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HEALTH STATUS OF THE SKILLED COALMINE WORKERS: A STUDY IN JAINTIA HILLS DISTRICT OF MEGHALAYA

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ABSTRACT

Coal Mining in Meghalaya is a "boom and bane" industry. It has not only brought employment opportunity and wealth to Meghalaya but has also lead to ecological poverty and environmental pollution. Large scale unscientific exploitation of coal in Jaintia Hills District has resulted into serious environmental degradation, loss of vegetation, land degradation and wanton deforestation. Exploration of new coalmines and encroachment of forest and agricultural land are regular phenomena in the coal mining belts. It has created shortage of safe drinking water, water pollution, and increase in wasteland, land subsidence and high concentration of coal dust. These have adversely affected health of the workers and the communities living adjoining the coal mining belts. Therefore, the present study intends to find out the health status of skilled coal mine workers working in coal belts of Jaintia Hills District of Meghalaya.

KEYWORDS

Working environment, coalmine workers, Jaintia Hills district.

1.0 INTRODUCTION

ealth is a fundamental Human Right according to the Declaration adopted by the World Health Assembly at Alma Ata in 1978. It is defined as a state of complete physical and social well being and not merely an absence of disease or infirmity (WHO, 1984). The dimensions of health include spiritual, emotional, vocational, political, cultural, socio-economic, environmental, philosophical, educational, nutritional, curative and preventive aspects. Disease is an abnormal vital process, a changed condition of life, which is inimical to the true development of the individual and tends to organic dissolution. Human health in its broadest sense of physical, mental and social well being is to a great extent depending on the access of the people to a healthy environment. Thus, health is that balanced condition of the living organism in which the integral, harmonious performance of the vital functions tends to the preservation and the normal development of the individual.

Physical dimension of health denotes the notion of perfect functioning of the body. It includes a good complexion, clean skin, bright eyes, firm flesh, not too fat, a sweet breath, good appetite, sound sleep, regular activity of bowels & bladder and proper coordination of bodily movements. It also includes all intact special senses, normal pulse rate, blood pressure and exercise tolerance. A mentally healthy person is one who is free from internal conflicts, well adjusted (i.e. able to get along well with others and he accepts criticism and is not easily upset), searches for identity, a firm sense of self esteem, knows himself (his needs, problems and goals), good self control and faces problems and tries to solve them intelligently. The social dimension implies harmony and integration with in the individual, between each individual and other member of the society and between individuals and the world in which they live. Spiritual dimension refers to that part of individual which reaches out and strives for meaning and purpose in life. Emotional dimension is that part of the mental health which can be seen as knowing or cognition while emotional health relates to the feelings of the individuals. Vocational dimension is a new dimension of life. It refers to mental and physical adaptation to work (human goals, capacities and limitations). The other determinants of health are environmental factors, life style of the people and the way they live, socio-economic conditions, economic status, educational status, occupation and health services.

The programmes for health services in India generally cover promotive health services, preventive health services and curative health services. The promotive health services include those services, which can improve the health of the people and this is usually achieved through awareness campaigns. The preventive health services include the provision of adequate portable water, sanitation and hygiene services, food security and overall healthy environment. The curative health services address health problems like diseases of different kinds, malnutrition/under nutrition, disabilities, and controlling population growth through family planning measures.

1.1 COAL MINING BELTS IN JAINTIA HILLS

Jaintia Hills District being a component of the Meghalaya Plateau has its physiographical features almost similar to that of Khasi Hills District, situated in the eastern part of the state of Meghalaya. The district was created in1972 with Jowai as the administrative headquarter covering a total area of 3,819 Sq.km. It is bounded by the state of Assam in the North and East and the plains of Bangladesh in the South and East Khasi Hills District in the West. The *Marangksih* peak on the Eastern plateau of Jaintia Hills stands majestically at the elevation of 1631 meters and is the highest peak.

