



**Occupational Health Hazard Assessment Among Coble Stone
Workers In Jimma Town, South West Ethiopia**

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JIMMA UNIVERSITY
COLLEGE OF PUBLIC HEALTH AND MEDICAL SCIENCES
DEPARTMENT OF ENVIRONMENTAL HEALTH SCIENCES AND TECHNOLOGY

OCCUPATIONAL HEALTH HAZARD ASSESSMENT AMONG COBLE STONE
WORKERS IN JIMMA TOWN, SOUTH WEST ETHIOPIA

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ABSTRACT

Introduction: Throughout the world many adults, and some children, spent most working hours at work. While at work, people face a variety of hazards almost as numerous as the different types of work, including chemicals, biological agent, physical factors and adverse ergonomic conditions among others. Cobble stone workers suffer from several types of disorders in their daily life; among them musculoskeletal disorder (MSD) is one of the prime one. MSD occurs gradually over a relatively long period of time of exposure to the corresponding contributing factors.

Objective: Occupational health hazard assessment on cobble stone in Jimma town.

Method and material: Cross sectional survey was conducted on 77 workers in Jimma town, from February 8-15, 2013. Face to face interview with structured questionnaire as well observation was used to collect the data. In addition to this, cultural value on the sensitivity nature of issue was given attention during data collection.

Result: According to this study, most of (72.72%) cobble stone workers were between 15-24 years of age, 94.81% are literate, On the working process, cobble stone workers were exposed to different occupational hazards such as sun radiation 62 (80.5%), excessive noise 58(75.32%), injury by sharp materials 58(75.32%), pinch point hazard 38(48.35%), frequent lifting 65(84.41%), and excessive twisting or bending 77(100%). work place was provided to them by Jimma city municipality and there is no any provision of PPE by government or volunteer organization.

Conclusion and recommendation: From the study finding, it can be concluded that occupational health hazard was common among the study population. Thus, it is mandatory to provide proper work place by Jimma city municipality and small scale industry in cooperation , and PPE should be provided by volunteer organization, health and safety protection office and Jimma town municipality.

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ACRONYMS

CBE---Community Based Education

GDB---Global Burden of Disease

ILO---International Labor Organization

MSD---Musculoskeletal Disorder

OHS—Occupational Health and Safety

PPE---Personal Protective Equipment

WHO---World Health Organization

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CHAPTER ONE

INTRODUCTION

1.1 Background information

Throughout the world many adults, and some children, spent most working hours at work. While at work, people face a variety of hazards almost as numerous as the different type of work, including chemicals, biological agent, physical factors and adverse ergonomic conditions among others.

Cobblestone workers are mainly involved in stone and marble cutting and setting them on floors. Thus, stone cutting and setting stone on the floor are important part of the masonry and construction trades work related musculoskeletal disorders (MSD) are common in masonry trades, in which stonemasons suffer from discomfort in the lower back, shoulders and their upper extremities.

Stonemasons proved physical overload is to be a principal factor responsible for the occupational disease. The physical overload is associated with prevalent manual task, frequent monotonous movement, lifting and manual handling of heavy loads during the working shift, uncomfortable working postures, which lead to occupational disorder .The stonecutters and setters are also exposed to different unfavorable working conditions during cutting and setting stone.

A posture analysis revealed that stonecutters worked continuously in awkward postures during stonecutting and stone setting activities. Consequently, they suffered from discomfort in different part of their body, and specifically in the lower back and, knees and shoulders.

1.2 Statement of the problem

In Jimma town there are many associations working on stone cutting and setting. Thus stone cutting and setting stone on the floor are important part of the masonry and construction trades. The understanding of the relaxation and interaction between work and health is very fundamental in understanding and practicing of occupational health and safety.

Assessment of Occupational health problems is one of the common fields of study of ergonomics. Occupational health problem among the cobble stone workers are one of the important factors nowadays. Cobble stone workers suffer from several types of disorders in their daily life; among them musculoskeletal disorder (MSD) is one of the prime one. MSD occurs gradually over a relatively long period of time of exposure to the corresponding contributing factors.

Cobble stone workers continuously in awkward postures during stone cutting. Consequently, they suffered from discomfort in different parts of their body, especially in their lower back, knees and shoulders, which mainly prevented them from continuing their work.

The noise level and dust particles emitted during stone cutting activities could affect cobble stone workers. Stone masons proved physical overload to be principal factors responsible for occupational diseases. The physical overload is associated with prevalent manual tasks, frequent monotonous movements, Lifting and manual handling of heavy loads during the working shift, uncomfortable working postures, which leads to occupational disorders.

