A Study on

Socio Demographic & Health Condition of

Brick Field Workers in Different Areas of Bangladesh

Dissertation submitted to the Department of Pharmacy,
East West University, Bangladesh, in partial fulfillment of the requirements for the degree of M. Pharm in Clinical Pharmacy and Molecular Pharmacology.

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Declaration by the Candidate

I, Dabashis Chanda (ID: 2014-3-79-016), hereby declare that the thesis work entitled "Socio Demographic & Health Condition of Brick Field Workers in Different Areas of Bangladesh", submitted by me to the Department of Pharmacy, East West University, in the partial fulfillment of the requirement for the degree of Masters of Pharmacy carried out by me during Fall 2015-Spring 2016 under the supervision and guidance of Farhana Rizwan, Assistant Professor, Department of Pharmacy, East West University.

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Abstract

Objective: To identify socio demographic & health condition of the workers employed in the brick kilns of Bangladesh by studying selected subject population.

Methods: It is a survey based study, where data was obtained from 276 brick field workers in 9 brick fields at Savar Upazilla, Dhaka District. Data was been collected based on questionnaires form, divided into socio demographic information, basic health status, medical information.

Result: Major workforce (90.97%) in the brick fields of the study area is found migrants. 65% of them didn't received any institutional education. Due to heavy workload (8-9 hours) in the field many workers recently suffered from discomfort in different parts of their body, especially in their lower back (21.73%), muscles of hands and legs (17.02%). The study shows recently administered medication by the workers is mostly NSAIDs(10.50%) for relief of pain on body parts, vitamin supplements(5.07%) for body weakness. High numbers of workers (76.81%) in the brick fields smoke biri/cigarette which is injurious to their health. Workers so often suffered small injuries during their work. Majority of the respondents (91.30%) from the study faces small cut, wounds on their body parts especially hands and legs. 4.34% of the respondents facing problems in their sleep during night, as they do hard work all over the day and aged workers are found with 2.17% memory loss. 70.40% did not seek any medical treatment largely due to their economical condition (59.03%).

Conclusion: With the high demand of infrastructure development, brick making industry in Bangladesh is a rapidly growing sector. Health of the brick field workers must have an impact on the overall health status of the country. There are lots of areas, in which health of the brick field workers need to be improved.

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Chapter-1

Introduction

Bangladesh is a densely populated country with more than 160 million people. Each year 3,00,000 to 4,00,000 rural people migrate in Dhaka. The existing people as well as new migrants need housing facility. At present the annually required shelter varies from 3 lakh to 5.5 lakh units. Bangladesh will need to construct approximately four million new houses annually to accommodate the growing population (Saha, 2013). Rapid urbanization in the country has created a booming construction industry and spurred the production of 8.6 billion bricks each year, with demand for the bricks rising at an annual rate of about 5.28 percent (UNDP, 2011). The cities of Bangladesh - one of the world's most densely populated countries-are growing fast, and there's a never-ending need for cheap construction materials.

Brick is one of the most important building materials or unit of construction. Brick Making in Bangladesh is a sector related with infrastructure development, contributing about one percent to the country’s gross domestic product (GDP) and generating employment for about one million people.

Bricks are made, sold and circulated from a brick kiln. Brick fields are generally situated both in urban and rural areas of Bangladesh. Brick-making provides a better income than agriculture or other jobs available in rural Bangladesh, but it is dangerous and often devastating to workers' health. Accidents are common and usually workers have no protective gear for safety.

No doubt brick kilns are an unsafe and hazardous workplace. The nature of the work exposes the workers to a dangerous environment and working conditions. Dust can lead to pulmonary diseases (e.g. asthma, wheezing) as well as silicosis. According to Bangladesh country report The brick kilns emit toxic fumes containing suspended particulate matter rich in carbon and containing a high concentration of carbon monoxides, as well as 8.8 per cent nitrogen oxide and oxides of sulphur (28.8 per cent) that are harmful to eyes, lungs and throat.

1.1.2 Brick Kiln Technology

Brick is an essential construction material for its building industries. Brick fields are growing sporadically here and there at the fringe zones and within the urban regions.

Brick is a popular construction material for thousands of years. At present, the demand of bricks is soaring, especially in the developing country like Bangladesh, where infrastructure development projects are the top priority. This trend eventually directed the brick sector to increase annually at a projected 2 - 3 percent over the next decade for housing construction and commercial sector developments.

Though, the brick manufacturers in Bangladesh is therefore expanding in production, a good number of these producers are not formally recognized as industry and not advancing technologically (Darin et al, 2013).

The kilns and technology remained unchanged for long times back and still consumes energy inefficiently. Biomass, mainly firewood and rice husk, are the main energy sources for the

brick firing. Brick making is traditionally a cottage industry which produces bricks for local consumption; though its technological development is inadequate.

Current technologies for brick production such as clamps, high draught kilns and bull's trench kilns consume large quantities of fuel such as coal, firewood and other biomass. In Bangladesh, about 4,500 brick kilns are in operation, producing about 9 billion bricks per year. Of the 4,500 kilns, more than 4,000 are of the Bull's trench kiln (BTK) type. The BTK employs an extremely crude technology to fire bricks. There are also about 400 fixed chimney kilns, 15 zig zag kilns, 25 Hoffman kilns and 5 modern tunnel-type kilns currently in operation in the country. Hoffman kiln uses natural gas and the other three types of kiln use low-grade coal and firewood as fuel. (Darin et al, 2013).

Fig.1 : Workers in a Bull's trench kiln in Savar, Dhaka

Till now, the greater part of the brick factories are operating Fixed Chimney Kiln (FCK) technology with coal as the key fuel as it is more economical than the alternatives. FCKs are not energy efficient and consequently pollutants are being emitted by a greater rate. To ease the emissions from brick field industries, the Government is working to propose alterations in FCK technology and newer technologies such as Zig-Zag and Hybrid Hoffman kilns, which are more energy efficient (Hossain, 2008).

1.1.3 Types of Brick Kilns in Bangladesh

Brick manufacturing process in Bangladesh is being carried out in a very primitive way. Still date traditional process is applied in Bangladesh. These age-old methods of manufacturing brick are leading to environmental degradation. The demands for bricks continue to rise, as the population increases and people aspire to having better standards for housing. To supply this growing demand as well as to reduce fuel consumption and air pollution it is necessary to develop new technologies and process of brick manufacturing. In the technological aspects the existing kiln technology should be studied in details. (Darin et al, 2013).

Brick kilns can be classified into four main categories, on the basis of how they are operated:

1. Intermittent or periodic Kiln:

intermittent or periodic kiln that consists of a single firing chamber. The intermittent kilns are loaded with green bricks, which is fired and allowed to cool before unloading, in preparation of next loading and firing. These types of kilns are capable of firing only one loading of brick at a time.

2. Semi continuous kiln:

Semi continuous kiln, where two or more intermittent kilns are interconnected by flues and dampers, to allow the heat from cooling bricks in one kiln to dry and pre-heat the bricks in another. The kilns are alternated being unloaded once the heat from the cooling bricks had been used to dry and pre-heat the bricks in the second kilns, that is then fired up to top temperature.

3. Continuous kiln:

In the continuous kilns, the firing zone moves through the kilns without stopping. Green bricks are loaded in front of firing zone and fired bricks are removed behind it. These kilns run day and night, with the fire never going out except for seasonal or maintenance stoppages.

4. Tunnel kiln:

In Tunnel kilns, the bricks are placed on trolleys and moved through the hottest part of the kiln at a predetermined rate. This is a form of continuous kiln, but with a stationary rather than moving firing zone.

Kilns can be further subdivided into three main classes, based on how they actually work.

A. Up-draught kilns:

Up-draught kilns where the heat travels naturally by convection, from the area of combustion up through the bricks.

B. Down–draught Kiln:

Down–draught Kiln is the type where the heat combustion is drawn down through the bricks by use of a chimney or forced draught system.

C. Horizontal/cross draught kilns:

Horizontal/cross draught kilns, where the heat of combustion is drawn sideways thought the bricks by the use of a chimney or forced draught system.

Different types of kilns in the technological point of view are used in brick manufacturing in Bangladesh. Most of them, which are technically, not sound enough to produce brick without polluting the environment. Recently, the researchers have done some technical improvement in the brick kilns.

Clamps

This is a very old aged method of manufacturing bricks. The clamp is the most basic type of kiln since no permanent kiln structure is built. The bricks are stacked in alternate layers to reach the desired height, gradually tapering towards the top. The base of the clamp is rectangular. The top surface is covered with earth to prevent the escape of heat. The biomass (fuel wood) is used on clamp as fuel.

Bull's Trench Kiln (BTK)

Bull trench kilns with fixed chimneys are generally seen in Bangladesh, which has some technological drawback. Now a day, a few countries are trying to improve this technology and going to implement in the modern sector.

