

SOCIO-ECONOMIC AND WORK -RELATED SAFETY CONDITIONS OF COAL MINE WORKERS: THE CASE OF ACHIBO-SOMBO COAL MINING SITE

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ABSTRACT

This study was designed as a descriptive case study to assess the socio-economic and safety conditions of coalmine workers at Achibo-Sombo of Yayo district, Ilu Abba Bor Zone, Oromia National Regional State, Ethiopia. The main objective of this study was to assess the socio-economic and safety conditions of coalmine workers by focusing on medical benefits, safety measures, employment relationship, labour union, wage/salary and psychosocial state. To this end, the research employed descriptive design guided by mixed research approach. The empirical data was obtained from 70 respondents via questionnaires, focus group discussions and interviews with key informants. Data collected was analyzed using stastical package for social scinence for descriptive statistics then presented in tables and charts in the

form of cumulative frequency, percentage, correlation and chi-square, while the qualitative data were analyzed by cross-analysis methods. The study found that the employment of a contractual nature does not take a formal legal procedure; mine workers were not organized in the form of union to defend/safeguard their interests and rights; lack of appropriate safety measures and health checkups, and low wage/salary. On the basis of the findings, provisions of safety measures, medical benefits, including pre and on job health examination for coalmine workers, issues of minimum wage policy and forming a trade union are serious concerns that should be addressed immediately.

Keywords: *socio-economic condition, safety and health, wage, coalmine worker, wellbeing, coal-mining, Ethiopia*

INTRODUCTION

Work is an essential part of our life and counts as a core activity, central to the well-being of individuals Kalleberg,(2009); Layard, (2010) as cited in (Vervakel, 2014). However, the conditions in which coal mine workers perform their jobs may be disparate although everyone strives to improve his|her living condition. For instance, among various activities, coal mining is a job to attain basic daily needs. Coal miners have their own contextual characteristics. And these are exposure to medical treatment, job stability, benefits and payment, and the urgent need to address them immediately.

With its unique contextual characteristics, coal mining is currently a predominant worldwide activity for electricity power generation and industrial raw material that requires manpower. Despite its economic benefits, Wright (2004), states that coal mining in China is the industry with the worst health and safety performances.

It is obvious that coal is an important source of energy in both developed and developing countries to fuel industrialization so as to improve the standard of living in the world (Finkelman & K.Gross, 2002). In this regard, literature shows how much the coal industry contributed in shaping the economic and political development of Europe in the 19th and 20th centuries. Since the beginning of the Industrial Revolution, fossil fuel has been consumed in a large and ever increasing quantity. In the aftermath of World War II, coal also played an important part in the reconstruction of Western Europe's economy (Rudianto, 2006 ; Mohr et al 2003).

A study by Frinkelman and K.Gross (2002) shows that in comparison to other energy sources, coal is found in abundance in the world and is the cheapest source of energy. Due to this, the use of coal has grown significantly(Finkelman & K.Gross, 2002). Evidence from the World Coal Institution (WCI) also verifies that the real need for coal is increasing. The study contends that, as the need for energy increases, the use of alternative energy sources also increases. As coal mining has grown in importance, the number of workers employed in coal mining has also increased.

Furthermore, Epstein; et al., (2011) show that the quantity of electricity generated from coal has been growing at 3.1% per annum. Coal currently generates about 40% of the world's electricity (Epstein et al, 2011). Recent practices of the world's largest coal producers, such as China, shows the need for coal as a domestic energy source. In contrast to China, most developed countries such as the USA, residential coal use constitutes only 1% of coal consumption but contributes 50% of energy used by industry.

A study in Nigeria indicates that, even though oil production is high, the energy produce by it remains very low. To satisfy the energy demand for development, the Nigerian government has been working to diversify the

generation of electricity by encouraging private sector participation in the energy sector and has targeted 30% of electricity generation from coal by 2015 (Ohimain, 2014; Odesola et al, 2013).

In Ethiopia, in line with its rapid economic growth, there is a high energy demand. To satisfy the growing demand for more energy. Ethiopia has developed coal production projects at Delbi Moye, Geba basin, Achibo-Sombo, Chilga and Delgi in addition to hydropower, geothermal and wind energy sources (Ahmed, 2008).

Despite its economic benefits at international, national and local levels, coal has adverse health effects on communities in the mining area, particularly on the mine workers themselves, for instance, respiratory damage through the high levels of dust and chemical toxics. The reason is that each stage at the life cycle of coal (extraction, transport, processing, and combustion) generates multiple hazards such as CO₂, chemicals and other toxic waste which endangers health and the environment (Epstein; et al., 2011,; Frinkelman et al, 2002). The exposure to such hazards cause direct health problems which may be very severe (leading to death), widespread (affecting many people), complex (requiring multidisciplinary approach).

This is serious in countries where the mining activities are labour intensive and where less technology is applicable. For instance, in the US coal burnings uses sophisticated pollution control systems that efficiently reduce the emission of potentially hazardous substances and employ technology for mining activities (Epstein, et al., 2011).

There are contending views regarding the adverse effects of coal mining on human health and well-being on the one hand and its economic benefits on the other. With regards to its adverse effects, in popular literature and media emphasize its “dirtiness.” For example, Bjureby (2008) referred coal

as “the dirtiest” mineral. Because of its high contents of toxic elements and compounds, including sulphur dioxide, nitrous oxides, hydrogen chloride, hydrogen fluoride, arsenic and heavy metals like chromium, actinium, and mercury (Keating, 2001). It is also a large source of carbon dioxide, the leading culprit in global warming. These substances have major health and environmental effects (Lockwood et al., 2009).