The purpose of this study was to assess physical, mechanical and ergonomic hazard on cobble stone workers.

1.3 Significance of the study

This research has a benefit for the community, to the country, and scientific community in many directions. After this research was done we can get information about occupational hazard that connected with cobble stone workers from the finding of the research. If this research disseminated to different bodies like publication of the finding in journal ,sending report to the concerned bodies, library, kebele, woreda, policy makers etc...the community can get awareness by reading the published findings, through media broadcasting, educating by public health worker, training given by employers before they start the work.

Creation of awareness to this community from disseminated finding from the study can benefit the community through, preventing the adverse health effect that comes due to this work, economic problem of the family of the worker due to absentism from work because of problem or money spent for treatment of the patient.

Through creation of awareness to workers how to prevent the hazard the country also can get benefit from this finding by decreasing foreign currency spent for health care equipment, drug, and material etc...used for treatment of the patient, as the number of occupational hazard caused due to this work decrease.

CHAPTER TWO

LITERATURE REVIEW

In the United State, occupational health problems received little attention until the twenties century. Today the profession that has primary responsibility for recognizing, evaluating and controlling hazard in work place is known in most countries of the world as occupational hygiene. The primary responsibility of those working in this field is to address the full range of chemical, biological and physical hazard, including the musculoskeletal problems that are becoming increasingly common in the modern technology world (Moeller,2005).

In Ethiopia financial and human resources available for health care are limited compared with the need for them. The extent of health problems are manifested by shortage of health professionals, high mortality rate, limited facilities and generally low prevention coverage. The underfunded health sector is one of the major causes of existing weak health care system in the country (Ashagrie and Abebe, 2004).

Dr HJ Md khalifah said that occupational health and safety is an important issue in every work place for every workers. A recent WHO survey identified twenty six major risk factors that contribute to the Global Burden of disease (GDB). These include several occupational risk factors such as work place carcinogen, air borne particulate, hazard for injuries, ergonomic stressors and noise ,said Md khalifa (Mohamed,2010).

Both international labor organization (ILO) and world health organization (WHO) encourage all countries to improve their workers health and working environment in order to maintain an economically productive work force. All employees must fulfill work place health and safety requirements and provide healthy and safe working environment for workers (Mohamed, 2010).

Occupational health problems are to a great extent derived from hazardous factors in the work environment. In most countries, hazardous exposure and factors that have adverse effect on health of workers are still found in high number of work place. Most hazardous conditions at work are in the principle of preventable and the primary prevention approach is the most cost effective strategy for their elimination and control. Many occupational hazards can be effectively avoided and controlled through the adoption of appropriate working practices by the worker and through providing him or her with information, tools, work organization and work aids that enable performing of work tasks without risk to health. This requires knowledge of health hazards at work and how to avoid them(WHO,2011).

Hazardous substance, depending on their quality, concentrations, infectiousness characteristics is of potential hazard to human they may cause to an increase in mortality and serious, reversible or irreversible illness (Nag and Vezayakumar, 2005).

Determining health effects, disease patterns and possible occupational hazardous factors in the work and work place can be helpful in reducing illness, improving work conditions, increase productivity, and can also be useful in improving personal protective equipment and developing training programs that teach workers how to self-regulate their health safety (Zelege, 2002).

Each year, work related injuries and disease kill and estimated two million people worldwide, which greater than the global annual number of deaths from malaria. Annually 160 million new cases of work related disease occur worldwide, including respiratory and cardiovascular disease, hearing loss, cancer musculoskeletal and reproductive disorders, mental and neurological illness (Taddesse,2006).

In Ethiopia financial and human resources available for health care are limited compared with the need for them. The extent of health problems are manifested by shortage of health professionals, high mortality rate, limited facilities and generally low prevention coverage. The underfunded health sector is one of the major causes of existing weak health care system in the country (Ashagre and Abebe, 2004).

Those who sit at their work and are therefore called “chair-workers,” such as cobblers and tailors become bent, hump-backed, and hold their heads down like people looking for something on the ground; this is the effect of their sedentary life and the bent posture of the body as they sit and apply themselves all day to their tasks in the shops where they sew. Since to do their work they are forced to stoop, the outermost vertebral ligaments are kept pulled apart and contract a callosity, so that it becomes impossible for them to return to the natural position. These workers, then, suffer from general ill-health caused by their sedentary life, But it is not so true of many other sedentary workers, potters and weavers, for example, who exercise the arms and feet and in fact the whole body; this keeps them in better health because the impurities in the blood are more easily dispersed by such movements. All sedentary workers suffer from lumbago. They should be advised to take physical exercise, at any rate on holidays (Am J, 2001).

