



**COMPUTER PROFESSIONAL'S HEALTH HAZARD:
A STUDY IN DHAKA CITY**

**2nd Semester, M.S.S
Session: 2012-13
Exam Roll No: 4138
Registration No: Ha- 5835
Department of Sociology
University of Dhaka**

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**A thesis submitted to the Department of Sociology,
University of Dhaka in partial fulfillment of the
requirements for the degree of MSS in Sociology**

**Department of Sociology
University of Dhaka
December 2014**

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DECLARATION

I hereby declare that this submission is my own work towards the MSS. Department of Sociology and that, to the best of my knowledge, it contains no material previously published by another person nor material which has been accepted for the award of any other degree of the University; except where due acknowledgement has been made in the text.

The Researcher

Exam Roll: 4138

ABSTRACT

The Information and Communication Technology (ICT) sector is an emerging industrial sector in Bangladesh. According to Ministry of Finance 2013, the size of the IT industry is estimated to be approximately around US\$ 120 million per year (including export). But computer professionals are among the most unnoticed working groups in Bangladesh who are exposed to various occupational health hazards due to their work postures and long working hour on computer. This study aims to assess the prevalence and pattern of computer related health hazards among the computer professionals in Dhaka city. It also seeks to examine the attitudes of the professionals towards health hazards, the association between the computer professionals' health hazard and their working environment and interventions by government, employers and employees. With the Dhaka Metropolitan Area as a study site, a descriptive cross-sectional survey of 105 computer professionals (79% males and 21% females) between ages 20 through 45 and made up of Software programmers, Designers, Business analysts, Developers and Network engineers was conducted. The participants in the present study were recruited from 12 different software companies in Dhaka city. Results indicated that musculoskeletal disorders were common among the computer professionals. The highest (56.2%) respondents suffered from upper back trouble and (43.8%) suffered from lower back trouble. However, (41.9%) of the respondents suffered from wrists trouble and (41.0%) suffered neck pain. Shoulder trouble was found among (24.8%) of the respondents and (25.7%) of the respondents suffered eye strain. Due to these troubles and discomforts, (20.0%) respondents were prevented from work and (40%) of the respondents consulted with the doctors or physio-therapists. Smoking habit was found among the (58.1%) of the respondents and a relation between long work hour and smoking habit was also analyzed. Accessing the Hamilton Depression Rating Scale, large number of respondents (38.0%) was found moderately depressed. Statistical significant association was found between the long work hour and the level of depression. These findings underscore that the computer professionals are prone to these occupational hazards so computer service sector should be emphasized as a field of concern in occupational health hazards. Application of ergonomics and better technology along with proper lighting; cushioned chair and soft keypads in the office settings are required. There is also a need for enforcing suitable preventive measures to combat these occupational health hazards along with establishing OSH policy and legislations.

Key words: IT industry, occupational health hazards, attitudes, ergonomics, computer professionals.

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ABBREVIATIONS

AOA	American Optometric Association
BACCO	Bangladesh Association of Call Center & Outsourcing
BASIS	Bangladesh Association of Software and Information Services
BBS	Bangladesh Bureau of Statistics
BCC	Bangladesh Computer Council
BCS	Bangladesh Computer Society
BEF	Bangladesh Employers' Federation
BILS	Bangladesh Institute of Labour Studies
BSS	Bangladesh Sangbad Sangstha
CHI	Computer Human Interaction
CIS	International Safety and Health Information Centre
CMDQ	Cornell University's Musculoskeletal Discomfort Questionnaire
CTD	Cumulative Trauma Disorders
CTS	Carpal Tunnel Syndrom
CVS	Computer Vision Syndrom
DOEH	Department of Occupational & Environmental Health
ESCAP	Economic and Social Commission for Asia and the Pacific
GBD	Global Border of Diseases
GOB	Government of Bangladesh
HDRS	Hamilton Depression Rating Scale
HRD	Human Resource Development
ICD	International Classification of Diseases and Related Health Problems
ICT	Information and Communication Technology
ILO	International Labour Organization
ISO	International Organization for Standardization
IT	Information Technology
JICA	Japan International Cooperation Agency
MMI	Man Machine Interaction
MSD	Musculoskeletal Disorders

MoLE	Ministry of Labour and Employment
MoF	Ministry of Finance
NCCWE	National Coordination Committee for Workers Education
NIOH	National Institute of Occupational Health
NIPSOM	National Institute of Preventive and Social Medicine
OHH	Occupational Health Hazards
OHS	Occupational Health and Safety
OHSAS	Occupational Health and Safety Assessment Series
OSHA	Occupational Safety and Health Authority
OSHE	Occupational Safety and Health and Environment Foundation
PAPM	Precaution Adaptation Process Model
RSI	Repetitive Stress Injuries
SAARC	South Asian Association for Regional Cooperation
SEM	Social Ecological Model
SPSS	Statistical Package for Social Scientists
UNCED	United Nations Conference on Environment and Development
VDT	Video Display Terminal
WB	World Bank
WHO	World Health Organization

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CHAPTER ONE: INTRODUCTION

1.1 Background of the study

The Internet (connected computers) has changed the way almost everything is done the world over. Information technology will determine the nature of human activities and to shape the world in future. Like individuals, businesses now communicate much faster than they could about a decade, or so ago (Blinder and Quandt 1997).

Research on ill-health and injury consequences of work has focused primarily on the physical and chemical occupational environment. Such as, toxic substances and mechanical hazards on the work place. More recently, however there has been growing recognition of health implications of the social environment at work such as job organizations, labour process, management systems and models of production (Ganster 1989, schnall et al. 1994). Sociology of health and illness is a vast paradigm which consists of a significant feature of work place health and safety, known as occupational health and safety. Occupational health hazards are common among the computer professionals now a day. Computer work is almost entirely cerebral. Most of the time, we are in our heads thinking about what's happening in the screen, oblivious to what happening beyond our brains. We can go on like for hours, ignoring the body signals (Stigliani 1995).

The World Health Organization (WHO 1994) analyzing some of the aforementioned problems concluded that the occupational health and safety of working people are crucial pre-requisites for productivity and are of utmost importance for all socio-economic and sustainable development. The emerging IT industry is also boosting up the unnoticed fact of occupational injuries of the professionals. Being at a desk and in front of a computer can be just as hazardous as being a construction worker or a mover for a moving company. There are health hazards that go along with sitting all day. Blood clots from lack of movement, the lighting of the computer screen which cause headaches and eye strain. With a busy work environment, often time there is no time for a nice long lunch hour which leads to grabbing something quick and usually not the healthiest on the menu. This is just to name a few of the problems with being an IT.

Studies from India shows that on an average an IT professional will work fifty hours per week with six hours on Saturday and Sunday, as well as seventy percent of the time working while ill. maintain our physical and mental wellbeing while doing a job that is very demanding, underpaid, understaffed, unappreciated and mostly end user undesirable (Shrivastava 2012; Prasad, Wagh and Mudey 2014).

The health status of the workforce in every country has an immediate and direct impact on national and world economies. Total economic losses due to occupational illnesses and injuries are enormous (WHO 1999).

International Labour Organization (1996) estimates show that two million women and men worldwide die each year as a result of occupational accidents and work-related illnesses. WHO estimates that 160 million new cases of work-related illnesses occur every year, and stipulates that workplace conditions account for over a third of back pain, 16 percent of hearing loss, nearly ten percent of lung cancer; and that eight percent of the burden of depression can be attributed to workplace risk (Biddle 2001).

Bangladesh is a growing sector for the information technology. The IT industry is a relatively new sector in the country's economy. Though it is yet to make tangible contributions in the national economy, it is an important growth industry. The Bangladesh Association of Software and Information Services (BASIS) were established in 1997 as the national trade body for software and IT service industry. Starting with only 17 member companies, by 2009 membership had grown to 326. In a study among Asian countries by Japan International Cooperation Agency in 2007–08, Bangladesh was ranked first in software and IT services competitiveness and third in competencies, after India and China (Karim 2010).

The World Bank, in a study conducted in 2008, projected triple digit growth for Bangladesh in IT services and software exports (Karim 2010). Bangladesh was also listed as one of the top 30 Countries for Offshore Services in 2010–2011 by Gartner (2013). The Internet penetration has also grown to 21.3 percent in 2012, up from 3.2 percent three years prior. As the Internet usage increases, the government expects the IT sector to add 7.3 percent to GDP growth by 2021 (Bangladesh Sangbad Sangstha 2013).

