

Caring Occupational Stress of Coal Bikers in Eastern India Coal-belt - a Debatable Issue

Pachal T

Bokaro Steel Plant , SAIL

Bokaro Steel City, Jharkhand, India

dr_tpachal@yahoo.com

Abstract: Hundreds of people in Eastern India Coal belt are engaged in a strenuous occupation of carrying sacks of raw coal or coal dust weighing 250 to 400 kilograms and travel 30 to 40 Kilometers with the load through the ups & downs road of Chotanagpur Plateau. A journey of 60-80 kilometers and carrying heavy loads on a Bicycle in a day under scorching sun or in chilled air can challenge any severe manual occupation in India, demanding high calorie expenditure along with severe occupational stress. The people engaged in such decades old manual occupation earn only 300 to 400 INR in a single trip and can manage only 10-15 such trips in a month. Though this very occupation is known to everyone, yet neither any change has been brought in this occupation nor has someone thought about the welfare of this unfortunate work force. The present paper has attempted to unveil information regarding the occupation as well as the occupational stress to the coal carrying bikers including several ergonomic stresses. This paper will also try to highlight the mechanical disadvantages during carrying the huge load on a bicycle in the uneven terrain and the bikers' way of carrying.

Key Words: Coal Carrying, Bicycle, Occupational Stress

1 Introduction

Hundreds of people in Eastern India Coal belt are engaged in a strenuous occupation of carrying sacks of raw coal or coal dust weighing 250 to 400 kilograms and travel 30 to 40 Kilometers with the load through the ups & downs road of Chotanagpur Plateau. A journey of 60-80 kilometers and carrying heavy loads on a Bicycle in a day under scorching sun or in chilled air can challenge any severe manual occupation in India, demanding high calorie expenditure along with severe occupational stress. The people engaged in such decades old manual occupation earn only 300 to 400 INR in a single trip and can manage only 10-15 such trips in a month. In early 2009, Department of Mines & Geology, Govt. of India released a report on such issue which indicates that the Jharkhand Government and coal companies suffer a loss of Rs.106 crore (1.06 billion) every year due to illegal mining in the state. The report says that nearly 45,000 people are involved in illegal mining. The report also predicts that the life span of illegal coal miners and coal bikers reduces by seven years due to such occupation. Every day, 7515 tons of coal is extracted and transported this way illegally, totaling 1.37 million tons in a year. All such information regarding illegal mining in Eastern Coal Belt is known to everyone. Even the parliamentary consultative committee attached to the coal ministry has expressed serious concern over illegal coal mining and called for setting up a special task force to check the menace in March 2009. Very recently in January 2015, Chief Minister of Jharkhand also shows concern over such issues to stop illegal mining. In spite of all such efforts, till now no changes have seen in this occupation or anybody has yet to think about the welfare of the unfortunate work force. The very reason may be the legality of the occupation.

Here starts the debate! In one way, helping the coal carrying bikers may help the illegal operation, on the other way, how a developing nation can neglect its one of the heavy manual work force? During two decades of staying at the heart of coal mines as Occupational health professionals, the authors felt that society should know the occupational stress



scenario of the unfortunate coal bikers, who terminate their occupation only after physical and /or physiological disabilities due to unduly heavy physical stress. The present paper has attempted to unveil information regarding the occupation as well as the occupational stress to the coal carrying bikers including several ergonomic stresses. This paper will also try to highlight the mechanical disadvantages during carrying the huge load on a bicycle in the uneven terrain and the bikers' way of carrying. The paper has emphasized on academic interest only.

2 Methodology

Though hundreds of coal bikers can be seen in any day in and around Bokaro District of Jharkhand State, still very few of the bikers allow the authors to do a formal survey on their occupation and their health status. In spite of their initial resentments, finally 78 (seventy eight) coal bikers, between March'09 to July'10, agreed upon to spare few minutes during their resting time. The survey format was designed in such a way that they can easily show the strained area of their body parts on a pictorial evaluation form. Few simple & portable diagnostic types of equipment like Pulse Oxymeter, Electronic BP Monitor, Oxylog, Glucometer and standard height & weighing machines were used during the survey. Clinical examinations were done at the resting places only. The Heart rate was recorded at rest and during coal carrying.