On the flip side, coal mining has also been consistently defended as an engine of economic growth and development and source of income for mine workers. For instance, Kirsch (2014), in his book “Mining Capitalism” stated that the coal mining industry is defended in terms of creation of wealth and employment (p. 4). It is a fact that mining contributed to solving the unemployment problem. In addition to this, Kirsch stated that, as the result of this, the attention of most states diverted to coal economy. This implies the continuity of coal mining despite opposition critics such as humanitarian and environmentalist groups. Although the dangers of coal mining are publicized, many countries reserve the right to extract coal for future use, arguing that it has many advantages in industrial sectors. The USA Energy Policy Act of 1992 (EPACT) directed the U.S. Department of Energy (DOE) to establish programs for developing environmentally acceptable coal-based technologies for a broad range of applications, notably electric power generation and the manufacture of liquid and gaseous fuels and non-fuel products such as carbons and coal-derived chemicals under the title; “coal: energy in the future” (p. 1).

Meanwhile the coal industry, through its mouthpiece, the World Coal Industry (WCI), has argued that it is possible to extract coal in an environmentally and human friendly way; that the so-called “dirty” aspects of coal mining are manageable (institute, n.d.); (Keating, 2001) . With this all controversies, coal production and the energy demand for ongoing economic

growth posed coal mining has a high probability of continuing in the future. The question who does involve in coal mining is vital.

According to Kirsch, (2014) coal miners may not require formal education and qualifications to work. In addition, Kirsch stated that miners work underground in hazardous conditions and can easily be replaced if they are injured or killed in mining accidents.

Coal mining like other mining activities, is known as a rural industry. According to Kirsch, however, peoples living in the rural areas expect a higher standard of living, better education, health care and new economic opportunities from the mining companies. Limited economic benefits prevent them achieving their ambition. In line with this, Kirsch (2014) also stated that in practice people living in the catchment area of these projects end up bearing from coal mining. This mostly refers to the socio-economic and work-related safety conditions of coalmine workers. Thus, against this background, this study was conducted at the Achibo-Sombo (Yayo area) coal mining site, in the Oromia National Regional State Government area of Ethiopia.

STATEMENT OF THE PROBLEM

This study assessed the state of socio-economic and work-related safety conditions of coalmine workers at Achibo-Sombo. Each stage in the life cycle of coal (extraction, transport, processing and combustion) generates multiple hazards such as CO₂, injuries, chemicals and other toxic wastes to health and the environment (Epstein; et al., 2011; Frinkelman et al, 2002), so, the problems associated with coal mining have masked its economic benefits. Furthermore, Kirsch (2014), in his book “Mining Capitalism” stated that the coal mining industry is defended in terms of creation of wealth and employment (p. 4). It is a fact that mining contributed to solving the an unemployment problem. Kirsch

(2014) stated that, as the result of this, the attention of most states has been diverted to a coal-based economy.

Different study findings show that various hazardous issues in the process of coal mining should be controlled. These include: dust, noise, poisons, load, roof fall, machines, high humidity and temperature that can potentially cause occupational hazards and pose a great threat to life safety and the miners's physical health (Zhu-Wu, Guan Peng, Ping-Young, 2011). Even though the above literature publicize the hazards working in coal mining; Salahahuddin (2013) stated that workers do not know the impact of coal mining such as exposure to hazardous working conditions or environmental degradation they concentrate only on earning money to support their families.

Some miners who sign an agreement stated that the minor will be compensated if she or he dies in an accident and on the condition that no law suit will be pursued by his family. In addition to this, coal mine workers are usually illiterate and poor. They do not care about their health and work more than their capacity for the sake of earning a petty wage. Wright (2011) stated that trade unions play significant role in representing and protecting the interests of member workers. He also stated that trade unions are a voice for workers, a mediator for conflict resolution, and shape the relationship between employee and employer. For coal mine workers the trade union is essential in evaluating the condition of workers .

Concerning conditions of coal mine workers emotional state, Jing-Gang and Wu Lei, (2013) stated that accident occurs frequently when people are fatigued. The higher the fatigue degree is, the higher the probability of an accident is. The occurrence of accident beyond victimized worker negatively affects at first line relatives, state's manpower, material resources and frustration of the co-workers (Jing-Gang and Lei 2013).

Furthermore, most literature reveal that coal mining as one of the world's most dangerous occupations and results in severe socio-economic consequences particularly for workers and society in general (Cui, Yan et al, 2015). Coal mining because of its many hazards create dangerous work settings, which, in turn, negatively impact health and wellbeing among workers. By direct implication the absence or protection and prevention of hazards may positively affect health and wellbeing (National Research Council, 2014).

On the other hand with these all adverse effects, coal mining creates job opportunity and contributes for local and national economic development (Juneau & Anchorage, 2015). In course of this contention, this study aimed to be done on coalmine workers' socio-economic and work related safety condition from the grounds yet in Ethiopia there is no study from the researchers knowledge on this area. To fill the gaps of lack of information about current state of socio-economic and safety condition of coalmine workers at Achibo-Sombo, this study was needed to be conducted.

OBJECTIVES OF THE STUDY

This study examined the current socio-economic and work-related safety conditions of coalmine workers at Achibo-Sombo.

BASIC RESEARCH QUESTIONS

1. What are the socio-demographic characteristics of Achibo-Sombo coalmine workers?
2. To what extent Achibo-Sombo coal mine workers are satisfied with the condition of their workplace?
3. How much the workers are satisfied with the salary they earn from coal mining?

4. To identify and describe the role of the workers' organization in collective bargaining or decision making in order to secure workers' wellbeing?