The occupational health and safety service in Bangladesh is still in the developmental stage. The main laws related to occupational health & safety in this country is the Factory Act 1965 and the Factory Rule of 1979. In USA Occupational Safety and Health Administration (OSHA) are

referred for the permissible levels or various standard limits for working environment. In Bangladesh no such organization or agencies have been developed which could be a referral center for different standard or occupational permissible limits. As such the prevalent rules and regulations in Bangladesh are insufficient or inadequate in terms of standards and permissible limits. Moreover, the enforcement department, the department of inspection, which is poor in quantity as well quality, could not effectively enforce to improve the occupational safety and health in Bangladesh (National Institute of Preventive and Social Medicine 1999). Considering the above problems, the study therefore seeks to assess the prevalence and pattern of the computer professional's health hazards in relation with their ergonomics setting in Dhaka city.

1.2 Objectives of the study

The broad objective of the study is to assess health hazards and safety issues regarding work environment of the information technology professionals in Dhaka city.

The specific objectives are:

1. To examine the prevalence and pattern of computer related health hazards among the computer professionals in Dhaka city
2. To examine the key health and safety risks faced by the computer professionals
3. To assess the attitudes of the professionals towards health hazards
4. To explore the association between the computer professionals' health hazard and their working environment
5. To identify interventions by government, employers and employees to manage work place risks

1.3 Importance of the study

Conceptually, the study focused on the health hazard and safety issues of the operations of people in the information technology sector in Dhaka south and north Metropolitan Area. In more specific terms the following categories of workers were studied.

- Software programmers
- Web developers
- Designers

- Network engineers
- Business analysts

The above categories of workers were selected because they are considered to be prone to a number of occupational hazards (Shrivastava 2012; Prasad, Wagh and Mudey 2014). The study therefore considered the risks each of the category faced considering their work environment, gender and their work demands. The study also reviewed various policies and laws that make provision for health and safety to find out possible reasons why they are not being implemented.

Geographically, the study was limited to the Dhaka Metropolitan area because it is the capital of Bangladesh and largest IT region in the country.

1.4 Research questions

The study seeks to answer the following questions:

- What is the prevalence and pattern of computer related health hazard among the computer professionals?
- What are the key health and safety risks faced by the computer professionals?
- What are the professionals' attitudes towards the health hazards?
- What is the association between the computer professionals' health hazard and their working environment?
- What measures have been put in place by government, employers and employees to manage workplace risks?

1.5 Outline of the thesis

The study was organized into nine chapters. Chapter one focuses on the general overview of the study comprising the introduction to the study, problem statement, research questions, research objectives, methodology and the scope of the study. Chapter two, three and four reviews literature on the concept of Occupational Health and Safety, the occupational health hazards associated with the service sector globally and locally, the economic and social cost of injuries and diseases of the sector and the international laws and conventions respectively. Chapter five presents a conceptual framework which gave a summary of the entire review and also served as a

baseline for the generation of questionnaire. Chapter six presents the profile of the study area to provide a basis for understanding the study components. A detailed research methodology was also undertaken. In chapter seven, results were analyzed and presented. Chapter eight consists of qualitative findings of the study. Finally the major findings, recommendations and conclusions were the focus of chapter nine.

CHAPTER TWO: OCCUPATIONAL HEALTH HAZARDS AND SAFETY OF THE COMPUTER PROFESSIONALS

2.1 Introduction

The chapter reviews available literature on the concept of Occupational Health and Safety (OHS), Technology and human body, the effects of new technology in human lives, information technology and risk, computer related health hazards, the influence of technology on physical and mental health, workplace health promotion roles and responsibilities, occupational health management and approaches for improving Occupational Health and Safety.

2.2 The Concept of Occupational Safety and Health (OSH)

Occupational safety and health (OSH) is generally defined as the science of the anticipation, recognition, evaluation and control of hazards arising in or from the workplace that could impair the health and well-being of workers, taking into account the possible impact on the surrounding communities and the general environment. This domain is necessarily vast, encompassing a large number of disciplines and numerous workplace and environmental hazards. A wide range of structures, skills, knowledge and analytical capacities are needed to coordinate and implement all of the “building blocks” that make up national OSH systems so that protection is extended to both workers and the environment (Ali 2008).

Occupational health and safety is a cross-disciplinary area concerned with protecting the safety, health and welfare of people engaged in work or employment. The goal of all occupational health and safety programs is to foster a safe work environment (Bohle and Quinlan 2007).

The International Labour Organization (ILO 1996) defines occupational health and safety as a discipline with a broad scope involving many specialized fields. In its broadest sense, it aims at:

- the promotion and maintenance of the highest degree of physical, mental and social well-being of workers in all occupations;

- the prevention among workers of adverse effects on health caused by their working conditions;
- the protection of workers in their employment from risks resulting from factors adverse to health;
- the placing and maintenance of workers in an occupational environment adapted to physical and mental needs; and
- the adaptation of work to humans.

Occupational health and safety encompasses the social, mental and physical wellbeing of workers. Successful occupational health and safety practice requires the collaboration and participation of both employers and workers in health and safety programmes, and involves the consideration of issues relating to occupational medicine, industrial hygiene, toxicology, education, engineering safety, ergonomics, psychology, among others.

A healthy workplace by WHO's definition is one in which workers and managers collaborate to use a continual improvement process to protect and promote the health, safety and well-being of workers and the sustainability of the workplace by considering the following, based on identified needs:

- health and safety concerns in the physical work environment;
- health, safety and well-being concerns in the psychosocial work environment including organization of work and workplace culture;
- personal health resources in the workplace; and
- ways of participating in the community to improve the health of workers, their families and other members of the community (WHO 1999).

2.2 Technology and human body

Technology influenced our daily life with its latest invention in every field. From the early history of human civilization, human life was always related with technology. Nowadays new information technology is a bit more complex with cloud computing, new methods of security.

Technology, together with commerce, has slowly robbed humans of their innate abilities and amputated them of their capacities. Today, many of us find ourselves in poor health, depressed,

isolated, alienated, alcoholics, drug addicts, overweight, stressed out, overworked, and exhausted. We are spending less and less time together in living face to face conversation and interaction with our families, friends, neighbors, and colleagues and more and more time working, consuming, eating, drinking, driving our cars, watching TV, being online on the computer, sending emails and text messages. We have given up so much in exchange for the glory and never-ending development of science, technology, and commerce, but we have little or no time for a few kind words with a neighbor or a friend or simply another human being whose path we cross during our busy days. This situation is in great need of our deepest attention and wisdom in order to find solutions for more harmony, wellness, and health for human beings everywhere, and also to set a balance between our use of technology and the time we spend in conversation and social interaction with others (Thiebaud 2010)

2.2.1 The effects of new technology in human lives

New science and technology is shaping the human life in various possible ways. Even one day new technology may one day lead to mainstream alternative fuel vehicles, virtual reality conferences, a worldwide network of personal wireless electronics, data-transmission at the speed of thought, space travel for civilians, reversal of global warming so on.

Computer science is everywhere in medical, business, gadget, IT, space, education, etc. Better health, more knowledge and more power at our finger-tips are the main concern of computer science and technology. Students and professionals, working mothers or for home-based jobs, from businesses to medicine, from education to aviation, from government departments to the corporate trading world, everywhere computers are used. Business technology is developing everyday to help companies get an edge on their competition as well as bring more engaging products and services into the market place. New business technology will lead to more productivity; it will also create more competition. One who prays for rain, one should also prepare for mud- an ancient phrase. Rain is a wonderful occurrence in nature that nourishes the world, provides it with water and helps it yield all sorts of fruits. However, with ending up the rain, muddy grounds and floods use to result into mudslides. This example of rain fits beautifully in the picture when considering equally innumerable benefits of Information Technology. The fact that the ability to disseminate information from one person to another with great facility has

nourished the world in a special way is indispensable. It has revolutionized the world we live in and made it a small village; a global village as some call it. The nature of the relationship between information technology and human life is very correlative.

Human kind has always been communicative. Human intellect is to know and to love, the trajectory nature of human beings is to seek knowledge and love. The knowledge and love takes place in an environment of reciprocation. The quality of this reciprocity enhances the quality of relationships. It is no small wonder that the ancients understood this earlier on when they coined the phrase: "I am because We are". Social order that the individual is forever subscribed to, then try acting without or against the society and/or the preset societal values. Writing revolutionized communication and information in unimaginable ways. It could be preserved for many centuries so that other generations would benefit from it. There was also an element of universality. Without lifting a finger, one could speak through a microphone and move big masses of people through radio and television.

Computers and internet became the pinnacle of communicational development. In the twenty first century to be beneficiary of this hi-tech world, we are privileged. Personal Computer began to facilitate the quality of communication. Accuracy and Speed became the default. The sheer output of work was ridiculously high. One computer could now do the job for a thousand people.

Ipod, ipad, blueberry, blackberry, Bluetooth and other unfathomable pads berries and teeth are the special category of miniature devices that are popping up day after day. Face book, twitter, iTunes, QuickTime, YouTube and all sorts of tubes consequently are the applications. Different organizations use these avenues to put their agenda out there so as to maximize outreach. Amazingly, society has determined that the web is the place to go so as to be heard. The blogosphere is now the new advertisement channel. With the dawn of this new web society, the value system has taken a paradigmatic shift. The society is or rather ought to be anchored on values. A new problem that was not foreseeable is now permeating the society. Things that people could not do in public, they can now hook up on a webcam and do them and then share them with the public. The line between the sacred and the profane has never been thinner.

