat (n = 400)

Age Distribution	n (400)	%age
< 20 years	21	5.3%
20-25 years	146	36.5%
25-30 years	69	17.3%
31-35 years	48	12.0%
36 years & above	116	29.0%
Total	400	
Duration of Job in Years	n (400)	%age
1-4 years	112	28.0%
5-8 years	112	28.0%
9-14 years	68	17.0%
15 years & above	108	27.0%
Total	400	

The chest x-rays findings were shown in Table No 2. & Figure No 2. The pulmonary function tests results are shown in Table No 2. & Figure No 2.

Table No. 02: Prevalence of occupational Obstructive pulmonary diseases among coal miners (n=400)

S. No	Laboratory Test/s	Findings	n	%
1	Chest X-Rays (P/A view)	Hyper Inflated Lung Fields	72	18.00%
		Normal or other diseases	328	82.00%
		Total Population	400	100%
2	Pulmonary Function Tests	Obstructive Disease Patterns	63	15.75%
		Normal or other diseases	337	84.25%
		Total Population	400	100%

Figure No 2. Graph Showing prevalence of occupational Obstructive pulmonary Disease among coal miners (n=400)

DISCUSSIONS

The respiratory health problems amongst 400 coal miners during medical examinations were: out of all chest problems, as reported by internationally¹², the coal miners showed high prevalence of dry cough¹³ and productive cough i.e. n=106(26.50%) and n=74(18.50%) respectively as reported in literature^{6,14}. n=68(17%) miners complaint of dyspnoea/shortness of breath, and 116(29%) having no chest problem during medical examinations.

The chest x-rays showed: Micro Nodular Opacities of 1-5 mm in n=109(27.25%) of coal miners¹⁵; Bilateral or unilateral Calcifications in n=64 (16%), Macro Nodular Opacities of >1 cm in n=15(3.75%) of coal miners, Hyper Inflated Lung Fields i.e. COPD or asthma in n=72 (18%) of coal miners^{5, 6}, and normal chest x-ray findings were observed in n=40 (35%). Occupational obstructive diseases had prevalence of about 18% in our study and thus confirmed 5-25% COPD & asthma prevalence¹³ as shown in Table No 2. & Figure No 2.

The pulmonary function tests had; n=210 (52.50%) restrictive pattern of respiratory diseases^{7,10}; n=63 (15.75%) had obstructive pattern of respiratory diseases^{5,13}, and only n=127 (31.75%) showed normal pulmonary function tests. International data reported that there were disordered pulmonary ventilation in 53.3% of coal miners⁴ and were supported by our study; which had high prevalence of obstructive diseases. Thus the prevalence of obstructive disease pattern by

PFTs was found as 15.75% whereas it had high prevalence of 52.9% by PFTs in international literature^{5,13}, as shown in Table No 2. & Figure No 2.

CONCLUSIONS

From the medical examinations, CXR and PFTs; it was concluded that the health status of the coal miners were not in accordance with the International standards and approximately 17% of the coal miners showed prevalence of occupational obstructive diseases and thus inflicts the overall situation of occupational safety and health measures in Cherat coal mines.

RECOMMENDATIONS

It is suggested that coal miners are one of the neglected sectors and needs proper and immediate attention of the concerned authorities, coal miners should be educated and trained regarding the occupational health & safety measures; pre-placement and periodic medical examinations should be arranged regularly; effective dust control measures should be adopted, and regular surveillance and monitoring of these coal mines be conducted. Moreover, provision of personnel protective equipments (PPEs) and their compliance should be strictly maintained in coal mines.

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