The firing in a Bull's trench kiln is continuous, can be day and night. Green bricks are loaded and finished bricks are drawn all the time. The fuel saving is achieved by reusing part of the energy that is otherwise lost in periodic kilns.

Advantages of the Bull's trench kiln:

- More fuel efficiency compared to periodic kilns.
- Low initial investment.
- High capacity.

Disadvantages of the Bull's trench kiln

- The kiln is fired continuously and has to be loaded with a constant number of bricks every day. This demands a good organization of the brick production, and the production cannot easily be adjusted to fluctuations in the brick market.
- The firing crew needs long time experience.
- Its moveable chimneys have a short working life.
- The moveable chimneys' exhaust temperature is high, causing a less than optimum firing condition and fuel economy.

Compared to the moveable chimneys the initial cost is higher, but the saving the cost of replacing the metal chimneys and the slightly better fuel economy soon pays back the initial investment. A large central flue channel is constructed in the centre of the elliptical kiln, and through this, the exhaust gases flow to a brickwork chimney. Where electricity is available and in stable supply, an exhaust fan can be used instead of a chimney. The cost of establishing and operating a Bull's trench kiln depends on the local cost of labor and fuel. (Norsker, 1995)

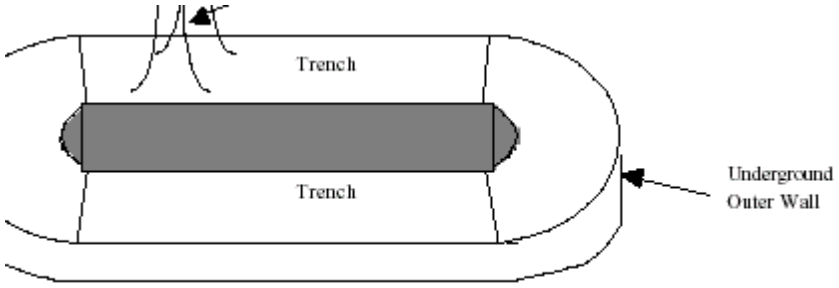

Fig.2: Trench of Bull's Trench Kiln (BTK)

1.1.4 Brick Making Process

Clay Preparation

a) Tempering:

Tempering is adding water to the clay soil in order to make it more workable. Too much water added to the clay mix will decrease quality, though.

b) Disintegration and Crushing:

An alternative to tempering is disintegration or weathering, which involves allowing clay to dry in the sun and accept moisture from rain and dew. The repeated drying and moistening of clay will bring clay to a plasticity and workability appropriate for brick making. Crushing will make the mixture more homogeneous.

c) Mixing:

Mixing is done to make the clay soil homogeneous and smooth. There are different techniques that can be used to do this, including using animal power or letting humans mix

the clay with their feet. Different admixtures such as coal or sawdust can be added to the clay for two beneficial reasons:

1) Reduce cracking during drying and 2) Reduce fuel usage during firing.

Molding

Bricks should have standard characteristics if they are to be used in construction. For example, contractors may buy bricks from several different sources for one project: the bricks must be the same size or there will be problems matching the construction of different sections of the building. Moreover, a standard brick size will allow a contractor to more accurately determine how many bricks will be needed for a project. A new brick maker, therefore, should follow local standards, checking with other brick makers in the area or with local authorities or construction contractors.

Fig.3: Molding in brick making process

Shrinkage:

When determining the size of a mold for brick making, a necessary consideration must be shrinkage. Bricks will shrink when drying, so the mold size must be larger than the intended finished brick.

Slop Molding:

In slop molding, a wet clay mixture is used- the mix is put into a rectangular form without a top or bottom. A problem with this technique is that because the mix is so wet, the brick may deform under its own weight and the surface can be marked easily.

Sand Molding:

Sand molding utilizes a drier clay mix, formed into a wedge and thrown into a mold. A bow cutter will be used to smooth the top of the brick, and the form will can be released because of a hinged bottom. Since the clay is drier, the brick can be moved with wooden palettes which can reduce the amount of surface marks. There are multiple benefits to using sand molding instead of slop molding, such as:

- Less water is used, so there is less cracking and the bricks are stronger.
- Fewer molds are needed because they can be removed from the brick right away.
- The work space is cleaner because of less splashing of the drier mix.
- The worker is standing up instead of squatting down, so they are more comfortable.
- The bricks are more regular because they don't deform like slop molded bricks, so a better product is produced. Therefore, better construction and better looking buildings will be possible.

- Slop molded bricks can be imprinted with the brick maker's name, called a "frog," on the flat side of the brick. This helps the brick dry and fire better, and is a good form of advertising.

Drying

Water was added during clay preparation to increase workability of the mixture, but in drying it is removed for several reasons. First, there will be less cracking in fired bricks with less water content. Second, additional fuel is needed, beyond what is used for firing, to dry the bricks in the kiln. Proper drying of bricks will involved rotating the bricks for different exposures to ensure even drying rates.

For best results, drying should be done slowly. This will help with more even drying. Also, the best drying technique may change from location to location, so the brickmakers must gain experience to determine the best way to dry bricks for each production process.

Firing

A clamp is a field kiln built from the green bricks that will be fired. Clamps vary with size and shape and must be oriented with respect to wind direction. Once a clamp is laid out and constructed, it must be insulated.

Finally, the process of firing the clamp will take place in several steps. First, pre-heating, or water-smoking, will remove the water leftover from the drying process. This process is still physical. The second stage is firing, where the clay bricks will vitrify through a chemical process. The temperature must remain constant at this stage for complete verification.

Finally, for the cooling stage, the temperature must be slow and steady. A clamp may take two weeks to cool. (Michigan Tech, 2004)

Fig.4: Firing Chamber for brick making

1.1.5 Labor Distribution in a Brick Field

The labor distribution in brick making process can be subdivided into followings steps:

- Spading for mud collection
- Loading mud
- Carrying mud
- Preparation of clay
- Carrying clay
- Molding
- Stacking bricks

- Setting bricks in the kiln
- Loading and unloading bricks

1.1.6 Season for Work

As the work-season of a brick kiln starts mostly from the last week of October the brickfields are typically small independent units and operate 24 hours during the dry season.

Peak season of manufacturing brick is October to March. It is a seasonal industry, with a seasonal employment opportunity. With the expansion of urban area, brick industry is also rapidly growing.

1.1.7 Sites of Brick Fields

Construction works in urban areas is increasing in a fast rate due to migration of people from rural to urban areas where houses are mainly built using concrete and bricks. Therefore, brick kilns are basically situated in interiors of sub-urban areas close to urban areas. They are located near towns or major construction sites; i.e., Gabtali, Savar, Ashuliya, Keraniganj, Narshingdi, Gazipur and Manikganj.

Fig.5: Brick fields located near towns/city

The brick-making industry in Bangladesh is best described as a “footloose” industry. Production is seasonal, confined to the six dry months of the year; technology is outdated; labor productivity low; capitalization non-existent and mostly operating on equity capital; and management is informal. Small and medium enterprises (SMEs) dominate the ownership pattern with little or no cooperatives or large-scale operations. Most brickfields are on leased land with no permanent sites and fixtures. This, along with seasonal nature of production, contributes to footloose nature of the industry. The average brickfield employs about 125 skilled and unskilled workers. Apart from 6 to 10 permanent employees, most are employed for only 6 months during the production season. (IDLC,2013)

These seasonal employees, mostly migrant workers from northern Bangladesh, are compelled to seek employment elsewhere during the ‘off-season’, in agriculture and other casual work. This contributes, on the one hand, to a precarious employment situation for the worker and, on the other, to the existing low labor productivity.

Fig.6: Workers preparing trench in heating area of a brick field

1.2 Socio-Demographic Condition

Brick making is a labor intensive industry in Bangladesh which generally employs a large number of workers of poor socio-economic status.

1.2.1 Origin

Migration is common phenomena regularly seen among Brick field workers. Every year, many brick field workers those of whom largely engaged in working farm land in rainy season temporarily moved to urban areas in dry season. Many of them have their own houses in their place of origin. Various reasons are responsible for working at brick field. It is quite easy to get jobs in the brick fields.

1.2.2 Educational Status

Education has been an important indicator to measure the life standard and the level of consciousness among the people. Previous study showed that most of the brick field workers are illiterate and they are only able to put a signature but they do not know how to read and write the basic things. Most of the workers have started their work at a very early age. And due to the extreme poverty they are unable to provide education to their children because they normally take their children to work at an early age.

1.2.3 Income Level

Income level of the brick field workers is generally poor. The average daily wages of brick kiln labor is starts from 200 taka to 400 taka depending on how much works has been done in the field. It is not sufficient how much hard work they put into their work.