The Jaintia Hills is richly endowed with natural resources with coal and limestone deposits. The total estimated inferred reserve of coal in Jaintia Hills Districtis about 40 million tonnes spreading over 60 sq.km area. Besides coal and limestone deposits, other minerals like clay, shale, and phosphate have also been detected in Jaintia Hills District.

1.2 METHOD OF EXTRACTION

The following methods have been practiced for extraction of coal in Jaintia Hills District.

(i) *Site Selection by traditional practice:* Firstly the landowners or investors along with the *sordar*, the most experienced person relating to the matter of coal mining helps the landowners to survey and guess the propose site for coalmining. Once the survey of the land satisfies the parties about the possibility of coal deposits, the work is initiated. Such type of guessing and forecast tends the owners to take a risk despite of non- existence of coal in the mine at the proposed site which often causes a huge loss to the owner.

(ii) *Modern practice:* Unlike the traditional practice, presently the landowners ascertain the presence of coal seams using machineries. To assess the uniformity of coal beds boring and drilling methods are carried out. This process assures the landowner about the presence of coal seams and its thickness. Thus by initiating this practice the landowner avoids the risk of not finding the coal beds.

The method of extraction of coal depends on the type of mines or on the nature of coal seams. The coal deposits found on the hill-slopes as well as along the river sides are operated by '*side-cutting'*. In the areas where the deposits are found in the plain lands or flat areas the extractions is done by '*box-cutting'*. In this

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method the land is first cleared by cutting and removing the ground vegetation and then pits ranging from 50 to 180 feet are dug into the ground to reach the coal seam by removing the earth crust. To access the coal seams, a great deal of rock work is required for dipping down to the elevation of the coal seams. The method is known as 'box cutting'. On the basis of this opening (box cutting) the size of the coalmines are classified as small, medium, and large mines. The size and the opening of a 'box cutting' range between 10 x 10 sq. fts to 25 x 25 sq.fts. During the process of excavation heavy equipments like bulldozers, tractors and cranes are used to strip off the upper layer of the earth and compressor machines are used to drill for making a sizable hole for inserting high intensity dynamite for blasting. While digging out, mine wastes comprising pieces of rocks and soil are generated in huge quantity which are removed and collected or dumped near the mining site. These waste materials are called as coalmine spoils (Gupta et al. 2002).

The system of excavation of coal in both the types is done by *rat hole mining method*. Rat hole tunnels are made into the sideways at the coal face. The lower seams thickness of coal ranges between 1-3 feet and the coal is extracted with the help of pickaxe. The extracted coal is brought out with the help of a wooden trolley. Men and women carry out the coal to the surface manually using cone shaped baskets (*Khoh*) made of bamboo. In medium and large coalmines, the mined coal is brought up using cranes or elevators. The extracted coal from the mines is deported along the roadside for transportation to other parts of the country.

Investment: Generally the investors use to invest 2.50-20.00 lakhs for each 'box cutting' depending on the depth of the coal beds and the size of the opening of the cutting. The additional expenditure incurred is about Rs. 2.00-3.00 lakhs for water pump, and wooden ladders. In large coalmines the owners use cranes, boring machines and water pump. Drill man, driver, and helpers operate these machineries. For this an additional expenditure of about Rs.6.00-7.00 lakhs is incurred.

1.3 HEALTH STATUS OF COALMINE WORKERS

The coal miner's occupational environment is characterised by numerous hazards not encountered in any other profession. The factors result in significant psychological burden and excessive stress that causes various acute functional and organic disturbances. The effects of excessive stress are general morbidity, sickness, absenteeism, unpleasant feelings of being burnout and lack of enthusiasm for work. There is deterioration of health status or depletion of biological potential of the workers over a period of time. The occupational underground work places are characterised by the occurrence of hazardous chemical, biological and physical factors which puts these coalmine workers at high risk. The workers are often confused between disease and symptoms because of their illiteracy. The diseases and the symptoms are not clearly manifested at an early stage. Therefore, the investigator studied the symptoms of the diseases which are related to other diseases based on review of related literature on occupational health and disease pattern among coalmine workers.