Privacy has gone through the window, normalcy has taken the back seat and madness is on the driving seat. No set of values governing the process of disseminating information. The public

and the public are now so similar beyond the syntax. The resulting disintegration within the human relationships is inevitable and unless something is done urgently, lives will continue to be lost and the technological monster will engulf us. The advanced methods of communication have discombobulated the basic structure of familial relations. Thanks to cable television, internet, video games and ipads, a little chatting among family members is now considered interference. People spend their free time online and working hours online. There are no one for watching the kids and who is taking care of the spiritual needs of the adults.

2.2.3 Information technology and risk

Children or elderly, every one spends much of their waking hours at work. Work provides a number of economic and other benefits. People at work face a variety of hazards owing to chemicals, biological agents, physical factors, adverse ergonomic conditions, allergens, a complex network of safety risks, and many and varied psychosocial factors. Broadly, these include respiratory, musculoskeletal, cardiovascular, reproductive, neuro toxic, skin and psychological disorders, hearing loss and cancers. Risk factors include adequacy of exposure information and the applicability of health outcome data to all regions of the globe, and the inclusion of the relevant health outcomes in the global burden of disease (GBD) database of diseases and injuries. Exposure to occupational hazards can adversely affect the human body. For some risk factors there is a very clear connection between the exposure and the disease. Many risk factors cause more than one type of outcome of interest. For example, exposure to asbestos can result in malignant conditions of the lung and the pleura, malignant conditions of the peritoneum, and nonmalignant conditions of the lung (asbestosis). Some exposures, such as occupational noise, are well characterized. Others have not been well characterized or are multifaceted, but the condition they cause is clear (such as occupational injuries).

The Internet is an open, interoperable, global system that has yielded unprecedented economic growth and innovation. Breakdown of the single root zone structure and the creation of alternate roots would have significant implications to international trade since the global free flow of electronic information would be hampered (Blinder and Quandt 1997).

2.2.4 Computer related health hazards

Although it is unlikely that computer equipment will be dangerous itself, it can be used in ways which can be hazardous to health of staff. Ergonomics is an applied science devoted to incorporating comfort, efficiency, and safety into the design of items in the workplace (Shelly and Vermaat 2008). Studies done using ergonomics show that using the correct chair, keyboard, display device, and work surface configurations helps computer users work comfortably and efficiently and also preserve their health.

According to previous studies (Das 2012), the majority of computer workers experience some eye or vision symptoms, but what was not clear was if whether these problems occur to a greater extent in these workers than in others who work in other visually demanding occupations. A national survey of doctors of optometry found that more than 14% of their present patients with eye or vision-related symptoms resulting from computer work.

Working on a computer for a long period of time cause different types of forearm and wrist Cumulative Trauma Disorders, which are inflammation of tendons, nerve sheaths, and ligaments and damage to the soft tissues. Tenosynovitis, ganglion cysts, de Quervain's disease, lateral epicondylitis, and carpal tunnel syndrome are different types of CTDs caused by computer use. Symptoms of CTDs are pain, numbness, tingling, or weakness in muscles or movement of arms, hands and fingers.

The Health and Safety Work Act explains how employers must minimize risks for all workers and also the legal standards for computer equipment. There are four main regulations that cover the use of computer equipment under the Health and Safety Work Act. These regulations are the Health and Safety (Display Screen Equipment) Regulations 1992, the Management of Health and Safety at Work Regulations 1992, the Provisions and Use of Workplace Equipment Regulations 1992 and the Workplace (Health, Safety, and Welfare) Regulations 1992.

In today's society, it is very unusual to obtain an occupation that does involve the use computers. Computers are utilized by employees and employers in convenience stores, office buildings, factories and even in fast food restaurants. But has it ever occurred to these employees and their employers that repeated computer use can cause minor, and sometimes major, health issues.

A study was done among 200 IT professionals in the NCR (Suparna, Sharma and Khandekar 2005) to evaluate the computer related health problems and role of ergonomic factors. The result revealed that there was approximately 93% of computer related morbidity in the subjects. The visual problems were noticed in 76 percent and musculo-skeletal in 77.5 percent. Furthermore, 35 percent faced stress. About 81.3 percent subjects had inadequate lighting and 76.3 percent were not using antiglare glasses/lenses because of what they suffered from considerable visual problem. About 80.2 percent of the total 152 subjects did not have the monitor at correct distance reported with visual discomfort. The subjects with improper ergonomics were higher in number for complaining musculoskeletal disorders.

Medically, we call it as Repetitive Stress Injury what are health issues because of the profession. The synonyms for this include regional musculoskeletal disorder, cumulative trauma disorder, occupational overuse syndrome (or simply overuse syndrome) and repetitive motion injuries or disorder. It's not that just IT professionals have health issues but anyone who does the same thing will suffer from one or the other problem the BlackBerry phone user uses the thumb several hundred times a day.

Problem with the computer use

They are there to help us but then we forget about health, about ourselves. Let's look at some important points to get into the topic

The posture –how one sit in front of the computer

The distance –how far is computer from one's eyes

The level –at what eye level the computer is fixed

Lack of motion & repetition – the body movement while using computers for whole day

The breath –the air one breathe in

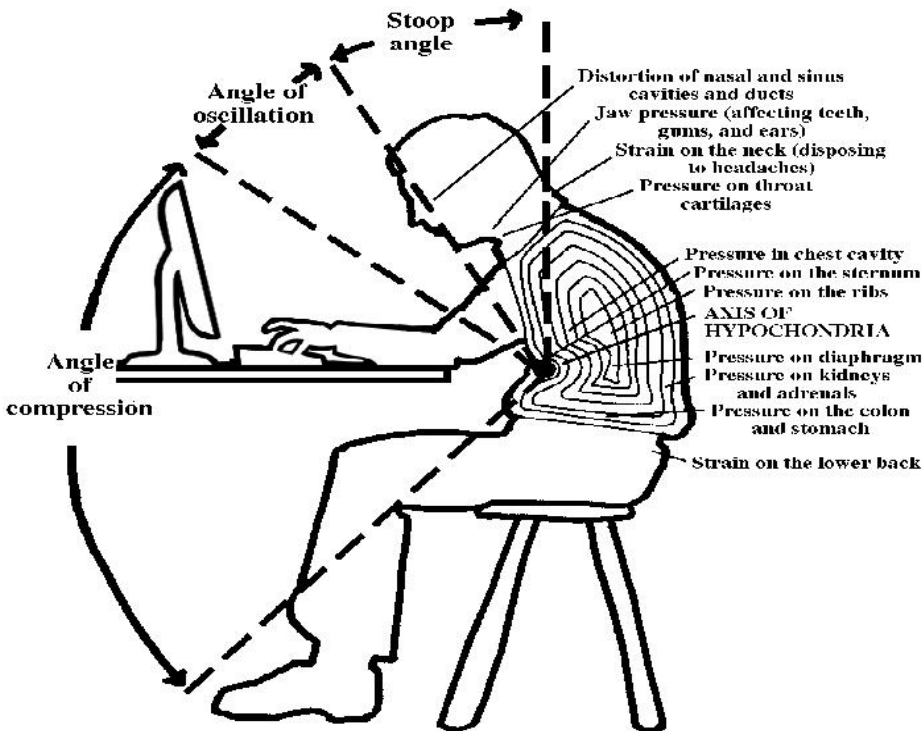
Internet –how close one is with this buddy

The Health Issues Due to Posture

Back Pain or Low Backache –the lower portion of back pains. The problem becomes severe that you cannot bend forward. This is typically noticed when you get up from your seat after sitting

for long hours. Your body feels stiffened and you take a few minutes to get back into your flexible movement.

Figure 1.1: Poor posture leads to multiple health problems



Source: Stigliani (1995).

Computer Eye Strain

Eye strain, dark circles and redness –the eyes are most delicate part of our body. If one has less distance between eyes and the monitor, the rays coming from it will affect the eyes badly. **Computer Vision Syndrome or Dry Eye Syndrome** –The eyes are red, itchy and constantly irritating. The simple reason is the screen, its radiation and resolution.

Surveys of computer workers (Shrivastava 2012) shows that eye and vision problems are the most frequently reported health-related problems, generally occurring in 70 to 75 percent of computer workers. Working at a computer is visually demanding because of frequent saccadic eye movement, continuous focusing, and alignment demands. Visual problems occur when the visual demands of the task exceed the visual abilities of the individual to comfortably perform

the task. These tasks involve repetitious muscular activity; therefore many computer related vision problems can be considered a form musculoskeletal disorder. These problems are commonly referred to as cumulative trauma disorders (CTDs) or repetitive stress injuries (RSIs).