1.2.4 Work Condition

The working environment in the brick factory is hazardous to worker's health due to unsanitary environment (unclean, smoke, bad smells of manures, and consuming pond water), unsafe working environment (such as heat, burning ashes, flying ashes, and pieces of broken bricks everywhere), and the hazardous work.

Most of the brick factories do not have any work regulations or do not use any low safety measures and protective equipments. Actually there is little use of modern safety gears like, head gears, glass, plastic boot, mask etc. They work in a field for 8-9 hours daily and seven days in a week generally.

Fig.7 : A brick field worker in Rajfulbaria, Savar

1.2.5 Living Condition

Brick field worker mostly lived in temporary but small huts besides their working places because the work in brick field is a seasonal job. Generally these places are overcrowded with co-workers. Some of them live in nearby slums. It is due to many of them don't have affordability to rent room to spend the night.

When there are too many people in any house, the likelihood of them getting disease is greater than if the house is not overcrowded. This is because people in an overcrowded house will be much closer to each other and it is therefore easier for any germs to spread from one to another.

For example:

- sneezing and coughing in crowded rooms makes it easier to spread cold and flu germs.
- sharing towels can spread trachoma germs and other germs which cause eye infections (runny or sore eyes).
- several people sleeping in the same bed makes it easier to spread a scabies infection.

1.3 Disease and Health Condition

Basic Health Status

1.3.1 Personal Hygiene

Personal hygiene can be defined as the principle of maintaining cleanliness of the external body. People have been aware of the importance of hygiene for thousands of years. The ancient Greeks spent many hours bathing, using fragrances and make up in an effort to beautify themselves and be presentable to others.

One of the most effective ways to protect from illness is good personal hygiene. The human body can provide places for disease-causing germs and parasites to grow and multiply. These places include the skin and in and around the openings to the body. It is less likely that germs and parasites will get inside the body if people don't have good personal hygiene habits. It has an overall impact on someone's health status.

Fig.8: Various component of personal Hygiene

Good personal hygiene habits include:

- Washing the body often. If possible, everybody should have a shower or a bath every day. However, there may be times when this is not possible, for example, when there is a shortage of water.
- If this happens, a swim or a wash all over the body with a wet sponge or cloth will do.
- Cleaning the teeth at least once a day. Brushing the teeth after each meal is the best way of making sure that gum disease and tooth decay are avoided. It is very important to clean teeth after breakfast and immediately before going to bed.
- Washing the hair with soap or shampoo at least once a week.
- Washing hands with soap after going to the toilet.
- Washing hands with soap before preparing and/or eating food. During normal daily activities, such as working and playing, disease causing germs may get onto the hands and under the nails. If the germs are not washed off before preparing food or eating, they may get onto the food.
- Changing into clean clothes. Dirty clothes should be washed with laundry soap before wearing them again.
- Hanging clothes in the sun to dry. The sun's rays will kill some disease-causing germs and parasites.
- Turning away from other people and covering the nose and mouth with a tissue or the hand when coughing or sneezing. If this is not done, droplets of liquid containing germs from the nose and mouth will be spread in the air and other people can breathe them in, or the droplets can get onto food. (Department of Health of Australia, 2010)

1.3.2 Food Behavior

Any substance that people eat or drink in order to maintain life and growth are foods. Food behavior is a basic determinant of health status. Without proper nutrition, body can't survive. When someone eats a balanced and regular diet, the body obtains the fuel and nutrients it needs to accomplish various bodily tasks.

For example, body needs minerals to make hormones, build bones and regulate your heartbeat. Examples of minerals include calcium, sodium, potassium, iron, iodine and copper. Water is another essential component of your diet. Without it, your body can't flush out toxins, transport nutrients to cells or perform other vital bodily processes.

As a hard labor working condition, a brick field worker requires good food practice for healthy life.

1.3.3 Physical Disabilities

A person with a physical disability is constrained by his physical ability to perform an activity independently such as walking, bathing, toileting, etc. A person can be physically disabled due to two reasons: Congenital/Hereditary – the person has physical disability since birth or the disability developed at a later stage due to genetic problems, problems with muscle cells or injury during birth. Acquired – the person acquired the physical disability through road or industrial accidents, infections such as polio or diseases and disorders such as stroke or cancer.

Types of Physical Disabilities:

There are two major categories under the Physical Disability Group, they are:

a) Musculo-Skeletal Disability

It is defined as the inability to carry out distinctive activities associated with movements of the body parts due to muscular or bony deformities, diseases or degeneration. The disabilities grouped under musculo skeletal disability are:

Loss or Deformity of Limbs

Osteogensis Imperfecta

Muscular Dystrophy

b) Neuro Musculo Disability:

The inability to perform controlled movements of affected body parts due to diseases, degeneration or disorder of the nervous system. The categories are:

Cerebral Palsy, Spina Bifida, Poliomyelitis, Stroke, Head Injury, Spinal Cord Injury. (Handicaps Welfare Association, 2012)

1.3.4 Body Mass Index

The body mass index (BMI) is a value derived from the mass (weight) and height of an individual. The BMI is defined as the body mass divided by the square of the body height, and is universally expressed in units of kg/m2, resulting from mass in kilograms and height in meters.

The BMI may also be determined using a table or chart which displays BMI as a function of mass and height using contour lines or colors for different BMI categories, and may use two different units of measurement.

The BMI is an attempt to quantify the amount of tissue mass (muscle, fat, and bone) in an individual, and then categorize that person as underweight, normal weight, overweight, or obese based on that value. However, there is some debate about where on the BMI scale the dividing lines between categories should be placed.

Commonly accepted BMI ranges are:

- underweight: under 18.5,
- normal weight: 18.5 to 25,
- overweight: 25 to 30,
- Obese: over 30.

Mid Upper Arm Circumference:

The Mid Upper Arm Circumference is normally used in the assessment of nutritional status. But this tool is also related heavily with BMI. Estimating body mass index (BMI) category If neither height nor weight can be measured or obtained, BMI can be estimated using the mid upper arm circumference (MUAC) Measuring mid upper arm circumference (MUAC) The subject should be traditionally be standing or sitting. Triceps skin fold thickness and arm circumference can be measured accurately, reproducibly and comparably in the supine position when the patient is unable to assume the recommended upright stance.

left arm is used if possible and ask subject to remove clothing Locate the top of the shoulder (acromion) and the Point of the elbow (olecranon process) Measure the distance between the 2 points, identify the mid point and mark on the arm. Ask subject to let arm hang loose and with tape measure, measure circumference of arm at the mid point. Do not pull the tape measure tight - it should just fit comfortably round the arm. If MUAC is less than 23.5 cm, BMI is likely to be less than 20 kg/m2 I.e. subject is likely to be underweight. (Hymers, 2014)

If MUAC is more than 32.0 cm, BMI is likely to be more than 30 kg/m2 i.e. subject is likely to be obese. Weight change over time MUAC can also be used to estimate weight change over a period of time and can be useful in subjects in long term care.

MUAC needs to be measured repeatedly over a period of time, preferably taking 2 measurements on each occasion and using the average of the 2 figures. If MUAC changes by at least 10% then it is likely that weight and BMI have changed by approximately 10% or more.

BMI according to MUAC can be considered as a basic parameter to judge human basic health status.

Medical Condition

1.4.1 Medication Intake

Medicines are chemicals or compounds used to cure, halt, or prevent disease; ease symptoms; or help in the diagnosis of certain illnesses. Advances in medications have enabled doctors to cure many diseases and save lives.

These days, medicines come from a variety of sources. Many were developed from substances found in nature, and even today many are extracted from plants. For example, one medicine that is used to treat certain cancers comes from the Pacific yew tree.

1.4.2 Physical Disorders

A physical disorder in medical terms is often used as a term in contrast to a mental disorder.

Depending on personal hygiene, living/working condition, food/water intake a worker may be affected with various physical disorders.

Muscle aches are known as muscle pain, myalgia, or simply pain in the muscles is common in. Muscle aches are common among the brick field workers. Almost everybody has likely experienced discomfort in his or her muscles at some point.

Because almost every part of the body has muscle tissue, this type of pain can be felt practically anywhere. Common Cause of Muscle aches among brick field workers are due to heavy work

1.4.3 Mental Health

Mental health includes our emotional, psychological, and social well-being. It affects how we think, feel and act as we cope with life. It also helps determine how we handle stress, relate to others, and make choices. Mental health is important at every stage of life, related with working condition.

Brick field workers are under continuous stress for their work condition and low income aspects plays a role in it. Mental illnesses are serious disorders which can affect thinking, mood, and behavior. There are many causes of mental disorders. Your genes and family history may play a role. Life experiences, such as stress or a history of abuse, may also matter. Biological factors can also be part of the cause. Mental disorders are common, but treatments are available.

1.4.4 Access to Health Care

Health care is a basic need of any human being. According to the constitution of The Government of Bangladesh the People's Republic of Bangladesh is responsible for securing healthcare to its citizens. But Inequities regarding access to medical services exist depending on socioeconomic status of a person.