To understand the physiological stress and Calorie expenditure during the whole journey with coal, the authors have measured Oxygen consumption during 10 minutes each of standard, up-hill and down-wards movements with load. As the hilly terrain of Bokaro and its surroundings can be presumed as 4:2:2 (Standard: Up-hill: Down-ward) road length ratio, the Oxygen consumption for total journey was calculated through the said terrain ratio. With all limitations, the authors succeeded to measure only four such measurements during the survey, result of which can be a fair reflection of their physiological stress due to such type of coal carrying.

Despite our utmost efforts we could locate only eight coal bikers who had left the job recently due to some occupational ailment. Detailed medical history and Clinical examination for the eight persons were done at their residence. In spite of our repeated request and assurance for safety, nobody agreed to come at our Hospital for detailed free health evaluation

3 The Occupation

Today, large-scale open cast mining is providing about two-third of India's coal production, estimating 200 million tonnes. Beside the large government operated formal mines, numerous small non-conventional mines have been mushrooming in Jharkhand during last few decades. This coal mining is carried out by villagers, digging in small patches or from older abandoned mines. At any time of the day, villagers can be seen disappearing into these pits and emerging sometime later with head loads of coal. The mineral is transported in bullock-carts to a nearby dump from where trucks haul the illegal load to factories or the coal bikers' purchase with optimal carrying capacity ranging from 200 to 400 kgs.

The occupation starts with collection of coal or crude coke, packing it in bags and then loading it on the cycle with an optimum balance. The bikers then push the cycle throughout the journey of 8 to 10 hours. When pushing the cycle up the steep inclines, they help each other. This inhuman occupation of carrying sacks of raw coal, crude coke or coal dust (Figure – 1), weighing 200 to 400 kilograms and travelling 30 to 40 kilometers with the load through

the ups and downs road , can challenge any severe manual occupation in India.



Figure-1. Up-hill journey of a coal biker with load of 300 Kgs of coal dust

The journey may be completed within 24 hours or sometimes two days are needed. Road side tea stall or low priced hotels are the transit rest place for the bikers. A two day journey may start at afternoon (3-4 p.m) and reaches the destination site by cycling 30 to 40 kilometers. They spend the night under any shade or at road side Dhabas and start buying the coal from early morning (4-5 a.m). Return journey starts at 6-7 am and finally they reach their villages before evening after delivering the coal to tea shops, brick-kilns or to the domestic users. For a 200 kgs of crude coke carrying, a coal biker may earn Rs.200 to Rs.300 in lieu of their high calorie expenditures, shown in Table 1.

Table-1 Estimated Calorie expenditure of Coal Bikers for carrying 200 Kgs of coal

Coal- bikers	Age (Yrs) & BMI (Kg/M ²)	10mins VO ₂ (lits)			Net carrying time (Hrs)	Net calorie expenditure for load carrying (Kcal)
		Standard Road	Up-hill	Down-ward		
A.ANSARI	52 (21.36)	13.8	26.2	14.3	6	3064.5
P.MAHTO	36 (19.43)	11.6	20.12	12.2	6	2498.4
D.TUDU	32 (23.22)	10.04	19.45	10.42	8	3267.0
L.MANJHI	46 (17.41)	14.6	25.38	17.34	6	3236.4

4 The Bicycle

The bicycle, which a biker uses for the occupation, is a modified version of common bicycle. The wheels are replaced with cycle rickshaws' stouter wheel (Figure 2), spokes are twice or thrice the diameter of conventional cycle and the hubs are stronger.