For the purpose of the studying the health status of skilled coalmine workers the following variables were chosen by the investigator. The various chosen variables were: humid working conditions, thermal environment, inadequate living conditions, loss of weight, malnutrition, addiction to alcohol and substance abuse, fatigue, overstress, musculoskeletal disorders, work related injuries and physical burnout. The variables were clubbed under health status of coalmine for pooled item analysis.

Correlation analysis was carried out by the investigator to study the health status of different categories of workers based upon their age and years of working experience

Humid working conditions

Heat and humidity are encountered in deep underground mines, where the virgin rock temperatures and air temperatures increases with depth, principally due to the geothermal gradient and auto compression of the air column. Both natural and 'man made' sources contribute to the underground heat load with blasting and equipment operation as significant heat contributors. The other source of underground heat is through energy released in blasting which eventually finds its way into the underground environment as heat. It is probable that some of the heat produced is carried away with the blasting fumes out of the development end and some remains in the broken rock which is released prior to and during rock removal. The proportion of heat removed by each process is a function of rock fragmentation. The use of mechanical processes adds to the heat load of underground environment. Hot working conditions with high sweat rates with excessive loss of body fluid may result in dehydration and electrolytes imbalance. It is established that dehydration and electrolytes disturbances will impair both mental and physical work performance. Prolonged exposure to heat can pose serious risk to workers health.

Thermal environment

Poor working conditions associated with working in hot environments both in dry and humid conditions leads to heat stress which degrade mental performance of the workers. The greatest problems of heat stress have been traditionally associated withunderground mines operation. Factors such as the rock and ground water temperature, heat released from blasting when stone and coal are broken also contribute markedly to the thermal load of the mine atmosphere. Further water in the underground mines has a detrimental effect on the mine atmosphere by increasing the level of humidity. The symptoms on health status of workers are usually characterised by heat cramps, which usually occur after heavy sweating and are associated with the subsequent excessive loss of salt from the body. Heat exhaustion is also characterised by weakness, rapid pulse, dizziness, headache and nausea.

Inadequate living conditions

As observed from the field the coalmine workers often suffer from illness like cold, fever, cough, cholera and jaundice primarily due to the nature of occupation and poor living conditions. Their living site is very unhygienic and they are commonly associated with malaria emanating from mosquitoes due to absence of proper drainage system. The other problems faced by the workers are unhygienic environment in their dwelling places like absence of sanitation. The health status of coalmine workers are also characterised by malnutrition, loss of weight, stress, diabetes, hypertension, anemia, dry scaly skin, brittle nails, loss of appetite, weakened muscles, pain in joints, weakened immune system, chronic diarrhea, constant irritability, exhaustion and fatigue, loss of weight

Loss of weight

Weight loss for these workers is unintentional and is due to manifestation of illness. Weight loss results in decrease of body fluid, muscle mass or fat. A decrease in body fluid can come from medications, lack of fluid intake, or illnesses such as diabetes. The loss of weight and lack of nutrition is associated with chronic illness. Rapid weight loss degrades the quality of nutrition in the body and it weakens the immune system. It is a clear sign that the body poorly digests food or has significantly decreased the food absorption capacity. Coughing, nausea, fatigue, weakness, lack of energy, fever, sore throat, anxiety and depressive symptoms are experienced by the workers in case there is weight loss.

Malnutrition

Malnutrition is an imbalance of essential nutrients in the body, due to improper consumption of nutritious food which leads to under nutrition. It is a harmful condition and can give rise to complications like loss of fat, breathing difficulties, a higher risk of respiratory failure, depression, weakened immune system, increasing risk of infections, higher susceptibility to feeling cold, tiredness, liver and respiratory failure. Malnutrition symptoms are observed at any age. This leads to low output urine leading to kidney problems. It may also give rise to hypertension, dizziness or strokes.