Brick field workers are known for poor health due to work condition & poor access to health care because of their economical condition.

Chapter: 2

Literature Review

3.1 Qualitative Study on Clinico-Social Problems of Brick-Kiln Workers

Sharma DK, Varun A, Patel M.

National Journal of Community Med 2013; 4(3): 503- 506.

The brick kilns serve as a source of livelihood for thousands of unskilled laborers from across the country. The seasonal nature of the work attracts migrant labour, many of them landless farmers. Objectives: The study was done with a view to know the clinicosocial problems of the families.

The following study is a focused group discussion with brick kiln workers in the catchment area of RHTC of Pramukhswami Medical College.

In the current study it was found that the condition of these migrant brick kiln workers is very pathetic on account of number of conditions. All the workers were migrant and marginal workers with migration duration of 8 months every year and then they are going back to the native place. These workers were mostly illiterate or had primary education. Females were uneducated. These workers are getting daily wages and there is no holiday as such. The days these workers don't work are non-paid days. Almost all these workers complained of bodily pains. Children in these families are usually suffering from respiratory tract infections, diarrhea and intestinal infections.

Irrespective of the migration status, local governance should do something for their benefit and health so that some decent work can be ensured.

3.2 Causes and Consequences of Child work in Brick Field: A Study on the Selected Brick Fields in Char Bhadrasan under Faridpur District.

Rana, M. and Das, A.

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Social norms and economic realities mean that child labor is widely accepted and very common in Bangladesh. Many families rely on the income generated by their children for survival, so child labor is often highly valued. Additionally, employers often prefer to employ children because they are cheaper and considered to be more compliant and obedient than adults. When children are forced to work, they are often denied their rights to education, leisure and play. Studies revealed that one in every six children in Bangladesh was working children. The gravity of the situation led our initiative to study on child labour in brick field in the work area in Char Bhadrasan under Faridpur district .This study uses data to examine the different components of child labor in brick field. Study used quantitative method for data collection and particularly survey was used. A total of 103 respondents of five brick fields in Char Bhadrasan upozila were interviewed. SPSS windows program was used to process and organize the data for the study. The respondent were interviewed regarding various aspects related to the child labour in brick field includes causes and consequences of child labor to engage their risky job, working environment , their schooling profile, their future goal etc. The fieldwork observation shows that the working environment

in brick field are hazardous to child health due to unsanitary environment, unsafe working environment (such as heat, burning ashes, flying ashes, and pieces of broken bricks everywhere), and the hazardous work (prolonged working hours, heavy work, and dangerous jobs).They also suffer from breathing problem, cold & fever, minor injuries and sometime more than that. Inspire of that majority of child workers have a very common expectation that is all of them want to lead a happy life with their work and their family.

3.3 Nutritional and morbidity profile of brick kiln workers in Sakwar, Tribal area of Thane District

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Brick workers are known for poor health and poor access to health care. Workers health should be evaluated from time to time, to look for possible solution for provision of effective health care and occupational environment.

To assess socio demographic, nutritional status and morbidity profile of brick kiln workers and to review working conditions and safety measures practiced at brick kilns.

Three brick kilns in Sakwar village were randomly selected for the study. All 86 workers were included in the study. Interviews were conducted and field checklist for presence of basic amenities and safety conditions was used at the brick-kiln sites. Result: Young adults of 20-30 age & children (below 14 yrs) formed majority of the working population(42%). 19% working population had some or another form of addiction. 83% of worker were working beyond 8-9 hrs per day. Majority of the workers were undernoursied(44.6%). 58.7% of workers complained musculoskeletal problems. Majority of the workers were not aware about safety measures and none was practicing such measures.

Study shows high prevalence of child labour, illiteracy and low income among the workers. Confirms high malnutrition and poor health status among brick kiln workers.

3.4 Socio-Economic Conditions of Female Workers in Brick Kilns - An Exploitation to Healthy Social Structure: A Case Study on Khejuri CD Blocks in Purba Medinipur, West Bengal

Das, R.

Research Scholar of Vidyasagar University, Midnapore,

Brick Industry is one of the informal/unorganized industries in India. This industry is booming with the expansion of real estate business. It is a labor intensive industry. The industry employs millions of workers. Sizable portions of the workers are women. They live in poverty. At work place, they are exploited, deprived and do not get the status which the men workers enjoy. There are varied natures of problems the women workers are facing now. Their socio-economic conditions cause concerns. In this backdrop, an attempt has been made to ascertain and examine the socio-economic conditions of women workers engaged in brick kiln factories. The data collected in this regard have been interpreted through percentage analysis. The entire gamut of discussion reveals that women workers live in poverty and as a consequence they come to work in brick kilns. They and their children are mostly illiterate. Most of them are migrants and their land holdings are minimal. Their annual incomes are very small. They are not given the scope of doing skilled work. Very often they express dissatisfaction on working environments. Working environment needs to be improved so that workingwomen get motivated and enthused that may result in development of the kilns. Statutory benefits need to be given for their welfare.

3.5 Assessment of occupational health problems and physiological stress among the brick field workers of West Bengal, India

Das, B.

International Journal of Occupational Medicine and Environmental Health
June 2014, Volume 27, Issue 3, pp 413-425

The brick field industry is one of the oldest industries in India, which employs a large number of workers of poor socioeconomic status. The main aim of the present investigation is i) to determine the prevalence of musculoskeletal disorders among brick field workers, ii) to determine the prevalence of respiratory disorders and physiological stress among brick field workers compared to control workers.

For this study, a total of 220 brick field workers and 130 control subjects were selected randomly. The control subjects were mainly involved in hand-intensive jobs. The Modified Nordic Questionnaire was applied to assess the discomfort felt among both groups of workers. Thermal stress was also assessed by measuring the WBGT index. The pulmonary functions were checked using the spirometry. Physiological assessment of the workload was carried out by recording the heart rate and blood pressure of the workers prior to work and just after work in the field.

3.6 Cardio-respiratory status of stone grinders and brick field workers from west Bengal, India

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Quartz crushing and brick making industry are informal and demands heavy manual labour. They are socio-economically backward and are unable to avail of social security's scheme meant for protection of the health and welfare of Indian workers.

To evaluate cardiovascular and respiratory status of stone grinders and brickfield workers and to compare the above parameters with the control group.

This cross-sectional study was carried out among 94 stone grinders and 82 brick field workers of West Bengal. They are mainly exposed to stone dust particles, silica dust and fumes. Pulmonary function and cardiovascular parameters were measured, and respiratory impairments were assessed by questionnaire.

Pulmonary function parameters, including breath holding time significantly reduced among these occupational groups of workers. But maximum oxygen consumption values were significantly higher than any other industrial workers of West Bengal. Workers of the above mentioned occupation showed restrictive type of lung impairment and prevalence of chest pain, and chronic cough (chronic bronchitis) were much higher than the control group workers. Stone grinders (42.6%) and brick field workers (78%) were in the pre-hypertensive state which is much higher than other industrial workers of West Bengal. BMI and skinfold thickness values of the above mentioned occupational workers were much lower than

controls as well as other industrial groups of workers indicating severe nutritional deficiency among them.

Thus the environmental stress and nutritional status of these two occupational groups of workers affect the cardio-respiratory status among them, which can be prevented by use of protective gadgets, use of modern engineering techniques, proper health education and awareness.

3.7 Occupational Stress among Women Moulders: A Study in Manual Brick Manufacturing Industry of West Bengal

Bijetri, B. and Sen, D.

International Journal of Scientific and Research Publication, 4(6).

International Journal of Scientific and Research Publications,

Manual brick manufacturing is an age-old profession practiced all over the world and brick is a very important building material for a developing country, especially like India to improve infrastructure. Women have become an integral part of manpower resources in these unorganized sectors, but unfortunately the female workers here suffer a silent agony. The present study examines the occupational profile, impact of work factor in terms of physiological, biomechanical, musculoskeletal and psychosocial discomforts prevalence among workers in brick kilns. A study was conducted on female moulders engaged in different brick-kiln of West Bengal. Physical parameters such as body weight, height, grip strength; occupational status based on socioeconomic profile; physiological parameters like pulmonary status, biomechanical assessment; and psychosocial assessment were studied. From the result it is seen that 18% of the sample population falls under severe Grade III chronic energy deficiency. More than 90% of body pain is felt in wrists, back, both knees, both thighs and both ankles due to the awkward postures adopted by them. Postural assesment by REBA, RULA and OWAS method shows that most of the posture adopted during work should be corrected immediately. Majority of the workers are in the borderline tending towards development of Chronic Obstructive Pulmonary Disease. The workers

worked for more than 8 hours per day, with very less monthly income. Long working hours without adequate rest, low wages, job insecurity and bullying by superiors contribute to various physiological and psychosocial stresses which in turn tends workers to various addictive behaviors. Thus, immediate ergonomic interventions are required to improve the quality of life of these workers so that they can continue working for a longer period under the conducive and safe work condition which in turn will influence the social security, health and safety of the workers.