Work related musculoskeletal disorder(MSD) are common in cobble stone workers, in which cobble stone workers suffers from discomfort in the lower back, shoulders and their upper extremities. Stonemasons’ tenders report a high prevalence of work related MSD. Stonemasons proved physical overload to be a principal factor responsible for occupational disease. The physical overload is associated with prevalent manual tasks, frequent monotonous movements, lifting and manual handling of heavy loads during the working shift, uncomfortable working postures, which lead to occupational disorders (JOSE,2010).

Silicosis is one of civilizations oldest known occupational diseases. The highest prevalence of silicosis was reported in late nineteenth and early twentieth century which was concomitant with the beginning of mechanization of industries and mines. As estimated, 2 million US workers and more than 10 million Chinese workers have potential silica exposure. In china the first case of silicosis was reported in early 1950. The number of cases increased rapidly due to the industrial growth and absence of dust control methods before 1960. Silicosis recognized since ancient times, this incurable lung disease caused by inhalation of dust containing free crystalline silica, is irreversible and the disease progresses even when exposure stops. Silica causes disease when workers breathe in tiny silica particles released into the air with the dust created by cutting, grinding, drilling or blasting rocks (Tanaffors, 2006).

CHAPTER THREE

OBJECTIVES

3.1 General objective

- To assess occupational hazard of cobblestone workers

3.2 Specific objectives

- To assess occupational hazards existing in their work place of cobble stone workers.
- To identify personal protective equipment utilization.
- To determine the contribution of government and volunteer organizations involved in occupational hazard prevention of cobble stone workers.

CHAPTER FOUR

METHODS AND MATERIALS

4.1 Study Area

The study was conducted in Jimma Zone, Oromia region found in south western Ethiopia. It is about 353 KMs away from Addis Ababa. It has 13 kebeles, and has an altitude of 1760m above sea level. Based on the 2007 Census conducted by the [Central Statistical Agency](#) of Ethiopia (CSA), this Zone has a total population of 120,960, of whom 60,824 are men and 60,136 women. With an area of 50.52 square kilometers, Jimma has a population density of 2,394.30 all are urban inhabitants.

4.2 Study design and period

A cross-sectional study design was used to identify the occupational health hazards of cobble stone associations from March to May, 2013 in Jimma town.

4.3 Source of population

There are 11 associations working in stone setting and cutting activities and their total number of individuals they comprise are 151 people. Out of 11 associations 5 of them are working currently and the rest are out of work. Those 5 associations comprise 77 individuals. Study population includes all 77 individuals currently who are engaged on work.

4.5 Study variables

The variables included in the study are categorized as dependent and independent variables.

4.5.1 Dependent variables

- ☞ Exposure to physical hazard
- ☞ Exposure to mechanical hazard
- ☞ Exposure to ergonomic hazard

4.5.2 Independent variables

- ☞ Service year
- ☞ Educational status
- ☞ Utilization of PPE
- ☞ Sex
- ☞ Age

4.6 Data collection

On conducting data collection, approval was primarily obtained from the department of environmental health science and technology. Then, using questionnaires and observational check list, data was collected from the sample population.

Tools that used to collect data where:

1. Questionnaires: face to face interviewing the cobble stone workers
2. Observation check list: observation of working situation
3. Interviewing responsible officials

4.7 Pre-test

The study questionnaires was pre-tested in similar study other than the actual Study population prior to the starting of actual data collection, to modify its appropriateness, clarity, completeness and easily understandability of the Questionnaires. 5% of the population was taken for pre-test.

4.8 Ethical considerations

The study was free from serious ethical implication on the cobble stone workers and they were free to express their own feeling and experience. Before actual data collection, informed consent was obtained from Jimma University environmental health department. And there is smooth relationship between me and cobble stone workers during data collection process.

4.9 Data analysis and interpretation

After the data was collected using questionnaires, then it was analyzed based on the setting variables and the objective of the study, using scientific calculator, and table was used to test the presence of association between dependent and independent variables.

4.10 Dissemination of the result

The result of the study will be disseminated to the Jimma town municipality offices, Jimma health offices, public library, department of environmental health science and technology and CBE office after approved.

CHAPTER FIVE

RESULTS

According to this study, most of (72.72%) cobble stone workers were between 15-24 years of age, 94.81% are literate, the rest didn't reach tertiary level of education and about 55.99% have <5 service year.