Computer Vision Syndrome (CVS) is another vision problem associated with repetitive or extensive computer use. CVS is the complex of eye and vision problems related to near work which are experienced during or related to computer use. CVS is characterized by visual symptoms which result from interaction with a computer display or its environment. Some ways to help reduce vision related problems due to computer use are to reduce or eliminate the amount of glare on the computer screen, make sure the screen and characters on the screen are large enough to be seen and read, take breaks every 30 minutes by looking away from screen for about 10 seconds, and drink plenty of water and blink frequently to keep the eyes lubricated. Working on a computer for a long period of time can cause different types of forearm and wrist CTDs, which are inflammation of tendons, nerve sheaths, and ligaments and damage to the soft tissues.

Neck pain (Cervical Spondylitis)

Cervical Spondylitis (neck pain) –this happens due to improper level of the computer screen and one's eyes. Constant looking low at the monitor will cause this problem as it will stiffen the muscles of the neck and make them rigid.

Heart problem

Heart Problem – A study revealed that the men with more than 23 hr./week of sedentary lifestyle were 64% greater risks of dying from cardiac arrest as compared to those who with less than 11 hr./week. For IT guys, this is alarming. The increase in cholesterol in IT professionals could be due to improper food timing, junk food, lack of motion and exercises. Improper breathing, chronic constipation, and poor blood circulation can also cause this issue (Sharma, Khera and Khandekar 2006).

Obesity in IT professionals

Obesity or overweight –this is typical problem that IT professionals face these days. The reason is simple again, lack of motion, activities and exercises. Constant sitting on the chair in front of the computer add extra pounds to the body.

Carpal Tunnel Syndrome

Carpal Tunnel syndrome, is a condition that occurs when the median nerve is squeezed as it crosses the wrist to enter the hand. The median nerve arises at the level of the sixth cervical vertebra in the neck. It supplies the muscles of the forearm, which pronate the arm. It has been recognized that repetitive movement at the wrist, as occurs with prolonged use of a computer keyboard can lead to inflammation in the carpal tunnel leading to carpal tunnel syndrome. The clinical signs and symptoms include numbness and tingling in the thumb, index and middle finger. If the symptoms are not very severe, carpal tunnel syndrome can be treated conservatively with rest, warm compresses, wrist splints, anti-inflammatory medications and steroid injections. If the symptoms are severe, a surgical carpal ligament release procedure may be necessary.

eThrombosis

Deep vein thrombosis; in other words, the clots deep in the legs. This happens due to lack of motion in the legs. The legs bear heavy flow of the blood because of the gravitational force. This major health problem in IT professional is due to long sitting hours on the computer without any physical movement of the legs. The vein in later stage become stiffened, start paining and then gives unbearable sprain and rigidity in the legs. A 32-year-old person lost his consciousness after a few weeks suffering a swollen calf. A massive clot caused as it moved from veins in his leg to the lungs, what we call a pulmonary embolism. The experts found no such risk factor for the clot, except long hours (more than 12 hr. a day) of sitting on the computer.

Multiple health issues due to lack of proper breathing

One of the commonest problems have been observed in IT companies is lack of ventilation. While the dwelling is initially planned with central air conditioning, the scope of putting windows for ventilation is always ignored.

Poor ventilation

The level of carbon dioxide is raised when lot many people exhale in poorly ventilated hall. The brain receives less oxygen and over the period of time, there could be mental health disorder including depression, anxiety, lack of concentration and any such issue what is mental health related. Poor breathing pattern also invites weakness of muscles, sleeplessness (insomnia), improper eye-to-hand coordination, decreased memory, strains and pains in the body, and poor blood circulation.

Repetitive Strain Injuries (RSI)

Repetitive strain injuries are on the rise with increased computer use, faulty typing techniques, poor body posture and positions. Lack of adequate rest between work and excessive use of force while using the mouse or the keyboard can lead to repetitive stress injuries (RSI). The symptoms of RSI are tightness, discomfort, stiffness, burning in the hands, wrist, fingers, forearms and elbows. Tingling, coldness and numbness of the hands with loss of strength and lack of coordination occurs. There is pain in the upper back, shoulders and neck and a need to massage them.

2.2.5 Internet addiction

Computer Addiction or Cyber addiction or Internet Addictive Disorders

The symptoms of computer addiction are quite specific. The psychological symptoms are, Having a sense of well-being or euphoria while at the computer. Inability to stop the activity and craving for more time at the computer. Neglect of family and friends, lying to employers and family about his activities. Along with the psychological symptoms, physical symptoms like carpal tunnel syndrome, dry eyes, migraine, headaches, backaches, eating irregularities, failure to attend to personal hygiene, sleep disturbances are also known to occur. Computer related injuries which began to be reported in India five years ago are now developing into an epidemic among computer users. It is estimated that world-wide, 25% of computer users are already suffering from computer related injuries. The United States has to shell out more than 2 billion US dollars annually for having ignored these computer related problems. It is now proved that the duration of work and computer-related problems are positively correlated. It is not uncommon these days for people having to leave computer-dependent careers or even be permanently disabled and

unable to perform tasks such as driving or dressing themselves. Occupationally caused RSI rank first among the health problems, in the frequency with which they affect the quality of life.

2.4 Workplace health promotion roles and responsibilities

The occupational health and safety of employees and visitors to workplace is an important issue for both employees and employers (Doan 2001).

Employer's Role

The safety and health policy should reflect the responsibility of employers to provide a safe and healthy working environment. The measures that need to be taken will vary depending on the branch of economic activity and the type of work performed; in general, however, employers should:

- provide and maintain workplaces, machinery and equipment, and use work methods, which are as safe and without risk to health as is reasonably practicable.
- In taking preventive and protective measures, the employer should assess the risk and deal with it in the following order of priority:
 - eliminate the risk;
 - control the risk at source;
 - minimize the risk by means that include the design of safe work systems;
- ensure that, so far as reasonably practicable, chemical, physical and biological substances and agents under their control are without risk to health when appropriate measures of protection are taken;
- give the necessary instructions and training to managers and staff, taking account of the functions and capacities of different categories of workers; provide adequate supervision of work, of work practices, and of the application and use of occupational safety and health measures;
- institute organizational arrangements regarding OSH adapted to the size of the undertaking and the nature of its activities;

- provide adequate personal protective clothing and equipment without cost to the worker, when hazards cannot be otherwise prevented or controlled;
- ensure that work organization, particularly with respect to hours of work and rest breaks, does not adversely affect the safety and health of workers;
- take all reasonable and practicable measures to eliminate excessive physical and mental fatigue;
- provide, where necessary, for measures to deal with emergencies and accidents, including adequate first-aid arrangements;
- undertake studies and research or otherwise keep abreast of the scientific and technical knowledge necessary to comply with the obligations listed above;
- cooperate with other employers in improving occupational safety and health (Ali.2008).

An integral part of an employer's duty is to engage in risk management processes in the workplace. This is a system which identifies the occupational health and safety risks that are relevant to a particular workplace. A risk management system should be flexible and up-to-date to reflect the safety issues associated with a company's daily operations. A risk management system involves identifying hazards, assessing risks, controlling the risks and reporting accidents (Doan, 2001)

Workers' duties and rights

The cooperation of workers within the enterprise is vital for the prevention of occupational accidents and diseases. The enterprise's safety and health policy should therefore encourage workers and their representatives to play this essential role: specifically, it should ensure that they are given adequate information on measures taken by the employer to secure occupational safety and health, appropriate training in occupational safety and health, and the opportunity to enquire into and be consulted by the employer on all aspects of occupational safety and health associated with their work. The policy should outline the duty of individual workers to cooperate in implementing the OSH policy within the enterprise (Ali, 2008). In particular, workers have a duty to:

- take reasonable care for their own safety and that of other persons who may be affected by their acts or omissions;
- comply with instructions given for their own safety and health, and those of others, and with safety and health procedures;
- use safety devices and protective equipment correctly (and not render them inoperative);
- report promptly to their immediate supervisor any situation which they have reason to believe could present a hazard and which they cannot themselves correct;
- report any accident or injury to health which arises in the course of or in connection with work (Ali, 2008).

Workers also have certain basic rights in respect of occupational safety and health, and these should be reflected in the enterprise's policy. In particular, workers have the right to remove themselves from danger, and to refuse to carry out or continue work which they have reasonable justification to believe presents an imminent and serious threat to their life or health. They should be protected from unforeseen consequences of their actions. In addition, workers should be able to:

- request and obtain, where there is cause for concern on safety and health grounds, inspections and investigations to be conducted by the employer and the competent authority;
- know about workplace hazards that may affect their health or safety;
- obtain information relevant to their health or safety, held by the employer or the competent authority; and
- collectively select safety and health representatives.