3.8 A Study of Impact of Brick Industries on Environment and Human Health in Ujjain City (INDIA)

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Govt. Kalidas Girls College, Ujjain (INDIA)

Indian brick industry is the second largest brick producer in the world after China. The industry has an annual turnover of more than 10000 crores and it is one of the largest employment generating industries. In Ujjain (India), many brick industries are situated on the banks of Kshipra river. The objective of the present study was to evaluate the impact of brick making process on environment and human health. The results show that there are adverse effects of these industries on soil, water, air, vegetation and human health. Bricks are mainly made of soil and numbers of additives are added to the soil to increase the strength of bricks. The use of excessive amount of soil causes soil degradation. These industries use huge amount of fuel and kiln process used at present in these industries is highly inefficient which leads to air pollution and causes damage to vegetation and human health. Besides these, the waste along with water flows back in the Kshipra river, increasing the total solids, suspended solids, dissolved oxygen, calcium hardness, total hardness etc. High pollution levels in Kshipra river near these industries has been noticed, which could be possibly due to leaching of compounds from raw materials used in brick industries. It is not possible to prohibit these industries because they are essential for economic growth and development of the city. The paper discusses the effect of these industries on the environment and human health and suggests alternative sustainable strategies for the kiln process, so that economic development and environmental protection can go hand in hand.

3.9 Work related Injuries and Musculoskeletal Disorders among Child Workers in the Brick Kilns of Khejuri of Purba Mediipur in West Bengal

Das, R.

International Journal of Advanced Research (2015), Volume 3, Issue 3, 1065-1076

Brick industry in India is the second largest brick producer in the world after China. The industry is one of the largest employment generating industries employing millions of people. Brick kiln workers always remain under heavy work pressure to work more efficiently for higher production during seasons with fewer resources and management skills. This stressful situation becomes worse by physical discomforts in the workplace. Brick manufacturing is a labor intensive informal industry using child workers as the major work force in India. Workers are required to use physical strength, carry heavy loads and remain in a squatted posture for longer periods doing repetitive tasks posing threats to musculoskeletal system. This study involved cross sectional study of children aged 17 years and below. The study respondent included 301 cases in Khejuri blocks under Purba Medinipur district of West Bengal. Lack of adequate physical infrastructures, poor working conditions with nonexistent safety procedures have posed risk to physical, mental and overall well being of children. The study identifies work related physical ailments and discomforts dominate brick industries of Khejuri. The musculoskeletal disorder related pain and discomfort was experienced by 73 per cent of working children in this region. This study finds that presence of poorer physical environment, working conditions and practices has contributed to musculoskeletal injuries and problems exposing working children to risks and hazards.

Chapter-3

Objective of the study

3.1 Aim of the study

In this STUDY our aim is to identify socio demographic & health condition of the workers, working in the brick kilns of Bangladesh.

3.2 General Objectives

To study health status & disease condition of the selected subject population by a survey, those are working in brick fields of Bangladesh.

3.3 Specific Objective

The specific objective of the study is to investigate and analyze the health issues of the brick field workers. The study then targets to recommend a set of suggestions for improving their work condition.

More specifically, the following specific objectives are determined:

1. Background and livelihood status of the brick kiln labors.
2. Their working conditions (employment, payment, shelter, seasonality etc.)
3. Basic Health Status of the workers (Hygiene, Food Behavior, BMI etc.)
4. Medical information like recent drug use & disease condition of the workers.

Chapter-4

Methodology of the study

This study is survey based, where data was obtained from the participants by questionnaire form. The study is carried out to determine the disease and health condition of the workers in brick kiln which includes direct conversation & face to face interviews.

4.1 Study Area

The study was conducted among the workers from 9 brick fields at Savar Upazilla of Dhaka District. All selected brick field unit of selected area are under private ownership and type of the kilns was Bull's Trench Kiln (BTK).

4.2 Sample Size

The Study was carried out with total sample of 276. Data was collected from several region of Savar which are as follows:

Amin Bazar, Savar

Number of Brick Fields: 3 Number of Participants: 98

Raj Fulbaria, Savar

Number of Brick Fields: 4 Number of Participants: 146

Asulia, Savar

Number of Brick Fields: 2 Number of Participants: 32

4.3 Study Period

The study as well as collection of the samples by interview was carried throughout a period of 10 month from August 2015 to June 2016.

4.4 Selection of subjects

A cross-sectional study is conducted on 276 brick field workers from 9 brick fields of Savar Upazilla, which is largely situated at the side of the River Turag. The brick kiln units were chosen randomly from the mentioned area.

235 male & 41 female subjects were selected those who were engaged in various steps of brick making process like loading mud, carrying mud, preparation of clay, molding, stacking bricks, setting bricks in the kiln, loading and unloading bricks etc.

4.5 Data Collection Tool

Data Collected based on questionnaires form, which is divided into three parts:

Part-I: Socio Demographic Information

Part-II: Basic Health Status

Part-III: Medical Information

Chapter-5

Result

5.1. Socio-Demographic characteristics of Brick Field Workers

Table 1: Origin of the Brick Field Workers

Division of Bangladesh	Percentage of Workers
Rangpur	20.27%
Rajshahi	32.25%
Khulna	14.86%
Barisal	18.84%
Dhaka	9.05%
Sylhet	2.54%
Chittagong	2.18%

It is seen from the survey most of the labors working in brick kilns are migrant from the other divisions of the country to Dhaka.

Most abundant numbers of labor came from the South west and North-west part of the region of Bangladesh like, Rangpur, Rajshahi and Barisal, Khulna region.

5.1.2 Age Distribution of Brick Field Workers

Table 2: Age distribution of workers in number & percentage

Adolescence (Ages 12-20)	**Early Adulthood (Ages 20-35)**	**Midlife (Ages 35-50)**	**Mature Adulthood (Ages 50-80)**
14	160	72	30
5.07%	57.97%	26.08%	10.86%

It was found most of the workers on the study samples are in their early adulthood (Age 20-35) which is 58%. The second majority of the workers are on their midlife region (Age 35-50). Some of the workers are in the range of adolescence age and child labors are also present in some brick kilns on the survey areas.

5.1.3 Educational Status of Brick Field Workers

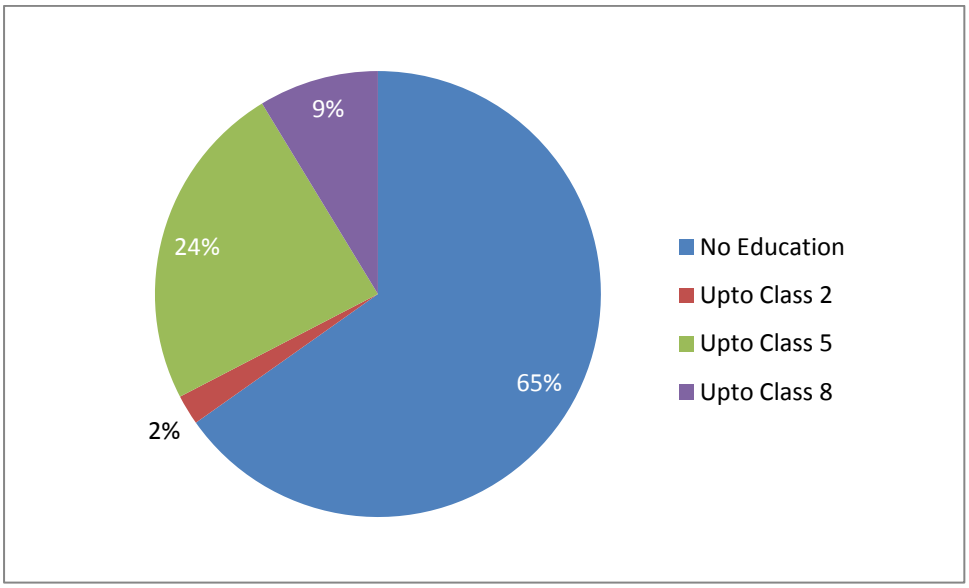

Fig.9: Level of education of brick field workers

Education is still a luxury for low income classes in Bangladesh; especially those are migrant from rural areas. In this study it is seen most of the workers (65%) did not get opportunity for any kind of institutional education. 24 percent of workers are identified who passed the stage of primary education (class 5) according to country's present educational system (April,2016). Only 9 percent has been identified to reach the level of junior education.

5.1.4 Labor Category of Brick Field Workers

Table 3: Distribution of labor category in numbers

Types of Work	**Amount of Workers**
Cutting & Digging Mud	51
Carrying Clay & Mixing clay	36
Arranging Bricks to Dry	73
Operating Brick Making	47
Remove Debris	25
Multiple Work In a Day	35

Workers in the brick fields are also seen to do multiple works in a day.