5. What is the current psycho-social conditions of the Achibo-Sombo coalmine workers'?

LIMITATION OF THE STUDY

Since addressing all aspects of the coal mine workers, socio-economic and work-related safety conditions was difficult, this study tried to focus on some socio-economic variables. The concept of well-being is interpreted according to multi-dimensional perspectives. Well-being for health professionals and economists may, for example not have exactly the same connotation. To overcome this vagueness, therefore, the study preferred to focus on the reciprocal aspect of well-being. Thus, the study dealt well-being from work-related safety of the mine workers. Another problem was the lack of transportation access to the study area, but, the company manager by providing us with a bicycle from the main office to the study area at (Achibo-Sombo), a distance which is 9km made the data collection possible.

RESEARCH METHODOLOGY

STUDY AREA DESCRIPTION

The Yayo area (Achibo-Sombo) is found in south-west Ethiopia. The area is located in the Oromia Regional State, Ilubabora Zone, Yayo woreda/district. The Yayo basin is situated at $8^{\circ} 22'00''$ - $8^{\circ}24'00''$ N, and $35^{\circ}36'21''$ - $36^{\circ}01'22''$ E latitude and longitude. Yayo is 564 km. from Addis Ababa along the Jimma-Bedele-Gambella road. The basin is between 1300 and 1700m above sea level. And contains an estimated total of 200,000,000 tons of coal deposits. Exploration in the Achibo-Sombo area indicates that there is a

very good opportunity to develop the coal deposit in the area. The total coal reserve in Achibo-Sombo is 121,457,030 tons. (Wolela Ahmed, 2007). It is hoped that area will to be used for the production of fertilizer (UREA & DAP) and thermal power co-generation.

RESEARCH METHODS

The research approach was a mixed approach (i.e., combination of qualitative and quantitative methods with the qualitative component being given significantly higher priority. The quantitative part was in fact, the survey questions presented to the target population in the Likert type scale. The content of this survey were categorical, interval and ordinal questions were presented to all the Achibo-Sombo coal mine workers. The inclusion of quantitative data is likely to provide richer data and better interpretation.

Qualitative data was collected through focus group discussions with ten groups of workers ,each group comprises five to seven members. The areas of the discussions covered the challenges at the workplace from natural and artificial (man-made) angles, the safety culture of mine workers, their rights and interests and their living conditions such as housing, family size, job opportunities and the challenges of mining. In addition to the data collected by survey questionnaire and focus group discussion, key informants from multi-sector and professional backgrounds contributed to enhance the quality of the data collected.

Key informants gave detailed explanation and information on the workers' rights and interests (function of the trade union in defending) them from the legal and social affairs point of view, health consequences of exposure to coal related hazards from health professionals perspective and employment conditions from the company manager at local level. The rationale/purpose of

combining the qualitative and quantitative methods in this study regards complementarities, triangulation and expansion purposes. For details, Greene, Caracelli, and Graham (1989) cited in (Combs, 2011), explain triangulation (i.e., quantitative findings are compared to the qualitative results); complementarities (i.e., results from one analysis type [e.g., qualitative] are interpreted to enhance, expand, illustrate or clarify findings derived from the other strand [quantitative]); development (i.e., data collected sequentially and the findings from one analysis type are used to support the other analysis type); initiation (i.e., contradictions or paradoxes that might reframe the research question are identified), and expansion (i.e., quantitative and qualitative analysis used to expand the study's scope and focus).

Methodological triangulation is a powerful way of demonstrating concurrent validity, particularity in qualitative research. Campbell and Fiske (1959), identify two categories in their typology 'within methods' and 'between methods' triangulation. Triangulation with in methods concerns the replication of a study to check reality and theory confirmation while triangulation between methods involves the use of more than one method in the pursuit of set objectives see Campbell and Fiske, (1959) cited in Cohen, et al, (2007:144); Denzin (1970b) sited in Cohen, et al, (2007:144). To check validity of the study, the between methods approach embraces the notion of convergence between independent measures of the same objectives (Campbell &Fiske, 1959 cited in Cohen, et. al, 2007). This increases validity and reduces bias and brings objectivity.

The results from one method either qualitative or quantitative was interpreted to enhance, expand, illustrate or clarify results from the other scores , whether qualitative or quantitative methods. In addition to this, triangulating

data helped to increase the validity and reliability of this study by comparing and cross-checking data.

The purpose of triangulating this study method is also on the lookout to expand the breadth and range of the investigation by using different methods for different inquiry components such as open ended and close ended questionnaire, unstructured interview and focus group discussion.

SOURCES OF DATA

Both primary and secondary data were used in this study. Primary data was obtained from Achibo-Sombo coalmine workers and local selected professionals on legal, labour and social affairs and health issues from expertise point of view. Secondary data was obtained from relevant journals, books and magazines on the issues of coal regarding the socio-economic conditions and well-being of the workers.

INSTRUMENTS OF DATA COLLECTIONS

The study employed survey questionnaire, focus group discussion and key informant interview

as primary data collection tools. Why and how these tools were employed discussed subsequently.

A. SURVEY QUESTIONNAIRE

The survey questionnaire was first prepared in English and then translated into the local languages Afan Oromo and Amharic, by experts. The translated survey questionnaires were administered to all the Achibo-Sombo coal mine workers. The aim was to determine the socio-demographic characteristics of the workers' including their sex, age and educational levels;

condition in the workplace moreover employment relations, safety measures, access to medical benefits; their economic conditions included wage/salary, working hours, labour organization included the establishment of workers' trade union and the role it has played in safe-guarding the interests and rights of workers, the psycho-social state of the workers.