Access to better information is a prime condition for significant, positive contributions by workers and their representatives to occupational hazard control. The enterprise policy should make sure that workers are able to obtain any necessary assistance in this regard from their trade union organizations,

which have a legitimate claim to be involved in anything that concerns the protection of the life and health of their members (Ali, 2008).

2.5 Occupational health management

Occupational health case management is actually a system that tracks each incident that relates to employee health and safety. It integrates the entire plan of an organization into a unified whole that assumes complete responsibility for each employee. This means that it is concerned with prevention as it is with health care after an accident. The goal of Occupational Health and Safety is to do everything that can be done to prevent accidents and minimize illness. Ultimately, that is all that can be done, but it is also considerably more than has been done in the past (Cruickshank 2010).

Constant monitoring and auditing of the safety conditions of the workplace is essential. This monitoring includes the individual employee. A health record can be kept on the employee as part of their other employment records. This process starts with a physical examination appropriate to the type of work that is done. It would be followed up by routine safety meetings stressing health related issues such as safety gear and proper lifting techniques (ILO 2001).

When a health issue develops, either as a result of illness or accident, the employee must be covered by a health plan that is part of the overall health care system. These selected health care providers must do more than just provide "medical insurance". They must also be aware of the health and safety situation of the employer as well as the employee. Careful follow up and record keeping of every health situation can provide ideas for improving the environment for others. Occupational health should no longer be taken for granted, but rather be managed and controlled for success in organizations (Cruickshank 2010).

2.6 Approaches for improving Occupational Health and Safety

There are many different systems for supervising and improving occupational safety and health. Gustavsen (1996) in his study identified three categories of improving OHS namely; A specification model- where laws and regulations are at the core and where the main actors are various types of experts. In Sweden, for example, the Working Environment Act provides for the establishment of a safety committee that plans and supervises safety activities. It also provides for the appointment of one or more workers' safety delegates who have wide powers of inspection and access to information. This combined force is authorized to order work to be

suspended when it considers a situation to be dangerous, pending a ruling by the labour inspection service and despite opposition by the employer. No penalty can be imposed on a safety delegate whose decision to have the work suspended is not confirmed by the labour inspector, and the employer cannot claim any compensation for the suspension from the safety delegate or trade union organization.

A procedure-based model- where the potential of a rational systems approach is at the core and the line organization is the main actor, e.g. internal control. In principle, it is a system for monitoring the work environment and for defining remedial action, with a strong resemblance to modern quality control systems (Gustavsen, 1996). The idea is to identify errors and rely on the ordinary line organization to correct them. Essentially, the point is to bring health and safety into the orbit of ordinary managerial concerns and actions. In return for this involvement, management is given a certain authority to use its own discretion in defining problems and priorities. The role of the labour inspection is defined as systems supervision where the primary point is to ensure that each enterprise has an adequate system in place. In general, it would seem that the participation of workers in the inspection of working conditions and the working environment will continue to increase, particularly in countries that have introduced "self - inspection regimes" or internal control was introduced in Norway and Sweden during the 1990's. Such regimes depend, however, on effective and aggressive workers' organizations and their active involvement in the audit process at the enterprise level, which is the centre-piece of any such "self inspection.

Gustavsen (1996) once again argues that it does, this was based on a study of about 1300 Swedish workplaces. The study suggested that if there is broad active involvement, there will be strong positive improvements in work environment conditions as well as in productivity. When health and safety was part of an overall process of improvement and integrated with efforts to promote productivity there was a clear management motivation. The idea of continuous improvement is widespread in working life today. Originally introduced by the Japanese, it has become a globally accepted practice and in most versions active participation from all concerned is a part of the concept. In sum, all three approaches described above are important. While expert competence is necessary in dealing with, for instance potentially toxic substances, work postures can hardly be changed without some kind of participation from those concerned.

2.7 Overview of computer professionals in Bangladesh

With 150 million people in an area of 55,598 square miles, Bangladesh is now the eighth largest in the world in population with high density. With such a large population, poverty is rampant, and there is a lack of educational and medical resources. Bangladesh has about five decades of experience in using computers. In its early days the ICT sector in Bangladesh mainly focused on hardware operations. The first ‘second generation’, world mainframe, computer was installed in 1964 at Dhaka University. Soon after this several large banks and industrial concerns started using computers, mainly for accounting and payroll applications. The Bangladeshi gas and electricity companies also began using computer systems for their customer billing. Unfortunately the financial crisis that the country faced after its independence in 1971 hampered the expansion of computer use in the Bangladeshi corporate sector. In 1982 a computer center was established at the Bangladesh University of Engineering and Technology. This center, later renamed the Department of Computer Science & Engineering, has played a pivotal role in Bangladeshi IT education since its inception. Although a bright prospect exists for Bangladesh in the export oriented production of ICTs (especially software), the industry is engulfed with many problems: very low telephone density, insufficient number of ICTs as a new tool to attract and teach present and future work force and to improve co-operation with different stakeholders, low pace of computerization in various offices and sectors, absence of cyber laws, power outages etc (Islam 2005).

ICTs have the potential to support the development strategy of “leapfrogging” i.e., bypassing heavy infrastructure building it is possible for a developing economy to transform itself directly into a knowledge economy. For example, during the last half of the twentieth century, substantial achievements in few countries which succeeded in narrowing the economic divide separating them from the industrialized world often involved the export-oriented production of ICTs (Hobday 1995).

The government of Bangladesh has declared ICT as a “thrust” sector. The creation of a separate Ministry for ICT (Ministry of Science and Information Technology) and initiation of government ICT projects are encouraging steps for the local and international investors in ICT industry in

Bangladesh The information technology industry in Bangladesh has gradually come of age and today accounts for more than Taka 25 billion or USD350 million in annual revenues.

It is still a tiny blip compared to a GDP nearing USD100 billion but it's a noticeable blip that is growing markedly every year. Twenty years ago the IT industry was predominantly a hardware vendors market with little or no value addition locally. Today there are more than 320 software and IT services firms registered as members of the Bangladesh Association of Software and Information Services (BASIS) that adds in excess of USD100 million in value through a full spectrum software and IT services for both domestic as well as overseas clientele (Karim 2010).

Though software has been a relatively late entrant in Bangladesh ICT market, it has become now the most promising export sector of Bangladesh. At present, there are over 4500 registered software companies in the country with over 5,000 professionals working in this sector. Quality software is being produced in the country and exported regularly to 30 countries in this world including USA, Japan, Canada, Australia and different European states (Bangladesh Economic Survey, 2007, cited in Laila 2008).

The World Bank in a study conducted in 2008 concluded that as one of the largest Anglophone countries in the world Bangladesh is poised for triple digit growth in its export of software and IT services. The WB projects such exports to exceed USD500 million by 2014. In another development the Geneva-based International Trade Centre in a study on the IT-enabled services industry concluded that this segment of the software and IT services industry will reach USD150 million in export revenue by 2011. In a related study conducted by the Japan International Cooperation Agency (JICA) in 2007-08, they ranked Bangladesh ahead of all other offshoring countries in Asia except India and China on software and IT services competencies. However, in terms of competitiveness Bangladesh ranked at the top. With such favourable assessments of the software and IT services industry here, it's no wonder that many global software and IT services companies are setting up their captive operations here and at the same time many local players are going global with their offerings. It's time this industry took to the wings and reached ever greater heights for all to see (Karim 2010).

Along with infrastructure development, it is equally important to take measures for the ICT industry to grow. Hardware and software manufacturing sectors under ICT industry will help create huge employment opportunities. In Bangladesh, the Information Technology (IT)/Information Technology Enabled Services (ITES) industry helped create US\$ 300 million market and generated 50 thousand employment opportunities. A good number of Bangladeshi companies have already begun exporting software/ITES services. In FY 2009- 10 and 2010-11, they earned US\$ 80 millions. In 2011-12, this earning went up to US\$ 100 million which is an increase of 25 percent over that of 2010-11. If appropriate steps are taken, the growth rate of IT/ITES will accelerate from existing 50 percent to 100 percent in the next five years. One of the major components of ICT industry is providing outsourcing services. High priced services in developed countries are usually outsourced to countries in developing world where the same service can be rendered in a much cheaper way and thus these countries can generate growth in their respective ICT industries. Our neighbouring country India is a case in point. However, in this respect, Bangladesh is not far behind. In the meantime, Bangladesh following the rating by an internationally reputed organisation has been included in the list of 30 most preferred countries in respect of IT/ITES outsourcing in December 2010. Now there is a discernible positive change in the status and prospect of Bangladesh as a reliable outsourcing service provider. At least 10 international ICT companies have established their production/research centres in Bangladesh in the last 3-4 years. This is creating employment opportunities for Bangladeshi ICT experts/workers. It is now anticipated that the large multinational companies, too, may come forward to invest in Bangladesh as it has secured a position in the list of best 30 preferred destinations for outsourcing (MOF 2013).