Addiction to alcohol and substance abuse

The coalmine workers after working for long hours feel physically retarded and tiresome. They work as underground miners or in the surface. They are engaged as operator of heavy equipment and excavators to strip earth, loading and unloading of coal. These workers always show the symptoms of physically stress and tiredness. Accidents and injuries are common in coal mining work because of poor working conditions. To succumb these work related injuries the workers use painkillers and when the prescribed dose no longer works, they take more to get relief which leads them to addiction. The underground coal miners are scared to go deep inside the underground mines. They use alcohol before entering the mines. The performances of coalmine workers are affected due to addiction to alcohol and substance abuse. The symptoms of increase use of alcohol and substance abuse are tension, psychological stress, feeling of physical sickness with regular headaches, colds and stomach problems.

Fatigue

The coalmine workers work without any social security benefits, besides poor and risky conditions of work. This creates physical and mental stress among the coalmine workers and lead to their physical ailment and fatigue. Further it cannot be denied that barriers to health services among the migrant coalmine workers arise due to financial constraints. With the minimal wages the migrant workers receive and with the frequency at which they fall ill due to their nature of work, it is difficult for them to finance appropriate health care facilities. These migrant workers view that although they earn more in the coal mining work, their work in their native place was less strenuous, implying better health. They often suffer from fatigue, sensation of tiredness, weariness, exhaustion and weakness. Fatigue is a symptom of a wide variety of mild to serious diseases and conditions including infection, inflammation, trauma, malignancy, chronic diseases, and mental illnesses.

Overstress

Overstress in workers life is associated with hassles, deadlines, frustrations, and demands. For workers, stress is so common that it has become a way of their life. Stress is not always bad. In small doses, it can help perform under pressure and motivate to do the best. The symptoms of overstress affects nervous system, nervous reflexes, which includes biting nails, clinching the jaw, grinding teeth, hunching shoulders, tapping feet, holding breath, changes in mood, anxiety, depression, panic attacks, frustration, habitual anger, feelings of helplessness and hopelessness, impatience, irritability, restlessness, constant fatigue, and in general feeling of being depleted, spiritually, emotionally and physically.

Musculoskeletal disorders

Work related musculoskeletal disorders refer to a collection of painful disorders of muscles, nerves, tendons, ligaments and joints that are common among the coal miners. Musculoskeletal disorders such as disorder to the upper limb (hand, wrist, arm, shoulder, neck and back etc) and lower limb (hip, knee, ankle and foot) of muscles, nerves, tendons, ligaments, joints and cartilage are the most common occupational disease in the underground coal mining due to poor working conditions. The workers walk to the underground on their hands and crawl on knees, back or stomachs to reach the coal face. It is at this coal face where the workers sit, knee and squatter in awkward posture for more than 8-10 hours in a confined space. This ultimately leads to musculoskeletal disorders. Pain is the chief symptom of most musculoskeletal disorders. The pain may be mild or severe, local or widespread. Although pain may be acute and short-lived as is the case with most injuries, pain may be ongoing with chronic illnesses such as rheumatoid arthritis.

Work-related injuries

Work related injuries in the work place are a major source of ill health and disability among the skilled coalmine workers in Jaintia Hills District. Work related injuries are common in coal mining work. There is no system of compensation due to work related injuries in these coalmines despite loss of work days. The work related injuries are caused due to faulty equipments including hand tools, defective drills and blasting equipments leading to serious injuries and fatalities. Overwork, physical stress and strain and exposures to dust and gases leads to common work related injuries among the workers. The injuries are diverse and it frequently occurs when objects drop or fall on the worker. The natures of injury are in the form of wounds, sprains or strains, finger blistering and injuries to eyes. These manifest mostly in mental ill-health relational problems at work place and absentmindness. These further lead to poor quality of life for employees and decrease the productivity and impair the quality of life in work environment.