B. FOCUS GROUP DISCUSSION

The aim of the focus group discussion was to debate, share and verify the study subjects' responses and to obtain deep and validate data through open focus group discussion. The workers were grouped in to ten total groups each group had have been 5-7 participants. The aim was to assess rich data and verify the issues of the condition of work place, workers' rights and interests, challenges at mining workplace, employment conditions, the general workers' perceptions on the coalmining occupation and factors that negatively or/ and positively influenced the wellbeing of the workers.

C. KEY INFORMANT INTERVIEW

To complement the information obtained from survey questionnaires, focus group discussion and key informant interview were conducted with purposefully selected project manager, supervisors, legal experts, labor & social affairs, and public health officer and some workers (accidentally) at local level. The key informant interviews was aimed at: capturing information that may not have been collected through the rest tools and issues related to legal aspects provided to protect coalmine workers in especial case, and participation on general workplace condition and workers wellbeing.

Findings and Discussion

The results of this study discussed across demographic and socio-economic variables. The results discussed using pie chart, bar chart, table, mean, percentage and cumulative frequencies or mode.

Gender

Regarding gender all Achibo-Sombo coalmine site workers are male. From this data, females are absent in the coalmining industry .

Age

The age distribution of research respondents showed 41 (.586) found in the age interval of 18-24, 18 (.257) workers were in the age interval of 25-31, 4(.057) workers were within age interval of 32-38, 3(.043) workers were within the age interval of 39-45 and 1(.014) worker was in the age interval of 46-52. Mean age of Achibo-Sombo coal mine workers was 70.

Table 1. Respondents by Age

Age class interval	Midpoint(m_i)	f_i	Cf	$m_i f_i$
18-24	21	41	.586	861
25-31	28	18	.257	504
32-38	35	4	.057	140
39-45	42	3	.043	63
46-52	49	1	.014	49
Total	175	67	0.957	1617

Source: own field survey, 2016

$$\text{Mean} = \frac{\sum m_i f_i}{\sum f_i} = \frac{1662}{70} = 23.74 \approx 24$$

M_i =midpoint

f_i =frequency

Cf =cumulative frequency

The mean age of the Achibo-Sombo coalmine workers was approximately 24 years. This implies that they were found in the young age group. Compared to the cumulative frequencies, the majority of the workers (.586) are in the age class interval of 18-24.

Educational Status

Regarding the educational level of the coal mine workers, 6(0.086) had completed university or college or the equivalent. 6(.086) had completed technical and vocational training, 19(.271) had completed preparatory school, 24 (.343) had completed high school, 11 (.157) had completed primary school and 4(.057) were unable to read and write. Comparing the cumulative frequencies, majority (.343) of coal miners had completed high school.

CIVIL STATUS

The civil status of the coal mine workers indicated that 30 (42.9%) were unmarried, 37 (52.9%) were married, 2(2.9%) were divorced and 1(1.4%) was a widow. Therefore, the majority of the workers hold family responsibility.

FAMILY SIZE

The majority of the coal mine workers (45.71%) holds family responsibility for 3-4 family members. This implies that it is highly possible that a wife, husband and child live under the same roof. Concerning the residence area of the workers before they were employed in coal mining, the survey reflects that 58 (82.98%) live at or near the mining project, 8 (11.4%) lived in other parts of the Oromia Regional State and 4(5.7%) live in other regional states. This shows that the majority of the workers employed live close to the project which, in turn, proves the creation of job opportunities for the nearby community.

EMPLOYMENT RELATIONSHIP

Regarding respondents' awareness about the party who they enter into agreement with, 34(.486) named the company, 12(.171) the government, 3 (.043) a private contractor and 21(.30) did not know who their agreement was with. Concerning the form of agreement, 65 (.929) replied that they had an oral agreement whereas 5 (.071) claimed they had a written one. Regarding the terms of employment, 4(.057) said permanent, 5(.071) contract and 61 (.871) as daily labours.

The data collected from the respondents indicated that the contractual relationship between employees and employer was made in oral form and the same employees have been employed on average for 2 years as daily labour. The data obtained from the focus group discussion also showed that they have been made oral contractual relationship. In addition to this, focus group discussion participants reflected that asking for one's rights means results in to be called lazy worker and its consequence is dismissal from work. Wagenaar (2012) discussed that temporary job is highly insecure work and low quality work.

This implies the close relation of most employees' welfare with potential risk of losing their job. For the next day if he/she asks for work he did not accept. This was mainly because of employment contract was neither permanent nor contract which renewed based on duration. Some research participants in the interview also reported that sometimes they acquired disease at work place which is most probably like malaria and while they go home they become ill and absent from work. In that case, they said that no one bother about worker absentee either from occupational diseases or others.

Though the interview with the company manager indicated that the company covers 60% of medical expenses for occupational-related accidents or

diseases, the employees complain that it falls short of implementation. One of the gap of covering, the said percent of expenses was lack of clear differentiation between occupationally acquired disease and natural diseases, except on job accident. Even though, the company provided 60% medical expenses in immediate occurrence of accidents, the long term burdens from physical damage were fall on the employee family and instead of the disabled employee, the company employed new one. From this, the study argued risks arise from coal mining not only have short term impact but also long term impact.

The participants on the focus group discussion reflected that their dissatisfaction with highly flexible daily labour employment. While the study referred to the Ethiopian labour proclamation no. 377/2003 under article 5 “employment contract shall be made in writing from and if it is not made in writing at date of conclusion of agreement, the employer have duty to prepare the agreement in writing form with in fifteen days at it was stated under article 7”. Data obtained from research participants in the interview that legal expert reflected from legal point of view, contract manipulation affected the workers’ claim for their rights and benefits provided to employees by labour legislation or collective bargaining. The study again argued that such employment type is inappropriate for employees in coal mining and the mechanism of disgusting the legal obligation of the company towards the employees. The study asserts two reasons for this argument.