5.1.5 Income Level of Brick Field Workers

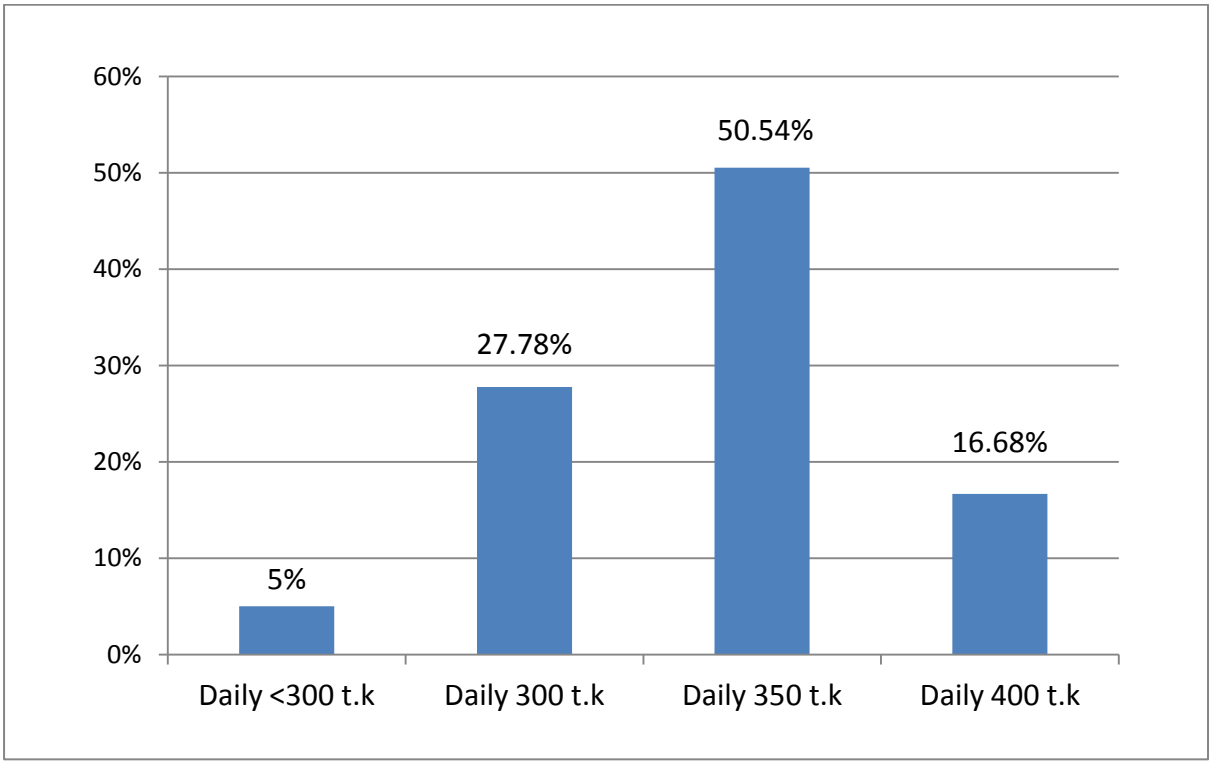

Fig.10: Daily income (in BDT) of respondents working in the brick fields

Workers of the brick fields paid depending on their work type, working hour, seniority and sometimes varies one field to another.

5.1.6 Working Hour & Day of Labor working in Brick Fields

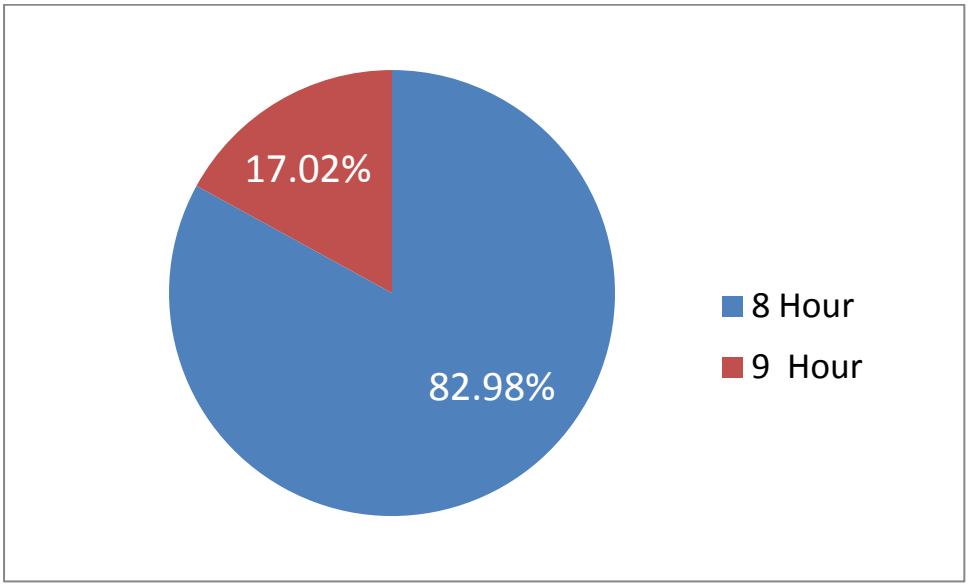

Fig. 11: Working hours per day of a brick field worker & distribution

Hours: A labor in a brick field works from early morning to evening ranges 8-9 hours a day with half an hour break during launch time. Labors working one hour extra get paid extra 50 taka.

Days: For a healthy worker everyday is a working day. A worker in the brick field works generally 7 Days a week. As they get paid for a day individually, some workers are observed took off days on their own.

5.2 Basic Health Status

5.2.1 Personal Hygiene of Brick Field Workers

Table 4: Level of different parameters involving personal hygiene

Parameters	Regularly	Irregularly
a) Washes Hands after Work	72.83%	27.17%
b) Washes Hands before eating	89.85%	10.15%
c) Use of Soap	53.98%	46.02%
d) Taking Bath Everyday	100%	0%
e) Washing cloth Daily	88.41%	11.59%
f) Brushing teeth Everyday	97.10%	2.89%
g) Nail Cutting Practice	Regular (Weekly)	Irregular
	60.14%	39.85%

5.2.2 Source of Water for Brick Field Workers

Drinking Water:

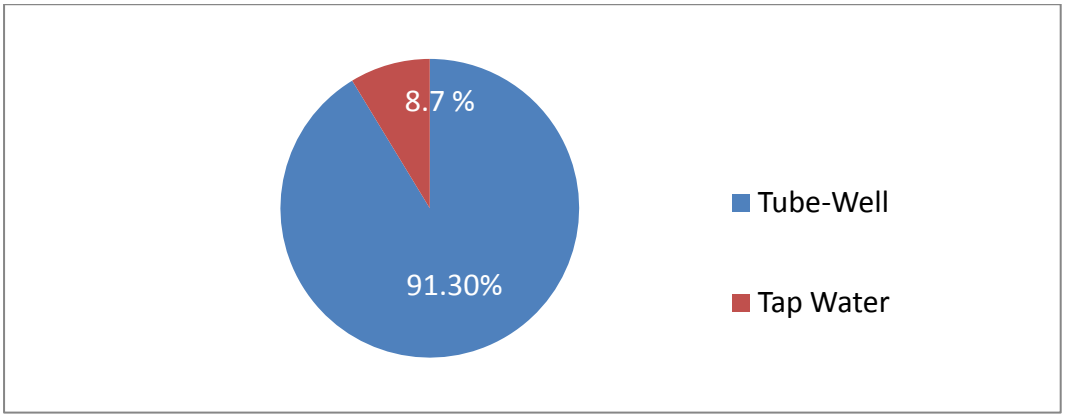

Fig.12: Source of Water for Drinking consumed by brick field workers

Tube-well water is the prime source of water for drinking among brick field workers.