Table 1.1: Current Status of ICT sector in Bangladesh

Category	Number	Amount
Size of IT industry	Around US\$ 120 million per year (including export)	Except telecommunication sector
Software industry	Around US\$ 30 million	
Software company	800	<ul style="list-style-type: none"> • Currently 160 companies export software to 60 countries and 30 companies are doing outsourcing jobs. Besides, companies have started getting involved in Offshore Development Centre (ODC) and joint venture activities. • 60% of the companies depend on local market, whereas 40 percent are export oriented
IT professional working in IT industry	20,000	
Human Resource working in IT industry	30,000	
IT professional working elsewhere	35,000	Working in business enterprises, government telecom, NGOs etc.

Source: Journey Towards a Digital Bangladesh, Ministry of Finance 2013.

CHAPTER THREE: INTERNATIONAL CONVENTIONS AND GUIDELINES RELATED TO OCCUPATIONAL HEALTH AND SAFETY

3.1 International Convention

There are several International organizations dedicated to improving occupational safety and health. The most prominent of these are the International Labour Organization (ILO), and the World Health Organization (WHO). Occupational Health and Safety has also been an important issue for the United Nations Conference on Environment and Development (UNCED).

3.2 The International Labour Organization

The International Labour Organization (ILO) which seeks to promote safe and decent work in all countries of the world is a member of the United Nations organizations. It is responsible for the formulation of international labour standards in the form of Conventions and recommendations. Since 1919, the International Labour Organization has approved and published nearly 190 Conventions, which are statements of legally binding international treaties related to various issues regarding work and workers. They cover a wide range of working conditions such as hours of work, the right of association for workers, child labour, employment discrimination, labour inspections, maternity leave, health and safety, workers' compensation, medical examinations, minimum working age, holidays with pay, and contracts of employment for indigenous workers.

Hogstedt and Pieris (2000) identified the major objective of the ILO in relation to occupational safety and health as enabling countries extend social protection to all groups in society and to improve working conditions and safety and health at work through its InFocus Programme which covers working conditions. The objectives of the Safe Work Programme are;

- To create worldwide awareness of the dimensions and consequences of work-related accidents, injuries and diseases

- To promote the goal of basic protection for all workers in conformity with international labour standards; and
- To enhance the capacity of member States and industry to design and implement effective preventive and protective policies and programmes.

The ILO provides for the adoption of a national occupational safety and health policy and describes the actions needed at the national level and at the enterprise level to promote occupational safety and health and to improve the working environment. The ILO Occupational Health Services Convention 1985 (No. 161) and Recommendation (No. 171), provide for the establishment of occupational health services which will contribute to the implementation of the occupational safety and health policy and will perform their functions at the enterprise level. Within the ILO is also the International Safety and Health Information Centre (CIS) in Geneva, Switzerland. The major objective of CIS is to be a worldwide service dedicated to the collection and dissemination of information on the prevention of occupational accidents and diseases (OHS Convention 1985).

A safe and healthy work environment is the basic right of every worker. However, the global situation falls far short of this right. The International Labour Organisation (ILO) estimates that more than 125 million workers are victims of occupational accidents and disease in a single year. Of these approximately 220,000 workers die and about 10 million are seriously disabled.

3.3 World Health Organization (WHO)

The World Health Organization was established in 1948 to improve the health status of working populations. WHO has an occupational health programme with emphasis on data collection and analysis, research, formulation of strategies and recommendations for hazard prevention and control, human resource development with special emphasis on developing countries. It is responsible for offering technical advice and expertise on health and safety by setting hygienic standards, promoting medical services and medical examinations.

WHO's way of solving health problems vary substantially according to the national and local needs and conditions, cultural influences, resources and other local factors. Currently, there is a network of occupational health institutes assigned as WHO collaborating centers. The policy

objective of this collaboration is —a global strategy for occupational health for all with 10 priority objectives. These objectives according WHO (1994a) include;

- Strengthening of national policies for health at work and development of policy tools.
- Development of healthy work environment
- Development of healthy work practices and promotion of health at work
- Strengthening of Occupational Health Services (OHS)
- Establishment of support services for occupational health
- Development of occupational health standards based on scientific risk assessment
- Development of human resources for occupational health
- Establishment of information systems
- Strengthening of research
- Development of collaboration in occupational health and with other activities

3.4 International Organization for Standardization (ISO)

The International Organization for Standardization (ISO) is the world's largest developer and publisher of international standards. It is a non-governmental network of the national standards institutes of 162 countries. It develops standards that are based on the best scientific evidence available, and which are agreed to by consensus among all participating nations (ISO/IEC, 2007).

3.5 South Asian Association for Regional Cooperation (SAARC)

The South Asian Association for Regional Cooperation (SAARC) was formed by the governments of Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka in 1985 to catalyze regional cooperation in economic and social development in the member countries. In 2007, Afghanistan joined SAARC. The core areas of cooperation among the SAARC countries are agriculture and rural development; health and population activities; women, youth, and children; environment and forestry; science, technology, and meteorology; human resource development (HRD); and transport.

The South Asian region (Bangladesh, India, Nepal, Pakistan, Sri Lanka) is a large block in terms of population, natural resources, and gross domestic product. The work force represents more than 20 percent of the world's working population.

In SAARC countries, Health and Safety Assessment Series (OHSAS-18001), is very common and this is an international standard for occupational health and safety management system. Many multi-national and local industrial enterprises in the region follow this system to improve their productivity under the umbrella of local laws. The local laws also encourage the activity of health and safety at workplace. National Institute of Occupational Safety and Health (NIOSH) USA formulate rules and regulation concerning health and safety while Occupational Safety and Health Administration (OSHA) is regulatory and implementing authority. The multinational companies have their own guidelines in accordance with that of these and other international agencies to implement (Hasan 2012).

Besides, the individual countries in South Asia region have their own policies and laws to promote and promulgate standards on occupational health and safety at the workplace. The Government of India has the National Policy on Safety, Health and Environment at Work Places in February 2009. The policy provides general guidelines for all stakeholders to develop a safety culture and environment in work places (Pingle S. 2012).

In Afghanistan, “Ensuring Health and Safety Conditions of Labour Law” describes the workplace requirement for safety of employees. In Bhutan, The Ministry of Labour and Human Resources is the main government organization in OSH activities. In Maldives, Work Place Safety and Employees Health is covered under „Employment Act, 2008 and the Ministry of Health is concerned with workplace health and safety. In Sri Lanka, there is a National Institute of Occupational Safety and Health Act, No. 38 of 2009 deals with occupational safety and health issues and covers many aspects related to work ailments.

The Constitution of Islamic Republic of Pakistan guarantees safe and humane working conditions at the workplace. Article 37(e) makes provision for securing just and humane conditions of work. The Constitution also guarantees that children and women are not employed

in vocations which are unsuitable to their age or sex and for maternity benefits for women who are employed.

The Labour Policies of 2002 and 2010 clearly highlight provision of safe and hazard free working environment and constitution of “National Health and Safety Council”. The National Labour Protection Policy, 2005 stipulates that “employers have a responsibility to ensure that hazards at the workplace are eliminated, minimized, or controlled in such a way that work accidents are avoided. Enterprises of all size in all sectors must develop a safety and health culture and introduce policies that transform intention into practice. Employers are also required to take measures for elimination and reduction of hazards causing occupational diseases and illness”. Under the 18th Amendment in the Constitution of Islamic Republic of Pakistan, the subject of labour was devolved to the Provinces in 2010. Now, the Provinces are responsible for legislation and formulation of policies in the field of labour and health and safety at the workplace.

India has had legislation on occupational health and safety for over 50 years. India was under British rule in the 19th and the early 20th century, hence the principal health and safety laws are based on the British Factories Act. The Factories Act, 1948 is amended from time to time, and especially after the Bhopal Gas disaster which could have been prevented. This demanded a shift from dealing with disaster (or disease) to prevent its occurrence. The Factories (Amendment) Act came into force on 1 December 1987. According to the article 24 – No child below the age of fourteen years shall be employed to work in any factory or mine or engaged in other hazardous employment.

CHAPTER FOUR:

OVERVIEW OF OCCUPATIONAL HEALTH AND SAFETY POLICIES IN BANGLADES

4.1 Occupational Health and Safety legislation in Bangladesh

People are the most important asset of every economical purpose. So the welfare and safety of the staff must be of paramount importance in every organization. Thus occupational health and safety should be a major consideration for successful businesses. Apart from looking after one's own personnel directly, a good set of Occupational Health and Safety (OSH) policies must have a secondary effect: on protecting co-workers, family members, employers, customers, suppliers, nearby communities, and other members of the public who are impacted by the workplace environment. Occupational Safety and Health have been repeatedly mentioned as a fundamental right of every worker, and are referenced in the Alma Ata Declaration on Primary Health Care (1978), the WHO constitution, the UN's Global Strategy on Health for All (2000), the ILO convention (1919) and in many other multilateral conventions and documents along with the National Labor Law of Bangladesh (Akram 2014).