Table 1: Socio-demographic characteristic of cobble stone workers, February, 2013

Characteristics	Number of worker	Percent (%)
Age		
10-14	1	1.3
15-19	20	25.97
20-24	36	46.75
>25	20	25.97
Total	77	100
Service year		
<1	40	51.94
1-5	37	48.05
6-10	-	-
11-15	-	-
16-20	-	-
Total	77	100
Educational status		
Illiterate		
Grade 1-4	-	-
Grade 5-8	4	5.19
Grade 9-10	10	12.98
Grade 11-12	60	77.92
Total	3	3.89
	77	100
Sex		
Male	63	81.81
Female	14	18.18
Total	77	100

Exposure to occupational hazards

On the working process, cobble stone workers were exposed to different occupational hazards such as sun radiation 62 (80.5%), excessive noise 58(75.32%), injury by sharp materials 58(75.32%), pinch point hazard 38(48.35%), frequent lifting 65(84.41%), and excessive twisting or bending 77(100%).

Table 2: The number of cobble stone workers who exposed to hazard in Jimma Town, February, 2013

Hazards	Exposure			
	YES		NO	
	Number	%	Number	%
Physical Hazards				
-Excessive radiation	62	80.51	15	19.48
- Excessive noise	58	75.32	19	24.67
Mechanical Hazards				
-Injury by sharp material	58	75.32	19	24.67
-Pinch point hazard	38	49.35	39	50.64
Ergonomic Hazards				
-Frequent lifting	65	84.41	12	15.58
-Excessive twisting or bending	77	100	-	-

Table 3: Utilization of PPE and educational status cobble stone workers in Jimma town, February, 2013

Utilization of PPE	Educational Status				
	Illiterate			Literate	
		Number	%	Number	%
Glove	Yes	-	-	59	76.62
	No	-	-	18	23.37
Goggle	Yes	-	-	3	3.89
	No	-	-	74	96.10
Hat	Yes	-	-	22	28.57
	No	-	-	55	71.42
Face mask	Yes	-	-	-	-
	No	-	-	77	100
Apron	Yes	-	-	61	79.22
	No	-	-	16	20.78

Table 4: Contribution of concerned bodies for cobble stone in Jimma town, February, 2013

Contribution	Yes		No	
	No	%	No	%
Training and education	71	92.21	6	7.79
Provision of work place	77	100	-	-
Provision of PPE	-	-	77	100

Contribution of governmental and volunteer organization

Concerning the contribution of Government and volunteer organization for cobble stone workers, there were some training and education given after they form associations and before they begin the work. After they form associations by Small scale industry, work place was provided to them by Jimma city municipality and there is no any provision of PPE by government or volunteer organization.

CHAPTER SIX

DISCUSSION

It is a fact that every occupation has certain degree of occupational hazards. Occupational health and safety is an important issue in every work place for every worker and better working conditions will improve workers health and safety.

Cobble stone workers are routinely exposed to physical, mechanical, ergonomic and chemical hazards. Hazardous exposure and factors that have adverse effect on health of workers are still found in high number of work place and their cumulative and synergetic effect aggravates the workers health problems with time in absence of safety precautions (WHO, 2011). According to this study the majority of cobble stone workers are exposed to excessive sun radiation where as exposure to sun ultraviolet can burn the skin, damage the genetic material and leading to potentially carcinogenic and premature aging of skin.

Prolonged exposure to excessive noise can cause temporary or permanent loss of hearing. Occupational related hearing loss is still serious problem, with WHO definition of health as “ a state of complete physical, mental and social well being and not merely absence of disease”, cobble stone work place noise is clearly a health problem (Salvato, 1992). In this study most of cobble stone workers are exposed to work place noise because there no provision of PPE by any bodies and they complained that their work place to be noisy.

Cobble stone workers work most of time a place without shade because of municipality did not provide appropriate work place with shade and super structured place, according to this study 62 (80.51%) of workers exposed to excessive sun radiation and this can cause burn the skin, damage the genetic materials and leading to potentially carcinogen and premature aging of skin.

The findings from this study revealed that 58 (75.32%) of cobble stone workers exposed to injury by sharp materials due to stone cutting to shape it in different size and shape using sharp materials like chisel. Sharp materials may not only cause cuts and punctures but also the main cause for infection. Because of this double risk of injury and disease transmission, sharp materials are considered as a very hazardous class (Tadesse, 2006). Some of cobble stone workers had habits of sharing these sharp materials.