Table 5: Water intake by boiling the source water

Drinking water after Boiling	Drinking water without Boiling
6.89%	93.11%

Water for Bath:

Table 6: Source for water for bath

Parameters	Tube-Well	River Water	Pond
Source of Water For Bath	35.50%	56.88%	7.61%

5.2.3 Defecation Facility Used by Brick Field Workers

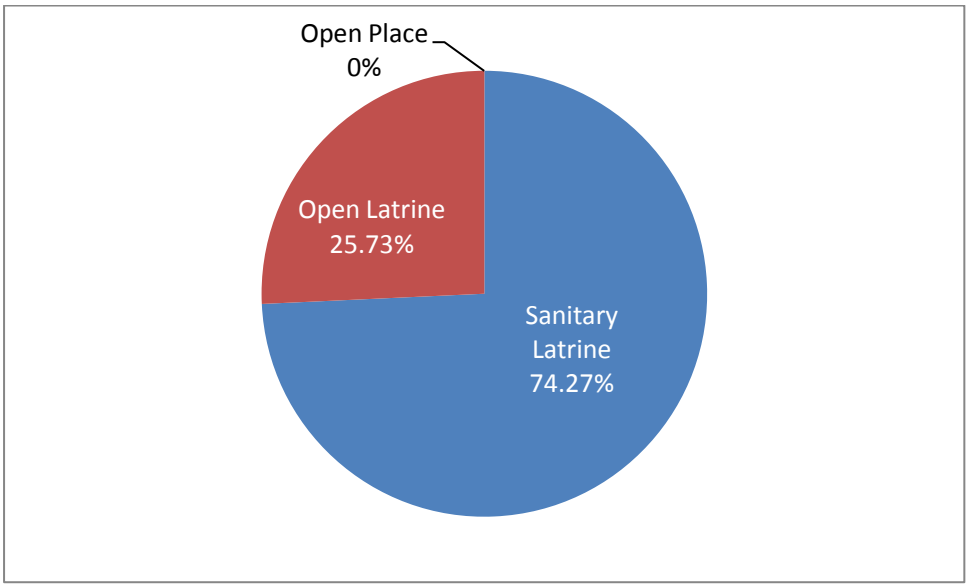

Fig.13: Use of defecation facility available to brick field workers in percentage

5.2.4 Food Behavior of Brick Field Workers

Table 7: Food behavior of respondents depending on food types

Food Type	**Regularly**	**Irregularly**
Breakfast	92.02 %	7.98%
Lunch	100%	0%
Dinner	98.55%	1.44%

5.2.5 Smoking & Other Addictions

Table 8: Number & percentage of smoker & non-smoker

Smoker	**Non Smoker**
212 Respondent	64 Respondent
76.81 %	23.19%

Table 9: Amount of sticks smoked by a smoker per day

Amount of Sticks Per Day (Average)	**Percentage of Smoker**
More than 20	10.37%
20	66.50%
10-15	18.39%
Less than 10	6.13%

Table10: Percentage of respondents involved in other addictions

Other Addiction	**Percentage of Worker**
Beatle Leaf	24.63%
Gul	13.40%
Weed	2.53%

5.2.6 Body Mass Index of Workers of Brick Fields

Table 11: Body mass index of respondents according mid upper arm circumference

BMI according to MUAC	**Percentage of Workers**
Underweight	21.01%
Normal	77.90%
Overweight	1.08%

5.3 Medical Information

Table 12: Recently Faced Health Problems by Brick Field Workers*

Recently Suffered Health problems	**Percentage of Workers suffered**
Back Pain	21.73%
Muscle pain	17.02%
Body Weakness	11.59%
Cold & Cough	9.78%
Burning Urination	5.80%
Fever	3.98%
Diarrhea	5.07%
Jaundice	3.26%
Gastritis	10.15%
Dental Problems	2.17%
Eye Disorders	4.71%
Headache	12.68%
Rheumatic Fever	2.53%

* Many Respondents have been found having multiple health problems at a time.

5.3.1 Recently administered Medication

Table 13: Percentage of workers recently administered medication regularly

Medicament Class	**Percentage of Worker Administered**
NSAIDs	10.50%
Vitamin Supplements	5.07%
Antiulcerent/antiacidic	6.52%
Cough Expectorant & Suppressant	4.71%
Oral Rehydration Solution	4.34%
Antiemetic	1.08%
Antihistamine	3.98%
Antiasthmatic	2.17%
Hypnotic/Sedative	1.44%

5.3.2 Medical Treatment

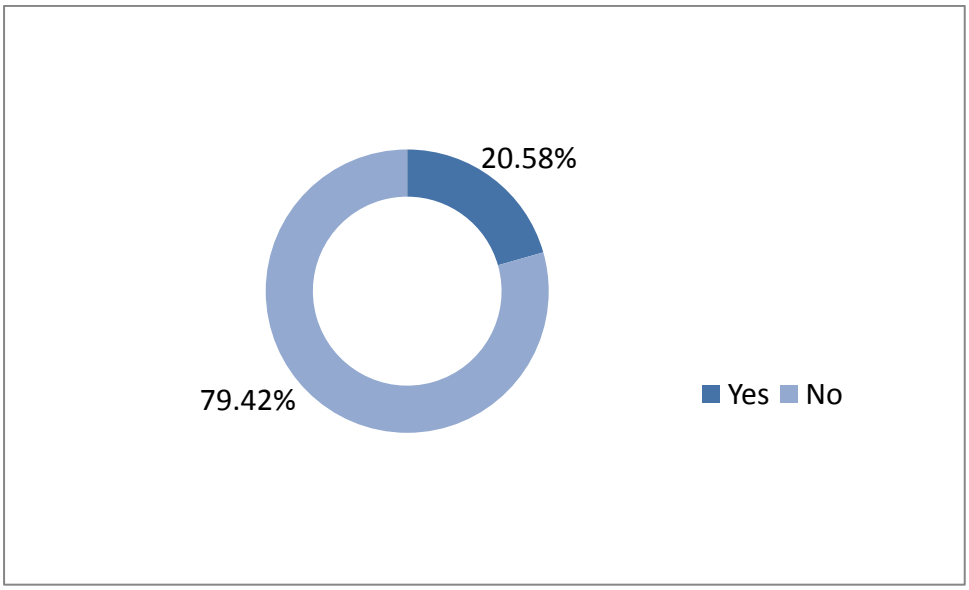

Fig 14: Percentage of respondents who seeks medical treatment with health problem

Table 14: Cause behind not taking any treatment when suffering physical disorder

Cause Behind No Treatment	**Percentage of workers**
Economical	59.03%
Ignorance	12.04%
Not Needed	28.93%

5.3.3 Small Injuries Faced by Brick Field workers During Work

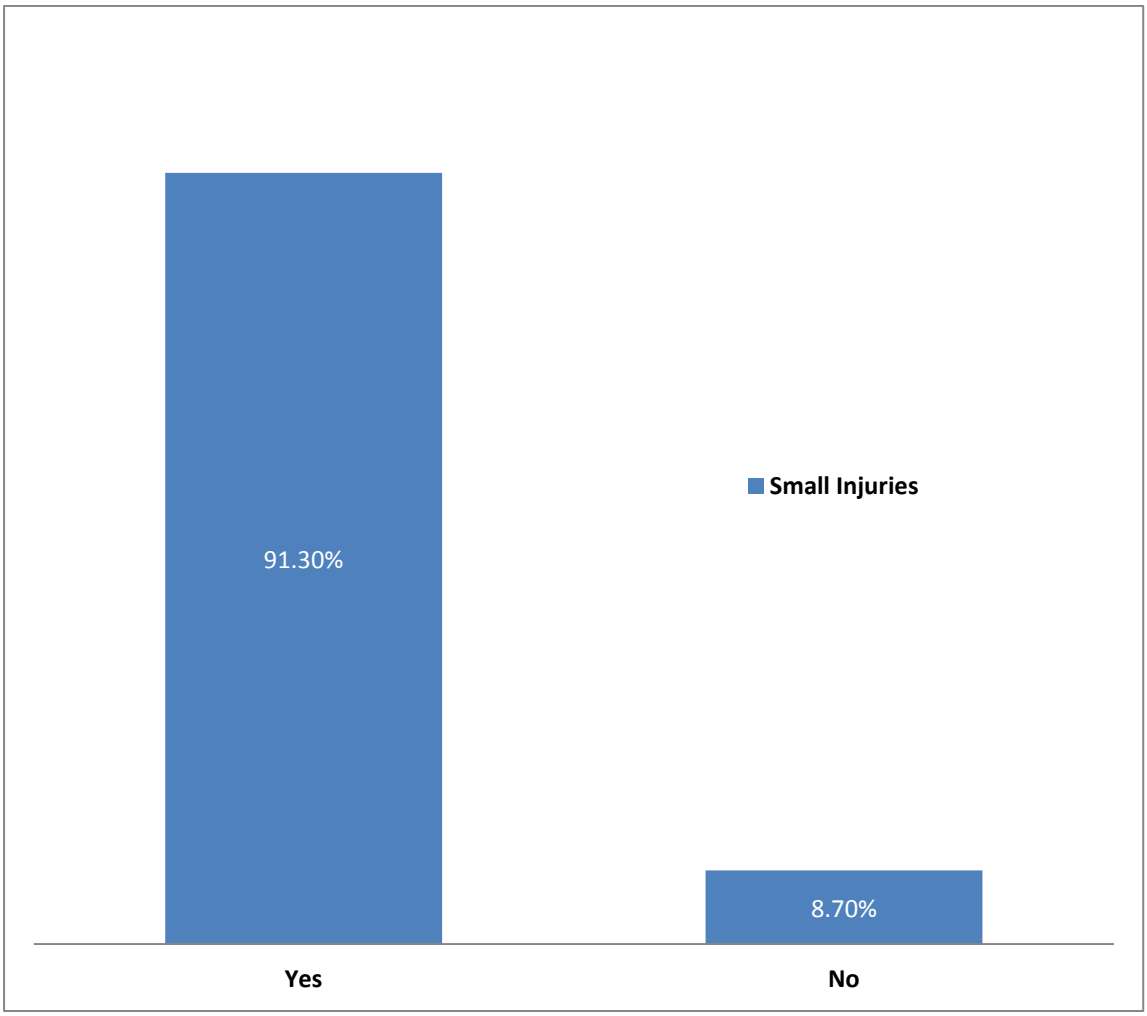

Fig 15: Percentage of respondents suffered small injuries during work.