According to a report prepared by ILO (2002) concerning the issue of occupational safety and health (OSH) in Bangladesh identified that occupational health and safety service in Bangladesh is still in the developmental stage. There are a number of other laws and regulations that are also have some provisions related to occupational health and safety. These laws have provisions on occupational hygiene, occupational diseases, industrial accidents, protection of women and young persons in dangerous occupations and also cover conditions of work, working hours, welfare facilities, holidays, leave etc. But most of the laws are lacking in standard values and not specific rather general in nature.

In Bangladesh, as in other developing nations the major considerations in industries are higher production and greater economic returns. The main economics centered on the employer's benefit. Little importance is focused on the social costs in terms of impacts on workers, society, and the environment. The impacts are compounded by inappropriate value of life considerations,

pain and suffering, opportunity costs and questions of equity. The estimates of direct economic costs and benefits are usually made keeping aside the ethical liabilities to the society as a whole. Entrepreneurs often consider the regulatory compliances and related administrative costs deterrent to productivity. As such occupational health & safety considerations remains ignored (ILO report 2002).

It is the high time to consider the Occupational Health and Safety in its true spirit in a holistic way. To understand the relationship of true social development with economic development through a system of good practices of occupational safety and health in work places should be realized by the policy makers, legislators, employers, and all other members of the society. Awareness should be build up about consequences of implementations of occupational safety and health standards.

4.2 The 2013 Constitution of the Peoples' Republic of Bangladesh

The constitution of Bangladesh adapted on the November 4th 1972 recognizes productivity as a basic need for economic development and covers the right to work and reasonable wages, medicare and, disease and disablement. And thus it is assumed the health and safety of industrial workers has been taken care of (ILO report 2002).

The Constitution of Bangladesh, in Article 14, states:

“It should be a fundamental responsibility of the State to emancipate the toiling masses – the peasants and workers - and backward section of the people from all forms of exploitation”.

The reality is that so much have to be done to make the above constitutional vision of worker emancipation from all forms of exploitation a reality. Economic reforms are obviously needed to put Bangladesh on the path of balanced, job-full and inclusive growth process. Political reforms are also needed to insure that growth is sustained in the framework of a stable democracy. In Bangladesh Occupational Health and Safety generally refers mainly to needs of workers of industries or some manufacturing process but does not completely cover all recognized occupations of the country.

In the Fifth Five Year Plan (1997-2002) for the labour and manpower sector the objectives relatable to OSH are:

- "To ensure fair wages, welfare and social protection of workers under the structural adjustment programmes adopted by the government."
- "To initiate steps to protect children from economic exploitation."

The 6th Five-Year Plan (2011-2015)

The 6th Five-Year Plan has been prepared to specify action plans over the medium term needed to implement the perspective plan. This Five-Year Plan will be the fundamental guiding instrument for the Government for implementing all the development activities. This Plan has again put particular emphasis on the development of ICT and set strategic objectives to implement the Government's commitments in the medium term (MOF 2013).

In the labour sector the OSH relatable programmes that were to be undertaken under the Sixth Five Year Plan included- Strengthening of Inspectorate of Factories and Establishments in terms of manpower and resources so as to enable them to enforce various labour laws/rules concerning working hours, working condition, safety, and maternity benefits in different mills, shops, factories and so on.

Table 4.1 Workers’ Rights Indicators

Occupational Safety and Health	Occupational Accidents, Hazards & Diseases	Accident prevention regulations, prevention from workplace hazards, safeguards against work-related diseases
	Safety Equipments/ Tools and Facilities	Fire extinguisher & emergency fire exit, protective kits, helmets, shoes etc.), safety measures
	Workplace Environment	Cleanliness, noise, temperature, ventilation, lighting, fumes, working space, drinking water, segregated toilet/washroom

Source: (Hossain, Ahmed and Akter 2010).

4.3 Bangladesh Labour Law, 2006

The labour law system is more than a century old in Bangladesh. The first labour law was enacted in the Indian sub-continent during the British period, in 1881. Subsequently, the British Government introduced several laws concerning different labour issues, e.g., working hour, employment of children, maternity benefit, trade union activities, wage, etc. The Factories Act (1881), Workmen's Compensation Act (1923), Trade Unions Act (1926), Trade Disputes Act (1929), Payment of Wages Act (1936), Maternity Benefit Act (1939), and the Employment of Children Act (1938) were remarkable labour laws enacted during the British period (ILO report 2002).

After the independence in 1971, the Bangladesh government retained the previous laws through the Bangladesh Laws Order (President's Order No. 48). It also enacted additional laws in response to the changing circumstances and needs of the working class and the country. In 2006, the country adopted the revised Bangladesh Labour Law of 2006 or BLL. The BLL is fairly comprehensive and progressive. The law is a consolidation and updating of the 25 separate acts. The comprehensive nature of the law can immediately be gleaned from its coverage -- conditions of service and employment, youth employment, maternity benefit, health and hygiene, safety, welfare, working hours and leave, wages and payment, workers' compensation for injury, trade unions and industrial relations, disputes, labour court, workers' participation in companies profits, regulation of employment and safety of dock workers, provident funds, apprenticeship, penalty and procedure, administration, inspection, etc (Hossain, Ahmed and Akter 2010).

The BLL is also considered an advance because it removes certain ambiguities in the old and diverse labour acts and aligns the labour law system with the ILO core conventions. On the removal of ambiguities, the definition of a “worker” is now very specific. Also, certain welfare and social benefits have been improved or instituted, e.g., death benefit (financial support to family of deceased worker), application of provident fund benefit to all workers in the private sector, expansion of maternity benefit from 12 to 16 weeks, adoption of group insurance for establishments with 200 or more workers, and increased employee compensation for work-related injury, disability and death (Hossain, Ahmed and Akter 2010).

On the ILO core conventions, Bangladesh has ratified the following International Labour Conventions (ILCs):

- ILC 29 (Forced Labour),
- ILC 87 (Freedom of Association and Protection of the Right to Organize),
- ILC 98 (Right to Organize and Collective Bargaining),
- ILC 100 (Equal Remuneration),
- ILC 105 (Abolition of Forced Labour),
- ILC 111 (Discrimination in Employment and Occupation), and
- ILC 182 (Elimination of the Worst Forms of Child Labour).

The BLL features the following key provisions:

Employment standards

- An employee or “labour” is defined as any person, including a trainee/probationer, whether the terms and conditions of his/her employment are expressly written or not, who is employed directly or through a contractor/agency, for any skilled, unskilled, physical, technical, business development or clerical job in any establishment or industry.
- Workers are classified into six categories:
 - a) Apprentice: A worker who is employed in an establishment as a trainee and during the period of training he is paid an allowance is called an apprentice.
 - b) *Badli*: A worker who is employed in an establishment for the period of temporary absence of a permanent or probationer worker.
 - c) Casual: A worker employed on a casual basis.
 - d) Temporary: A temporary worker in an establishment for work that is basically temporary in nature and is likely to be finished within a limited period.
 - e) Probationer: A worker provisionally employed in any establishment to fill up a post of permanent vacancy and his probationer period has not to be completed.
 - f) Permanent: A worker employed with a view to fill up a permanent post or if he completes satisfactorily his probation period in the establishment.

- The law defines who is responsible for payment of wages: employer/owner; chief executive officer (CEO); manager/person assigned responsible by the company; and the contractor, in case of worker appointed by the contractor.

However, the employer is allowed

- Termination simplicitor: to terminate services of worker without explaining any reason by giving a written notice of 120 days for permanent workers employed in a monthly basis and 60 days to other workers.
- Misconduct: to dismiss workers without serving prior notice due to worker's conviction for any criminal offence, or if the worker is proved guilty of misconduct, which may be any of the following: willful insubordination (alone or in combination with others) to any lawful or reasonable order, theft or fraud or dishonesty, taking or giving bribes, habitual absence without leave for more than 10 days, habitual late attendance, habitual breach of any rule or law applicable to the establishment, riotous or disorderly behavior, habitual negligence or neglect of work, frequent repetition of work on which fine can be imposed, resorting to illegal strike or to go slow or instigating others to do so, and falsifying, tampering the official document of the employer.
- Retirement age for workers employed in any establishment is 57 .
- Work hours are set at eight hours a day, 48 hours a week, with a weekly rest day.
- Overtime (OT) work is maximum of two hours a day. OT pay is twice the hourly remuneration.
- Workers are entitled to rest and meal in a day as follows:

one hour interval for over six hours work a day; (ii) half an hour interval for more than five hour work; and (iii) one hour interval once or half an hour interval twice for more than eight hours work a day.

- Workers are entitled to holidays, casual leave, festival leave, annual leave and sick leave.
- Every worker has the right to participate in company's profits/benefits.
- No young worker is permitted to work in any establishment between the hours of 7 p.m. and 7 am.