The first is the short term and long term health impact of coal mining related factors such as respiratory diseases. The second is based on the study by (Vervakel, 2014, p. 31), which find out that the highest level of well-being is found within the group of employees with unlimited contracts.

The reverse of this finding indicated that the lowest level of wellbeing is found within the group of employees with limited contracts, so, the researcher argued that the employees with neither limited nor unlimited agreement nor workers without fixed agreement were more in negative wellbeing. The more insecure a job, the higher the employees level of stress are expected to be, hereby decreasing level of wellbeing (Vervakel, 2014) From this; reasonably the study asserts that Achibo-Sombo coalmine workers yet daily labourer type of employment contract significantly has negative impact on their wellbeing.

The study revealed that concerning the relationship between the employer (MetEC) and employees, of the total respondents 25(35.78%) replied there was no intimacy whereas 17(24.5%) were undecided and the rest 30(40%) replied there was intimacy. The most frequent or mode is the 4th alternative with cumulative frequency 0.30 which represent intimate employment relationship.

RESPONSES ON SAFETY MEASURES

What the respondents were asked whether they had received training on safety measures or not, 42(.60) replied “yes” whereas 28 (.40) replied “no”. They were also asked when the training offered to them on safety measures took place, 17 (.33) replied pre-job, 34 (.67) on job and 19 (.27) respondents missing.

SATISFACTION WITH WORKPLACE SAFETY MEASURES

Concerning satisfaction with the safety training they had been received, 36(.51) replied unsatisfied whereas 21(.31) undecided and 13(.19) replied satisfied.

WORKERS' PERCEPTION ON THE USE OF SAFETY DEVICES TO PROTECT THEMSELVES FROM HAZARDS

To cross check level of workers' awareness with regard to protecting themselves from hazards related problems, 18(.26) responded that they are unaware of protecting themselves from hazards as a mandatory thing for their health, whereas 33(.47) reported that they are aware of protecting themselves from hazards through effective utilization of safety devices.

Table 2 Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	30.074 ^a	16	.018
Likelihood Ratio	32.478	16	.009
Linear-by-Linear Association	.010	1	.920
N of Valid Cases	70		

a. 21 cells (84.0%) have expected count less than 5. The minimum expected count is .43.

If mine workers understand that protection of oneself is mandatory for health well-being, they asked whether frequently have been used safety devices, 6(.09) replied never, 15(.21) rarely, 14(.20) sometimes, 9(.13) often and 26(.37) always. Next to this, workers' satisfaction with safety measures at workplace were asked and 45(.64) replied unsatisfied and 10(.14) replied satisfied. The results obtained from the interview and focus group discussion indicated that the workers negligence and lack of interest to wear or put on safety equipment's. Particularly, workers who work under the ground removed their

safety device since the temperature is high and due to high humidity. From this, the study argued that due to company's lack of concern in strict implementation of safety regulation and the workers poor safety culture, the well-being of the workers were in poor condition. This in turn negatively affects the workers' health condition.

Concerning access to health benefits, the respondents were asked whether they had health examination before they were employed in coal mining depicted that 55(78.6%) replied "no" and 15(21.4%) replied "yes". They also replied if there was regular health examination for workers on job and 7(10%) replied "yes" whereas 63(90%) replied "no". In addition, respondents were asked whether they have medical benefits (health care access) nearby mining sites and 38(54.3%) replied "no" whereas 32(47.7%) replied "yes". The results obtained from the focus group discussion showed that underground mining lacked ventilation, too warm and high droplet (humidity). For this reasons, coal pickers (diggers) remove eye protection, ear and mouth mask while they have been working underground.

Regarding whether employees had received safety training either pre-job or on job. Majority of the respondents replied 36(51.4%) replied that they had dissatisfied with safety measure training they had received. This implies either the training was not given appropriately as a result of shortage of time (workers busy) or the workers understanding level might be less (lack of attention on safety measure training). Whatever the case since awareness and skills on safety measures contributed for workers protection and prevention from hazards sufficient training is mandatory. Weeks (1991) recommended that an individual before work as a miner should take 48 hours of training and on job miners also should receive eight hours of refreshment training. In line with this, the Ethiopian Labour proclamation Article 90(2) also provides the

importance of giving proper instruction and notification for workers concerning the hazardous. The implication is that an uninformed worker(s) might easily be exposed to hazards.

Research participants in the focus group discussion revealed that the cause for the accidents occurred on workers were the results of the poor inspection from the side of the company managers and lack of interest to use safety equipment among the miner workers. Moreover, some workers were seen while violating safety regulation intentionally or unintentionally. From this, one can infer that workers violating the safety regulation either they have no concern for their safety or did not be well- informed about obligations expected from them to protect themselves from hazards as tried to be discussed previously.

In this matter, the Ethiopian Labour Proclamation Article 14(2) obliged the workers to respect safety and accident prevention rules and take necessary safety precaution/measures. Here, the researcher recommends that the requirement of legal training for workers concerning their obligation related to safety. The researcher also argues that the issues of safety should become the common concern of both the company and the coal mining workers.