Figure-2. The wheel is replaced with cycle rickshaws' stouter wheel & spokes

They use tough tyres which are generally used in cycle van. The modification cost may



extend up to Rs. 1500 to Rs.2000. Some cycles have stronger frames with welded additional metal plates. The art of the occupation lies with the balancing the load on the frame. The load may range from 2-3 plastic or jute bags with a varied load of 60-100 kgs each or 8-12 bags loading 20-25 kgs per bag. All the bags are stacked in such a manner, that the cycle can move with optimum CG balance and with less frictional resistance. Sometimes the experienced older bikers help the new entrants for stacking the load on the cycle.

5 The Health Scenario of Coal-Bikers

During the survey two categories of coal bikers were identified. The 'Regular' group carries the coal on regular basis and they have no other mode of income, whereas the 'Seasonal' group comes in the occupation during agricultural leisure or during jobless period as contract laborers. Table- 2 depicted the details of the physical and Physiological status for both the group.

Table 2 Physical & Physiological status for the Coal bikers (N = 78)

Parameters (Mean & SD)	Regular Group (n=52)	Seasonal Group (n=26)	Level of significance
Age (yrs)	38.90 ± 8.32	44.5 ± 5.36	P<0.01
Height (Cms)	158.52 ± 5.03	156.48 ± 6.34	Insignificant
Weight (Kgs)	51.94 ± 4.48	54.23 ± 4.87	p<0.05
BMI (Kg/m ²)	19.29 ± 3.07	21.48 ± 4.43	p<0.02
Resting Heart Rate (beats/min)	83.02 ± 11.58	85.07 ± 11.30	Insignificant
Resting Systolic B P (mm Hg)	132.57 ± 19.34	143.27 ± 20.93	p<0.05
Resting Diastolic BP (mm Hg)	84.32 ± 6.53	88.48 ± 6.72	P<0.01
Random Blood Sugar(mg/dl)	123.47 ± 12.34	130.90 ± 18.64	P<0.01

It is interesting to note that there exists significant difference between the two groups in terms of their various physical and physiological parameters. Based on their clinical examinations as well as their own complaints through pictorial presentation the followings health status is obtained in Table-3.

Table 3 Morbidity profile for the Coal Bikers and comparison between the groups.

Disease identified	Regular Group (n=52)	Seasonal Group (n=26)	Level of significance
No. of cases & %			
Hypertension	6 (11.54%)	5 (19.23%)	Insignificant
Diabetes	2 (3.85%)	4 (15.38%)	P<0.05
MSD	14 (26.92%)	6 (23.07%)	Insignificant
Respiratory disorders	6 (11.54%)	3 (11.53%)	Insignificant
G I disorders	8 (15.38%)	3 (11.53%)	Insignificant
Varicose vein	12 (23.07%)	4 (15.38%)	Insignificant
Dermatitis	6 (11.54%)	2 (7.69%)	Insignificant
Others	4 (7.67%)	3 (11.53%)	Insignificant

6 Discussions

The legal aspect of the coal biking in Eastern India coal belt need not require any debates or discussions and it is confirmed that the said occupation is truly illegal as per

Indian Coal & Mines Act. The present paper does not have any intention to analyze the root cause for such occupation, rather restricts itself on the pathetic occupational health scenario evaluation, which has never been disclosed so far. The intention behind the pilot research is to initiate a debate whether our developing society can keep a blind eye on the poor health conditions of the coal bikers or start a medical welfare scheme to prevent them from immature disability due to the very strenuous occupation. Table-1 clearly indicates that in addition to daily routine energy expenditures including normal cycling of 20-30 kilometers, an additional 2500 to 3500 Kcal of energy they spend to earn only Rs.200 -300. This high energy demanding occupation is rare in organized as well as in unorganized occupational sectors in India.