The other finding from this study revealed that 65 (84.41%) of frequent lifting and 77 (100%) of excessive twisting or bending during work time happen hence they move stone from storing site to work place by caring and working most of time by twisting or bending. Work related musculoskeletal disorder(MSD) are common in cobble stone workers, in which cobble stone workers suffers from discomfort in the lower back, shoulders and their upper extremities. Stonemasons' tenders report a high prevalence of work related MSD. Stonemasons proved physical overload to be a principal factor responsible for occupational disease. The physical overload is associated with prevalent manual tasks, frequent monotonous movements, lifting and manual handling of heavy loads during the working shift, uncomfortable working postures, which lead to occupational disorders (JOSE,2010).

Both international labor organization (ILO) and world health organization (WHO) encourage all countries to improve their workers health and working environment in order to maintain an economically productive work force. All employees must fulfill work place health and safety requirements and provide healthy and safe working environment for workers (Mohamed, 2010).

CHAPTER SEVEN

CONCLUSSION AND RECOMMENDATION

Generally cobble stone workers are potentially exposed to physical, mechanical and ergonomic hazards and subjected to various safety problems.

From the study, it was also observed that there is no usage of protective device, no provision of appropriate work place and no provision of PPE.

Based on the finding of the study, the following recommendations are forwarded.

1. Proper work place should be provided by Jimma city municipality and small scale industry in cooperation.
2. PPE is mandatory. Hence, volunteer organization, health and safety protection office and cobble stone workers themselves should give emphasis to it.
3. Even though there is training and health education given before they begin the work, it must be followed after they begin the work by concerned bodies.

ANNEX I

OCCUPATIONAL HAZARD CHECKLIST

	HAZARD	Yes	No	Person responsible for the action
1	Will the workers be doing excessive lifting of heavy or awkward load?			
2	Is there adequate fall protection?			
3	Will the workers spend period of time working in sun?			
4	Will the workers work in very cold or hot conditions?			
5	Will the work environment be noisy?			
6	Will the worker working shift?			
7	Will the worker use personal protective equipment?			

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CONCENT

Title: Occupational health hazard assessment among cobble stone workers in Jimma town

Objective: To assess the occupational health hazards that affects the health and safety of cobble stone workers

1.Socio-demographic status

- 1.1 Age.....
- 1.2 Sex.....
- 1.3 Service year.....
- 1.4 Daily income(Birr).....
- 1.5 Educational status

- A.Illiterate
- B.Grade 1-4
- C.Grade 5-8
- D.Grade 9-10
- E.Grade 11-12
- F.Above 12

2.Potential exposure to physical hazard

2.1 Do you exposed to excessive sun radiation?

Yes No

2.2 Is there excessive noise problem in your work place?

Yes No

3.Potential exposure to mechanical hazards

3.1 Do you have an exposure to sharp cutting?

Yes No

3.2 If yes, for how many times you encountered?.....

3.3 Do you have exposure to pinch point hazard?

Yes No

3.4 If yes,for how many times you encountered?.....

4. Potential exposure to ergonomic hazard

4.1 Do you have an exposure to repeating the same motions frequently(e.g frequent lifting) and for prolonged period(e.g 8 hour shifts)?

Yes No

4.2 Do you have an exposure to excessive twisting or bending?

Yes No

4.3 Do you have failing to take short frequent breaks?

Yes No

5.1 Do you use protective equipment during work?

Yes No

5.2 If yes, what type of protective device used?

- A.Gloves
- B.Goggle
- C.Facemask
- D.Hat
- E.Appron

5.3 If no,what is the reason?

- A.Personal protective equipment is not comfortable for work.
- B.It is not affordable
- C.Usage of protective equipment is of no value
- D.There is no available of protective device
- E.Others, specify.....

6.Official support

6.1 Have ever gotten an education and training for the activities?

Yes No

6.2 If yes,how many times and what are the major issue you gain from education and training?

- A.....
- B.....
- C.....

6.3 Does it help you in identifying the hazard in your work place?

Yes No

6.4 If yes,for question 7.3, how?

- A.....
- B.....
- C.....

6.5 Is there provision of protective equipment you got?

Yes No

6.6 If yes,what type of protective equipment you got?

- A.Glove
- B.Goggle
- C.Hat
- D.Facemask
- E.Appron

6.7 If no,have you requested to gain protective equipment?

Yes No

6.8 If yes, what was the response?

- A.....
- B.....

6.9 If no,why?

- A.....
- B.....
- C.....

6.10 .Have you got proper work place?

Yes No