This study also argues that lack of sufficient safety training and legal obligation to wards oneself might increase the risk factors related to coal mining which significantly affects workers safety and well-being. For example, in the focus group discussion research participants forwarded that some of co-workers were visiting hospital from respiratory trunk infection and most of them developed cough with thick sputum. In addition to this, they informed that most of them were coughing with thick sputum. This findings is similar with the works of Victor Munnik (2010) who found workers' inhalation of air polluted by coal dust can cause respiratory tract infections.

In addition to this, Howard (2011) stated that exposure to coal mine dust causes various pulmonary diseases, including workers pneumoconiosis and chronic obstructive pulmonary disease and recommended, periodic medical examination in order should be included in workers safety. The interview with public health officer and reports related to health consequences of coal, for example Lockwood et al., (2009), approved that unless preventive and protective mechanism is used to minimize the degree of problems from exposure to coal related substances such as mercury, silicon, and methane designed, the coal mine workers in the first line are often exposed to occupational respiratory diseases. Therefore, since respiratory diseases; for example, lung diseases can bring about impairment, disabilities and premature death which is negatively influence the health wellbeing of the coalmine workers.

Concerning the coal mine workers medical benefits the results of the focus group discussion and interview reveal that those acquired respiratory diseases have been getting treatment at higher hospital. The information from key informant and focus group discussion showed that 60% of medical expenses is covered by company whereas the rest 40% is covered by the worker. Notice that, this has been in the case of workplace emergency, but do not include gradual coal related health consequences on mineworkers.

The Ethiopian labour proclamation article 90(5) impose obligation on the employer to arrange, according to the nature of the work, at his own expenses is medical examination of newly employed workers and for workers engaged in hazardous work. From this the researcher argues that the company had responsibility to cover all health insurances for work related accidents rather than 40% from workers share. On the ground of above discussion, the study argues that first aid or medical benefits at workplace injuries should be

covered by company and individuals victimized since the coal related health impact most probably long term, it requires especial legal protection. As absence of special legal protection for coal miners, will have long term health impact.

In addition to the problem of coal dust challenges in (warm season) *Bega* season, the participants in the focus group discussion discussed that they were working in hardship condition during the rainy season (*Kiremt*) since flood filled in the hole and sometimes the stagnant water causes malaria. They reflected that most of them had acquired malaria disease after they were employed in coal mining. Most probably the cause of malaria is stagnant water which is suitable environment for mosquito reproduction. Thus, the researcher argued that lack of early prevention consequent in the workers exposure to malaria.

The interview with the public health professional confirmed that the stagnant water is conducive for mosquito reproduction and epidemic malaria. In addition to this it is noted that the high morbidity nature of malaria disease leads to workers absentee from daily activities. From the study this, the study asserted that malaria affected both workers health condition and income since it causes the absentee of workers from job. As a result of this they were daily workers they did not get payment even though they bring sick leave.

As far as health examinations is concerned, research respondents reported that they hadnot had either a pre-job or on-job a health examination. From this, one can conclude that, in the absence of health examinations for workers, it is difficult to differentiate occupationally-acquired diseases from natural diseases. This could show that there negligence to give consideration to the workers' health profiles that most probably emanated from the mechanism of avoiding liabilities.

Table 3 Workers Working Hours'

How many hours you work per a day in coal mining?			
		Frequency	Cumulative frequency
Valid	1-4 hrs	1	0.01
	5-7hrs	27	0.39
	8 hrs	42	0.60
	Total	70	1

Source: own field survey, 2016

Concerning the daily working hours of the total respondents, 1(1.4%) replied 1-4 hours, 27(38.6%) replied 5-7 hours and 42(60%) more than and/or eight hours. The study considers that the work hour is normal hours, even though the workers reported that they fatigue at the end of their daily work. The data also indicated that there was no occurrence of accident related with the fatigue caused by working for long hour. This is approved by the Ethiopian Labour Proclamation article (61) that the normal work hours shall not exceed eight hours a day or forty eight (48) hours a week. The Achibo-Sombo coal mine workers informed the researcher that they consequently work six days in a week and take rest on Sunday with incentive.

They also informed that the normal work hour or actual involvements in work for eight (8) hours per a day. From this the researcher concluded that the workers under study area so moderate. In this regard, the study argued that working within the extent of appropriate time reduces the occurrence of accident. This is most probably contributes for physical wellbeing of workers. The data from focus group discussion also reflected that underground miners were facing shortage of oxygen which makes the digging difficult and they usually easily tired. The other challenge was after the daily work, since there is

no transportation service; the fatigued workers in the area under the study travel more than 6 km per a day of work in the morning to mining site and in the evening to their home. Therefore, the sum total of this all challenge and burden on miners significantly affected their well-being.

Since wage or salary is a part of the economic conditions, the workers were asked to state the range of the salary they earn per month in Ethiopian birr and 7(10%) replied 151-650, 10(14.3%) 651-1400, 26(37.1%) 1401-2350, 22(31.4%) 2351-3550 and 5(7.1%) 3551-5000. The mean salary is therefore, 2080.5. Following this, the same respondents were asked whether the salary they earn enables them to cover the cost of living. and 10(14.3%) replied “yes” whereas 60(85.7%) replied “no”.

Perception of Achibo-Sombo coalmine workers about their income they earn from working in coal mining

Research participants were also asked their perception on current living conditions compared with before they were employed. 28(37.1%) replied unimproved, 34(48.6%) replied no change (as it was) and 17(24.3%) replied improved. To assess the perception of the respondents, the study employed judgmental question “Since you have been employed in the coal mining company, you are able to fulfill your basic needs such as food, cloth and shelter; 26(37.1 %) replied in the negative whereas 34(48.6%) replied positively.