Physical burnout

Occupational stress can be temporary or permanent. It depends mostly on how long it continues, how powerful they are and how strong the workers recovery powers are both physically and psychologically. This condition is called burnout a situation in which workers are emotionally exhausted, become detached from their work and feel unable to accomplish their goals. When workers become burned out, they are more likely to complain and cause errors leading to fatal accidents. Work environment uncertainty influences the stress level among workers. Task demand is a factor related to a worker's job. They include working conditions and the physical work layout. Works where temperatures, noise or other working conditions are dangerous or undesirable can increase anxiety. Role ambiguity is created when role expectations are not clearly understood and the workers are not sure what to do in a particular situation. Individual factors encompass factors in the worker's personal life. Primarily these factors are family issues, personal economic problems and inherent personality characteristics. Increase tension interrupts the process of blood circulation and increases psychological stress among workers. The symptoms of physical burnout are characterised by appearance of anxiety and depression, development of cynical attitudes, suspicious outlook, excessive use of alcohol and other drugs, feeling physically sick on a regular basis with headaches, cold and stomach problems.

1.4 HEALTH STATUS OF COALMINE WORKERS (AGE AS CONSTANT FACTOR)

For studying the health status of the coalmine workers age factor was taken into consideration for only sixty skilled workers. For studying the health status of workers, women and children were excluded. The age distribution of the sample workers were: fourteen skilled workers in the age group of 19 - 25 years, thirteen workers in the age group of 26 - 35 years, nine workers in the age group of 36 - 45 years and twenty four workers in the age group of 46 - 55 years. Pearson's correlation analysis was used to find out relationship between dependent and independent variables.

FactorHCTEILCLWMNASAFTOVSMDWRIPBOHC1 <t< th=""><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th></t<>												
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WRI 0.99** 0.89** 0.19 0.15 0.19 0.40** 0.73** 0.84** 0.31* 1	OVS	0.84*	0.81**	0.23	0.13	0.77**	0.50**	0.64**	1			
	MD	0.41**	0.90**	0.13	0.18	0.13	0.18	0.12	0.31*	1		
PBO 0.15 0.26* 35* 0.85* 0.30* 0.09 0.26* 0.27* 0.93** 0.07 1	WRI	0.99**	0.89**	0.19	0.15	0.19	0.40**	0.73**	0.84**	0.31*	1	
	РВО	0.15	0.26*	35*	0.85*	0.30*	0.09	0.26*	0.27*	0.93**	0.07	1

TABLE NO. 1.1: FACTORS AFFECTING HEALTH STATUS OF SKILLED WORKERS [POOLED ITEMS] (AGE AS CONSTANT FACTOR)

**Correlation is significant at 0.01 level *Correlation is significant at 0.05 level.

The data analysis on the first item i.e. 'working under humid condition of work' is having positive correlation with overstress with a correlation of 0.84 which is significant at 0.05 probability level. The humid condition of work is also having high positive correlation with thermal environment, loss of weight, fatigue, musculoskeletal disorders and work related injury with a correlation of 0.92, 0.37, 0.74, 0.41and 0.99 respectively which are significant at 0.01 probability level. It indicates that the humid condition is correlated with overstress. On the other hand the five variables i.e. thermal environment, loss of weights, fatigue, musculoskeletal disorder and work related injuries are highly responsible factors detrimental to the health status of the coalmine workers. Hence the humid condition of work is undoubtedly responsible for accident, injuries' and ill-health of the coalmine workers.