Table- 2 has opened a new area of interest on such occupation. During survey it has been identified that there are two different types of population engaged in the occupation, one regular group and other seasonal group, involved in coal biking only during jobless period. It is interesting to note that the two groups differ significantly, both in physical and physiological status. Age may be a significant cause for such difference but other socio-economic factors cannot be denied. Generally the seasonal group of workers is engaged in agricultural work or in building job. They join the coal biking occupation as and when they are jobless. As a matter of fact the physical and physiological factors may not be capable enough to do the strenuous job; hence they are more vulnerable to several diseases in comparison to regular coal bikers. In fact, all the eight persons who left the occupation due to their ailments are belonging to seasonal group. Five of them are now physically challenged due to acute Musculo-skeletal disorders (two cases of Slip disc, one disc prolapsed, one cervical spondylocis and one knee join Osteoarthritis), two of them are suffering from IHD and one with abscess in Varicose vein. It is evident that except IHD, all other diseases have a close association with the occupation which forced them to withdraw themselves from the only available occupation for them. As the treatment for such diseases are insufficient in local health centres, hence they are spending a miserable life as a 'dependant' in their early fifties. Is it not a national loss of Human resources?

Table-3 depicts an in-depth view on their morbidity profile after thorough clinical examination. It clearly indicates that most of the coal bikers are suffering from MSD and varicose vein. The pushing of heavy load in uneven terrain for long 30 to 40 kilometers needs a good muscle mass through enough protein intakes. Only rice dominated food cannot meet the demand, hence MSD or varicose vein is the ultimate. Though the authors have seen a very good Ergonomics practice in this occupation, while lifting and stacking the load on the cycle and also a good posture for pushing a heavy load, still lack of muscle mass cannot prevent the MSD. Except diabetes amongst seasonal workers, other morbidities do not significantly differ in both the groups and more or less same in comparison to local population.

7 Conclusion

Based on the above findings and discussions we can conclude the followings:

1. Coal carrying in bicycle is a strenuous occupation in Eastern coal belt area of India where hundreds of people engaged in such inhuman occupation.
2. A journey of 60-80 kilometers and carrying heavy loads on a simple bicycle in a day under scorching sun or in chilled air can challenge any severe manual occupation in India, causing severe occupational stresses.
3. Present observation estimated that in addition to daily routine energy expenditures including normal cycling of 20-30 kilometers, an additional 2500 to 3500 Kcal of energy they



spend to earn only Rs.200 -300. This high energy demanding occupation is one of the rare physical occupations in India.

4. Acute Musculoskeletal disorders and abscess in varicose vein are the main occupational diseases which forced them for self-termination of this occupation in early fifties.

5. Less muscle mass and unduly heavy workload for pushing on uneven terrain is the prime factors for the onset of MSD. The treatment facilities are insufficient to those occupational disorders in local health centres. As they cannot afford higher medical facilities, the bikers spend a miserable life at home.

6. The coal bikers modify their cycle just to accommodate heavier loads they can push but nothing is spend for reducing their own physical stress. There are scopes for ergonomic modification of the said cycle.

7. Can Occupational Health Professionals or Ergonomists dare to assist the occupation as well as the unfortunate manual workers?

References:

1. Nachemson, A. 1965, "The effect of forward leaning on lumbar intra-discal pressure", *Acta ortho.scand*, 35: 314.
2. Haber, L.B, 1971. "Disabling effects of chronic Disease and impairment", *Journal of chronic diseases*, 24: 469-487.
3. Kumar, A, 1999. "The Black Economy in India", Penguin, New Delhi.
4. Kuntala Lahiri-Dutt and David J Williams, 2005. "The coal cycle: small scale illegal coal supply in eastern India", *Resource, Environment and Development*, TERI, New Delhi, 2: 93-105
5. IANS, 2008. "MPs want tougher action against illegal coal mining", March 14th, ICT by admin New Delhi, March 14,
6. Ken Ward Jr., 2008. "Coal mining in India", Centre for Science and Environment, New Delhi,
7. Prabhat Khabar, 2004 & 2009. 'Illegal coal mining strikes again', Ranchi, Jharkhand, 2 March, & "illegal coal mines threaten NH 33, villages in Jharkhand", Aug 20.
8. The Telegraph, 2015 "Coal Peddler & Illegal Mining" January 15.