5.3.4 Mental Health

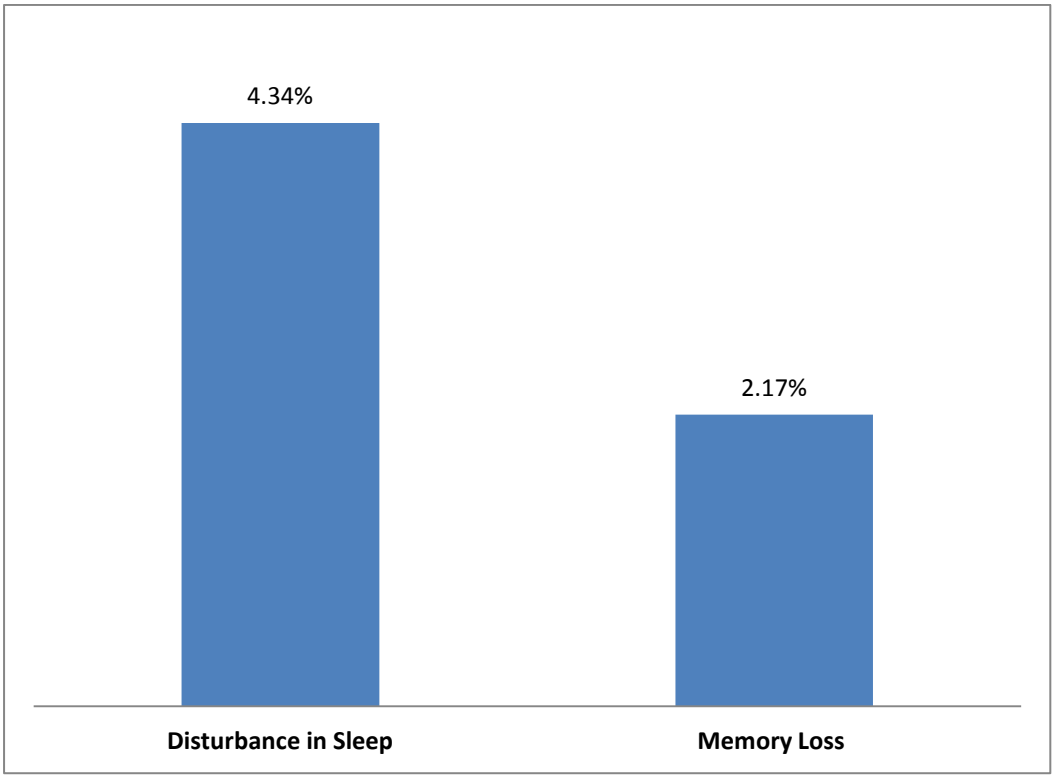

Fig.16: Status of Mental Health: Percentage of Disturbance and memory loss

Chapter- 6

Discussion

Major workforce (90.97%) in the brick kilns is seen migrants to Dhaka from other division of the country & as the dry season approaches they move to brick fields for this seasonal work for 6-8 months.

Most of the workers are in their early adulthood (Age 20-35), which is 57.97% in this study. They sometimes move with their other family members and seen working in the same kilns.

It is seen major part of the workers (65%) do not received for any kind of institutional education. Only 24 percent of the workers were lucky enough, who had passed the stage of primary level of education. Illiteracy put a foremost effect on vulnerability to social, economical & also health condition because of lack of knowledge.

Although the income level of a brick field worker is not so high, but workers tends to engage in this due to easy availability of this employment. Depending on the types of works they get paid from less than 300 to 400 taka daily and generally work 7 days of a week. An off day from work results into non-paid day for them. Workers remain busy for 8-9 hours in the field (82.98%, 8 hours)

Quality of personal hygiene among brick field workers is average, which may have an effect on their health status. 72.83% of the respondents wash hands after work regularly, 89.85% of them responds that they washes hands regularly before eating a meal which should be higher. Use of soap during hand wash was also not satisfactory, only 53.98% used soap regularly. On other parameters like taking bath everyday (100%), washing cloth daily (88.78%), brushing teeth everyday (97.10%) is on satisfactory level. Regular nail cutting practice must be improved, which is 60.14%.

In case of food behavior regularity in taking food in breakfast is 92.02%, in lunch is 100% & in dinner it is 98.55%. On the other hand 91.30% of respondents drink water from tube-well water. Most of them are found not boiling the water (93.11%) before drinking.

As all the brick field of the study areas are besides banks of river Turag or branches of its water system, 56.88% of workers are seen to take their bath in river water. Percentage of workers in the brick fields use sanitary latrine as defecation facility is 74.27%, where 25.73% uses open latrine besides water systems which must have an effect on health status of the labor living on this region.

High numbers of workers (76.81%) in the brick fields smoke biri/cigarette which is injurious to their health. Major amounts of smoker from workers took 20 Sticks on average of biri/cigarette per day, which 66.50%. On the other hand 59.42% of was found who do other addictions (Beatle leaf 24.63%, Gul 13.06%, weed 2.53%) and many of them are also a biri or cigarette smoker besides it which is a threat to their health status. 66.50% personnel in brick field found smoked 20 sticks a day.

Body mass index of the respondents according mid upper arm circumference examined during the interview. Normal body weight was found in 77.90% of the respondents, where 21.01% of the workers are under weight which indicates poor nutrition status of their body.

It was also seen that many workers recently suffered from discomfort in different parts of the body, especially in their lower back (21.73%), muscles of hands and legs (17.02%). It occurs because; brick field workers are under high physical & biomechanical stress for prolonged period of time (8-9 hours) & due to heavy workload. In brick fields 12.68% of the workers faced headache, where 9.78 % of them found recently caught cold & cough.

In this study, recently administered medication by workers are mostly NSAIDs(10.50%) for relief of pain on body parts & took vitamin supplements(5.07%) especially for body weakness. Other medications are antiulcerent/antiacidic, cough expectorant/suppressant, oral rehydration solution etc.

The workers in brick fields so often suffered small injuries during their work. Majority of the respondents (91.30%) from the study faces small cut, wounds on their body parts especially hands and legs. 4.34% of the respondents facing problems in their sleep during night, as they do hard work all over the day and aged workers are found with 2.17% memory loss. 79.42% did not seek any medical treatment largely due to their economical condition (59.03%) which indicates their inability to afford the higher medical facility.

Chapter-7

Conclusion

With the high demand of infrastructure development, brick making industry in Bangladesh is a rapidly growing sector. Health of the brick field workers must have an impact on the overall condition of the health status of the country. According to the study there are lots of areas, in which health of brick field workers needed to be improved.

Depending on the present basic health status & medical information of the study we hereby recommended some suggestions.

Recommendation

1. Workers should drink enough water during work to avoid dehydration and other related disorders due to it.
2. Every worker should use soap in hand washing & use sanitary latrine.
3. As the first meal of the day is the most important one, all of the workers should try to take their breakfast regularly.
4. The brick field workers should boil water before drinking water.
5. Rotation of work among the brick field workers can be applied more.
6. Various kinds of stretching exercises should be practiced to minimize muscle aches.
7. Protective equipments like, gloves, masks, headgear must be used to avoid work related injuries.
8. Sever work related pain should not be ignored and medical attention is required.
9. During work avoid the inhalation of smoke dust particles.
10. Workers in brick fields should reduce smocking cigarette & stop other addictions.
11. Brick kiln owner should provide medical facility to its workers or medical bonus can be included to their salary.

Limitation of the Study

1. Health status of brick worker is a sensitive issue. Many of them were shy to answer, as a result they are doubtful about it and sometimes the respondents were unwilling to provide necessary information. So, sometimes it was very difficult to explore the real situations.

2. The respondents did not have enough time to answer the whole questionnaires, as they were busy in their work. So we had to go back several times to complete all questions. It sometimes hampers the integrity of the study.

3. Generally it is a very lengthy process to take permission from the owner of a kiln before interview of the workers. The owner may often restrict the labor to give an interview. So, to avoid lengthy formalism, sometimes the data collected by permission of the respondent only.

Chapter-8

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