Table 4 Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	77.592 ^a	16	.000

Likelihood Ratio	49.124	16	.000
Linear-by-Linear Association	7.791	1	.005
N of Valid Cases	70		

Source: own field survey, 2016

a. 20 cells (80.0%) have expected count less than 5. The minimum expected count is .29.

The result obtained from the focus group discussion reflects that workers were happy with the job opportunity around their homes. Ohimain (2014) also indicated that the economic benefits of mining show that the mining industry contributes to the economy by creating job opportunities and contributes to the country's gross domestic product. However, from the survey data, the study first observed that the majority of workers was dissatisfied with the salary they earn. The result obtained from the focus group discussion also confirmed that the miners were dissatisfied with the salary they earn. They also reported that their salary was not sufficient related to the increasing cost of living. This might be due to the increasing number of the population or the shift from agricultural employed labour force to industrial employees. Stutzer & S. Frey, (2010) stated that "high income resulted in high opportunity to attain one's desire and the capacity of those with high income is high."

The study argued that miners with a low salary have relatively less choice, meaning they can only afford low quality goods and cheaper services. Therefore, the study argues that low income and the low consumption level of the workers has a negative impact on their well-being. In addition to the low salary, according to the data from the focus group discussion, and interviews with the workers' supervisor and project manager respectively indicated that sometimes work is halted as a result of a problem with a broken or missing machinery. If this happens, the salary for miners is blocked. Redae (2009) discussed that Ethiopian labour proclamation article 54(2) stipulates that a worker shall be entitled to his wage if he is ready to work but, because of interruptions in supply of tools and raw materials or for reasons not attributable to him. Though the study is not concerned with legal issues, the trend of this provision is that the employer has an obligation to pay workers in case of employer's fault. This indicated that since they have any more alternative workers wait until the machine is purchased or repaired. The study argued that workers were not machines, they work for a living. They must eat, drink, and clothe themselves. They cannot do this without money.

According to the result of a focus group discussion most of the research participants are living in rented houses with rent ranging between 500-600 Ethiopian birr. So from their salary almost nothing is left in their pocket. This means they have meager life. In connection with this, the study argued that there must be a minimum wage policy for daily labourers like for public servants as its absence is contributing for labor exploitation. It is also obvious that lack of collective bargaining and other alternatives which pushes the workers to be employed with low wage. As a result current economic well-being of the Achibo-Sombo coal miners was in poor condition.

A low level of economic well-being means that wage/salary of the Achibo-Sombo coalminers are not sufficient to meet their daily expenses. It is obvious that, for example, as research participants reflected on the focus group discussion, the salary the miners earn was not enough to feed them from month to month. This indicated that the miners suffer poor nutritional status and, because of this, the workers were not happy or productive.

Regarding the labour organization, the respondents were asked whether they have trade union representatives/leaders, 16(22.9%) replied “yes” whereas 54(77.18%) replied “no” The information obtained from focus group discussion was verified and showed there is no well-organized and effective workers’ trade union.

The respondents were asked about the miners trade union in safeguarding the interests of member miners, and 50(7.4%) replied involvement was poor whereas 9(12.9%) replied that trade union involvement was adequate.

Concerning labour organization, research by (L.Weeks, 1991) stated that the function of the coal mine workers’ union should involve collective bargaining and regulation. He also stated that labour organization is crucial for advocacy regarding workers’ health and safety. The mine workers unions are also active participants in both mine inspections and rule making.

Ethiopian labour law article 115(1) also details the functions of labour organizations which shall have such as observation of the conditions of work, fulfil the obligations, respect the rights and interests of members, represent members in collective negotiations and labour disputes. The data collected from respondents concerning trade union reflected that the workers consider the boss as appointed person among them as workers trade union’s leader. The study draws from the results of the focus group discussion that in one or

another there is lack of awareness. From the interview with the local labour and social office, the information collected indicated that company's lack of concern to organized labour. The expert from her office told me that they try to deal with the workers on their association through the company. However they tried their best she said that yet the workers were not form trade union.

From this evidence the study draws that the bargaining power of an individual worker was weaker than that of trade union bargaining on behalf of the worker. From this argument, since bargaining power of an individual person is weak, his rights and interest might be violated. Studies in this regard showed that the trade unions have been the voice and representative of workers in shaping the relationship between employer and employee, in conflict resolution and negotiating its members wage (F.Wright, 2011).

Achibo –Sombo coalmine workers perception of their Psychosocial Depicts

Concerning the psycho-social condition related to the social support at workplace as one can see from table-5 , 21(30%) workers dissatisfied with the workers' cooperation whereas 33(47.1%) satisfied with the recent workers cooperation. Regarding the company program 21(30%) respondents were unsatisfied and 27(38.6%) respodnets were satisfied. For the researcher question “are you feeling happy being employed in coal mining”, 24(34.3%) respondents have felt unhappy whereas 38(54.3%) respondents have felt happy. The results of interview and the focus group discussion confirmed that though getting job opportunity makes them feel happy, on the contrary the roof fall and hardship of coal mining worsening their working conditions.

Table 5: Respondents' Perception on Satisfaction in Safety Training and Safety Measures Offered to them

Psychosocial state	frequency	cumulative frequency
Cooperation among mineworkers		
very unsatisfied	12	0.17
unsatisfied	9	0.13
undecided	16	0.23
satisfied	31	0.44
very satisfied	2	0.03
Total	70	1.0
Supervisor support		
very unsatisfied	14	0.20
unsatisfied	25	0.36
undecided	18	0.26
satisfied	11	0.16
very satisfied	2	0.08
Total	70	1.0
company program		
very unattractive	15	0.21
unattractive	6	0.09
undecided	22	0.31
attractive	12	0.17
very attractive	15	0.12
Total	70	1.0
happiness from being employed		
strongly disagree	9	0.13

disagree	15	0.21
undecided	8	0.11
agree	26	0.37
strongly agree	12	0.17
Total	70	1.0

Source: Field Survey, 2016

On the other hand, 33 respondents (47.1%) replied that they were satisfied with cooperation among the workers. And this was also verified by the interview with some workers. The study argued that adequate social communication at workplace will certainly relief a persons from stress. And consequently promote happiness.