The second item i.e. 'working under thermal environment' for skilled coalmine workers is having positive correlation with loss of weight, fatigue and physical burnout with a correlation of 0.86, 0.26 and 0.26 respectively which are significant at 0.05 probability level. On the other hand, the humid condition, overstress, musculoskeletal disorders and work related injuries is having high positive correlation with a correlation of 0.92, 0.81, 0.90 and 0.89 respectively which are significant at 0.01 probability level. It indicates that the thermal environment is positively correlated with the loss of weight, fatigue and physical burnout. The working under humid condition of work, overstress, musculoskeletal disorders, fatigue and work related injuries are highly responsible factors to detrimental to the health of workers. Hence working under thermal environment conditions is directly or indirectly responsible for the ill-health of coalmine workers.

The third item i.e. 'working under inadequate living conditions' for skilled coalmine workers is having positive correlation with physical burnout with a correlation of 0.35 which is significant at 0.05 probability level. It is also having high positive correlation with malnutrition with a correlation of 0.85 which is significant at 0.01 probability level. It indicates that physical burnout and malnutrition among the skilled coalmine workers is correlated with inadequate living condition.

The fourth item i.e. 'experience of loss of weight' for skilled coalmine workers is having positive correlation with thermal environment, addiction to alcohol & substance abuse and physical burnout with a correlation of 0.86, 0.67 and 0.85 respectively which are significant at 0.05 probability level. On the other hand, it is also having high positive correlation with humid condition of work and malnutrition with a correlation of 0.37 and 0.83 respectively, which are significant at 0.01 probability level. It indicates that loss of weight among the skilled coalmine workers is correlated with thermal environment, addiction to alcohol & substance abuse and physical burnout.

The fifth item i.e. 'working under malnutrition' for skilled coalmine workers are having a positive correlation with physical burnout with a correlation of 0.30 which is significant at 0.05 probability level. Inadequate living condition, experience of loss of weight and overstress are also having high positive correlation with respect to malnutrition with a correlation of 0.85, 0.83 and 0.77 respectively which are significant at 0.01 probability level. It indicates that the malnutrition is correlated with physical burnout. Inadequate living condition, experience of loss of weight and overstress and physical burnout are also responsible factors deteriorating the health status of the coalmine workers.

The sixth item i.e. 'working under the influence of addiction to alcohol & substance abuse' for skilled coalmine workers is having positive correlation with respect to loss of weight and fatigue with a correlation of 0.67 and 0.25 which is significant at 0.05 probability level. The habit of working under the influence of addiction to alcohol & substance abuse is also having high positive correlation with respect to overstress and work related injuries at work place with a correlation of 0.50 and 0.40 respectively which are significant at 0.01 probability level. It indicates that the addiction to alcohol & substance abuse is linked with loss of weight and fatigue. On the other hand, the two variables i.e. overstress and fatigue are also responsible factors detrimental to the health status of the coalmine workers. Hence the addiction of alcohol & substance abuse is undoubtedly responsible for accident, injuries' and ill-health of the coalmine workers.

The seventh item i.e. 'working under fatigue condition' for skilled coalmine workers is having positive correlation with thermal environment, addiction to alcohol & substance abuse and physical burnout with a correlation of 0.26, 0.25 and 0.26 respectively which are significant at 0.05 probability level. The item is also having high positive correlation with respect to humid condition of work, overstress and work related injuries with a correlation of 0.74, 0.64 and 0.73 respectively which are significant at 0.01 probability level. It indicates that workers working under thermal environment, influence of addiction to alcohol & substance abuse and physical burnout are correlated with working under fatigue. On the other hand the three variables i.e. working under humid condition, overstress and work related injuries are also responsible factors detrimental to the health of coalmine workers. Hence working under fatigue condition is undoubtedly indirectly responsible for accident, injuries and ill health of the workers.

The eighth item i.e. 'working under overstress' for skilled coalmine workers is having positive correlation with humid conditions of work, musculoskeletal disorders and physical burnout with a correlation of 0.84, 0.31 and 0.27 respectively which are significant at 0.05 probability level. The affect of overstress is also having high positive correlation with respect to working under thermal environment, addiction to alcohol & substance abuse, fatigue and work related injuries with a correlation of 0.81, 0.50, 0.64 and 0.84 respectively which are significant at 0.01 probability level. It indicates that the working under overstress is closely related with musculoskeletal disorders and physical burnout. On the other hand the five variables i.e. working under humid condition of work, thermal environment, addiction to alcohol & substance abuse, fatigue and work related injuries at work place are also responsible factors detrimental to the health status of the coalmine workers.