The majority of respondents 27(38.6%) also replied that they were satisfied with the company program. The researcher argued that they were satisfied with the company’s program since they get job opportunity. The study also argued that unemployment is worse than working with low wage. Majority of the respondents replied that they were feel happy being employed in coal mining.

The study argued that what makes them happy is not the conducive nature of mining, but employment is better than unemployment and might be the result good workers relationship. From the interview with selected individual on their memory of short period the interviewee reported that being seen the buried co-workers from roof fall make them worried in their experiences. From this one can argued that workers in job related anxiety.

From the interview the data gathered on the expectation of workers and what they get really mismatched. From the interview with (D. C, 18/4/2016) reflected that his expectation was promotion based on formal educational qualification, but there was no position to him. The interview with others also indicated though they were waiting for salary increment but there is no change. The study argued that the workers expectation and what they have been getting mismatched. All of this might negatively affect their psychological wellbeing or emotional state.

In general, the respondents answered that they were satisfied with the co-workers good relationship and company program whereas in another way round majority 39 (55.7%) of them dissatisfied with the supervisor support. This implies that the workers have positive social supports despite several challenges of life condition.

CONCLUSIONS

Coal mining has a significant economic importance. Yet, most literature shows that coal mining has adverse effects on human well-being. But, regarding the context and extent of risk from working in coal mining very little research was done. This study assessed the socio-economic and work-related safety conditions of coalmine workers at Achibo-Sombo focused on the socio-demographics of the workers, employment relationships, safety measures, medical benefits, working hours, salary or wage, labour organization and social support. The socio-demographics of the workers was assessed in terms of sex, age, education level, civil/marital status and family size. The study found that majority of the workers are young, literate and married. Moreover, it revealed that no female employee works at the coal mining site. Though the issue of

gender gap was not the direct concern of this study, the study also revealed that females were absent due to the hard working conditions.

The employment relationship was assessed in terms of contractual form, terms of employment and the relationship between the employees and their employer. The study showed that their employment is not formal. Workers do not know who employs them and the Achibo-Sombo coalmine managers have not clarified this matter so far. As a result the workers do not know to forward their claims or complaints to. Some of them, for instance; consider they are employed by the company whereas others by government or by a private concern. This confusion comes from the absence of a proper contractual agreement in written or any other form. The safety of workers was assessed in terms of safety training and the use of safety devices. This study showed the safety of the workers was not properly addressed due to a lack of proper training and a shortage of safety equipment. On the other hand, some workers do not use safety devices because they are not familiar with them or because of their safety devices and from their personal negligence and poor safety monitoring system.

With regards to medical benefits, there was neither a pre-job medical examination nor on job periodical checkups. There were no profiles to indicate about the pre-employment and on-job workers' health status. Furthermore, there is no first aid service at the mine area. This reflects that the managers concentrate on profit not the health of their workers. Concerning terms of employment, the majority of the workers are daily labourers. There are no formalities that indicate whether they are permanent or temporary employees. Workers leave their work according to the managers' opinion. Communication between employees and employer is not good. The employer focuses more on

transferring their messages, giving directions and keeping their time rather than creating a conducive workplace.

Regarding the mine workers' monthly salary/wage, the study showed that the workers' monthly salary or wage is unsatisfactory. The monthly salary/wage they earn is not enough for their daily expenses. However, the working hours of the workers were consistent with the legal working hours of Ethiopia, eight hours (8) per a day and six (6) days per week. This reflects that workers have no complaint regarding their working hours only that their monthly salary is not enough.

Related to labour organization, the study depicted as workers have no labour organization which safeguard their interest and rights. For this reason, workers claim and complain remain without accessing employers and getting solutions. Nevertheless, workers were not organized in labour union, majority of them have intimacy for one another at workplace and happy with the job-opportunity they get from the mining company since they have no alternative more than or equal to this job opportunity. Conversely, majority of the workers were dissatisfied with behaviour and the way their supervisor directed them. As major respondents, their supervisor not provides social support like enhance relationship between worker and worker which, in turn, promote to realize their full potential for benefit of themselves and their employer. The workers also unhappy with super visors since he was not serve as a bridge and communicate their desire to the top manager. Furthermore the company's program on workplace condition worsens them from lack of favourable work environment.

RECOMMENDATIONS

Based on the findings of the study, the following are suggestions:

- Workers in coal mining should get special protection such as special compensation for occupational diseases, legal attention on the base of contractual relationship and company liability to workers' injury on the job.
- The safety measures regulation should be get more consideration from the company, workers and government. A strategy for improving the safety culture of the workers should be planned and implemented. Inspection activity should be seriously focused since it is attached with the early prevention of accident. On safety promotion, there should be cooperation among the company, government and workers has great contribution.
- It is better to implement pre-job health examination since it help to dictate occupational diseases from natural diseases. In addition to this on job regular health examination is important to prevent workers from complicated health problem.
- There must be minimum wage policy in Ethiopia so as to avoid unfair labor exploitations.

Future Study Areas

1. Gender inequality in coal mining industry
2. Child labor involvement in the coal mine industry and
3. Negative Impacts of coal industry on the surrounding community

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