The ninth item i.e. 'musculoskeletal disorders' for skilled coalmine workers is having positive correlation with overstress and work related injuries with a correlation of 0.31 and 0.31 which are significant at 0.05 probability level. The musculoskeletal disorders is also having high positive correlation with respect to working under humid condition of work, thermal environment and physical burnout with a correlation of 0.41, 0.90 and 0.93 respectively which are significant at 0.01 probability level. It indicates that musculoskeletal disorders are positively associated with overstress of workers. The other three variables i.e. working under humid condition of work, thermal environment and physical burnout are also responsible factors detrimental to the health status of workers.

The tenth item i.e. 'working under work-related injuries' for skilled coalmine worker is having positive correlation with musculoskeletal disorders with a correlation of 0.31 which is significant at 0.05 probability level. On the other hand working under work-related injuries is also having high positive correlation with working under humid condition of work, thermal environment, addiction to alcohol and substance abuse, fatigue and overstress with a correlation of 0.99, 0.89, 0.40, 0.73, and 0.84 respectively which are significant at 0.01 probability level. It indicates that the work-related injuries is associated with musculoskeletal disorders. On the other hand, the five variables working under humid condition of work, thermal environment, addiction to alcohol & substance abuse, fatigue and overstress are also responsible factors detrimental to the health status of the coalmine workers.

The eleventh item i.e. 'working under the affects of physical burnout' for skilled coalmine worker is having positive correlation with working under thermal environment, inadequate living condition, experience of loss of weight, malnutrition, fatigue and overstress with a correlation of 0.26, 0.35, 0.85, 0.30, 0.26 and 0.27 which are significant at 0.05 probability level. The physical burnout of worker is also having high positive correlation with respect to musculoskeletal disorders with a correlation of 0.93 respectively which is significant at 0.01 probability level. It indicates that the physical burnout is correlated with working under thermal environment, inadequate living condition, and experience of loss of weight, malnutrition, fatigue and overstress. On the other hand musculoskeletal disorders are also responsible factors detrimental to the health status of the coalmine workers. Hence, working under physical burnout is undoubtedly responsible for accident, injuries' and ill health of the workers.

1.5 SUGGESTION AND CONCLUSION

Health status of unorganized workers is now considered as an indicator of development, rather than just a medical one. Making equitable and affordable medical care accessible to these unorganized coalmine workers remains a challenge. Health is a basic need along with food, shelter and education for productivity and growth. It has a major influence on the well-being of the worker. Health intervention can lead to economic growth. Ill-health and in access to health service are increasingly seen as major dimensions of poverty. The workers in coalmines are caught in vicious circle of poverty leading to ill health which ultimately results in indebtedness.

When an individual joins the coalmine, the risk of being afflicted by a disease increases significantly. As he works in the insanitary and unhygienic environment of coalmines, there is an onset of occupational health problems. Initially the disease does not create any major problem. However, as he continues to work in the mine, the disease assumes a chronic form leading to permanent disability or even death.

This indicates that for designing a health care policy it is necessary to first examine whether the risks of suffering from health problems increases significantly on joining the work force in coalmines. The results of this survey indicates that joining the coal mining sector indeed increases the possibility of being affected by any health disorder. Further lung and pain related disorders are the common diseases affecting most mineworkers. Thus, policy makers should give priority to these diseases in the health care policy. It is also necessary to identify the workers who are at risk, and the health problems commonly affecting them. If high-risk workers can be identified on the basis of factors like place of work, period of exposure to the mining environment, then special schemes can be introduced for such workers.

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