- No children (under 14 years of age) are allowed to work in any occupation or establishment. However, a child who has completed 12 years of age is permitted to do light work not harmful to his health, development and education.
- A 'Minimum Wage Board' is established to determine the minimum rates of wages in different private sectors, taking into consideration varied criteria: cost of living, standard of living, cost of production, productivity, price of products, business capability, and economic and social conditions of the country.
- Employers are mandated to observe equal wages for male and female workers for work
- of equal nature or value.
- Forced labour is prohibited.

In case of maintaining the healthy and safe working conditions there are some laws in Bangladesh which are followed by the reference of ILO and WHO. These rules are revised in many times and now the established one is known as "Bangladesh Labor Code, 2006".

On the basis of this labor code, laws which are described as "Health and Hygiene" is in Chapter 5 and "Safety" is in Chapter 6 from the pages: 68-90. In a brief of these codes cover the following conditions as health and hygiene issue: cleanliness, ventilation and temperature, dust and fume, disposal of wastes, artificial humidification, overcrowding, lighting, drinking water, latrines, spittoons, etc. On the same time the safety issues include: safety of building and machinery, precautions in case of fire, fencing of machinery, work on or near machinery in motion. According to this labor code, working conditions, including safety standards, in garment factories are notoriously bad in Bangladesh. Since 1990, 22 factory fires took the lives of nearly 300 garment workers and injured more than 2,500 (World Bank statistics June 2000). In garments factory, locked exits, a lack of properly functioning fire safety equipments, such as alarms, extinguishers and sprinkler systems, are common among garment factories. Too often, the factory gates were locked even though the worker exits in factory (Akhtar and Shimul 2012).

Occupational safety and health

- Establishments are required to put up for every 150 workers one first aid box and one trained person per first aid box, and an equipped dispensary with a patient-room, doctor and nursing staff.

- Employers are required to take appropriate measures to protect workers from danger and damage due to fire.
- Every establishment is required to be kept clean and free from effluvia arising out of any drain, privy or other nuisance.
- The work room should not be overcrowded and injurious to the health of the workers.
- Every establishment should provide pure drinking water, sufficient light and air, and separate toilets for its male and female workers.

Welfare and social protection

- Gratuity is defined under the law as separation payment, at least 30 days, for workers discharged from work and yet have worked not less than 6 months.
- Factories are required to have an in-house canteen for every 100 workers.
- Every establishment/employer is required to form a Provident Fund if three-fourths of its workers demand it by written application, and a Workers' Participation Fund and a Workers' Welfare Fund for its workers.
- Establishments with 200 or more workers should institute a group insurance.
- Every employer should provide compensation to its workers for work-related injury, disability and death.
- Various women's issues are also covered: maternity leave of 16 weeks (8 weeks before and 8 weeks after child birth), no gender-segregated wage structure, prohibition of any form of discrimination against women, prohibition of women working between 10:00 p.m. and 6:00 a.m. without consent, prohibition for women handling running or dangerous machines (unless they are sufficiently trained to operate such machinery), prohibition for women working under water or underground

GAPS in BLL

Occupational Safety and Health

The law has no clear provisions on the following:

- (i) specific weight limit (for load carried by workers in any factory) according to age, condition and sex;
- (ii) ratio of alternative stair as precaution in case of fire and other apparatus against the number of workers; and

(iii) workers-toilet ratio.

Welfare and Social Protection

The establishment of provident fund is not mandatory. It is dependent on the demand of a prerequisite number of workers. Group insurance is also dependent on the number of the workers and the prerequisite number is quite high. The amount of compensation given to workers due to work-related injury, disability and death is not adequate for the worker and his/her family. The provision of compensation is also discriminatory in terms of age of the workers, with an adult worker getting Tk. 1,25,000 for complete permanent impairment whereas a child/adolescent/young worker gets Tk.10,000 only. Other aspects of social protection have remained untouched in the labour law of Bangladesh such as provisions on pension and medical and life insurance for the workers (Hossain, Ahmed and Akter 2010).

4.4 Bangladesh ICT policy, 2009

According to the report of the Planning commission of Bangladesh (2012), The importance of science and technology in general, and of ICT in particular, has led the Government to formulate the National Science and Technology Policy and National ICT Policy 2009. In pursuance of this policy Bangladesh's ICT sector is growing at an estimated 20% per year. From the perspective of policy reform and development, the Access to Information (A2I) Programme (based at the Prime Minister's Office) identified over 53 e-citizen services which were termed as quick-win activities. 21 of these quick-win activities have already been launched, while the rest are being pursued either independently by the implementing ministry/implementing agency. The project has already provided technical assistance to ministries and divisions to develop their websites and imparted training to key officials. As part of the Digital Bangladesh strategy's formulation and planning, the project developed a concept note on Digital Bangladesh and assisted the Ministry of Science and ICT to develop a five-year budget to implement Digital Bangladesh projects.

The main goals of Science, Technology, and ICT Policy are:

- Establishing more institutes of higher learning in science and technology.
- Allocation of a higher share of GDP to research and development.

- Productivity increase in all spheres of the economy, including Micro, Small and Medium Enterprises.
- Inclusion of ICT in education and research to expand the scope and standard of knowledge on ICT throughout the country; to ensure computer literacy at all levels of education and government; to encourage creativity.

Constraints

- Lack of capacity: The teachers of universities are not sufficiently trained to adopt current changes in science and technology.
- Limited access to scientific sources
- Electricity and power instability
- Lack of coordination among ministries

Priorities in ICT strategy:

- Development of a comprehensive master plan
- Framing of a universal access policy
- Developing legal and regulatory environment for ICT development
- Ensuring access to Government information
- Promotion of e-commerce and automation of financial sector
- Establishing E-citizen services
- Enabling E- participation in decision making
- Developing curriculum based computer labs for education institutions
- Expanding digital content in Government websites
- Attracting local investment and FDI in ICT sector through PPP initiative

The above strategies are to be implemented in the short and medium term (5 years) along with some complementary strategies to be stretched in the 10 year time frame.

In order to translate the vision for digital Bangladesh into a reality, it is necessary to have an appropriate ICT policy. ICT Policy 2009 has been framed to meet this need. The objectives, as set-out in the policy to ensure the role of ICT in national development, are to: (1) maintain social equity, (2) increase productivity, (3) ensure data integrity, (4) assist education and research, (5) generate employment, (6) increase export, (7) enhance quality of health services, (8) ensure

access to information for all, (9) protect environment and strengthen disaster management, (10) support expansion of ICT (MOF 2013).

4.5. National Occupational Safety and Health policy, 2013

Adoption of National Occupational Safety and Health Policy, is the ultimate outcome of the National Plan of Action. It contains twenty five activities to be implemented by the tripartite partners, individually or together. It will take years to improve structural integrity and fire safety to a level where every worker in the ready-made garments sector can go to work knowing with certainty they will return home safely to their families at the end of the day Adopted in October 2013, the Policy covers all formal and informal sectors, not just the ready-made garments sector, and will guide all actions by government, employers and unions in relation to promoting and safeguarding safety and health in workplaces. In consultation with the social partners and with the assistance of the ILO the Government of Bangladesh has developed a National Occupational Safety and Health Policy, 2013. The Policy has already been approved by the cabinet division on 21/10/2013 (Muyid 2014).

The Government of Bangladesh's adoption of a National Occupational Safety and Health Policy in November 2013 as part of its response to the commitments made in the National Action Plan on Fire and Building Safety in July 2013 is a matter of great achievement for both the labour safety and humanitarian basis. Well-functioning Occupational Safety and Health committees in factories are essential for the safety and health of workers and for this, new committees are established in a fair and transparent manner with the appropriate representation of workers, including women. The Netherlands, Canada and the United Kingdom are committed to the establishment and capacity building of the Occupational Safety and Health Committees.

In accordance with the Labour Law reformation, this National Occupational Safety and Health Policy provides the basic determinants of work legislation and safety of workers in every industrial sector of Bangladesh.

4.6 Occupational Health and Safety Services in Bangladesh

In Bangladesh the occupational health & safety services is not well organized. Different ministries such as railway, port and shipping, jute, textile etc. operate the occupational health care program through various departments and directorates. It is the legal obligation of the employers to provide medicare in case deterioration of health or injuries result in from exposure to agents related to work situation. Medical officers have been employed by various agencies in accordance with section 44 of Factories Act 1965, which is obligatory for those factories having 500 or more workers. Different Govt. and Non-Govt Occupational Health Services are as follows Department of Labour (Ministry of Labour & Employment) 7 (seven) new Labour Welfare Centers are now under construction and are situated in tea estates. Under this department there are 4 Industrial Relation Institutes (IRI).

National Safety Committee was formed under Ministry of Industries on 1992 to look after issues on OSH. Ministry of Transport & Communication/shipping/aviation.

The services provided include;

- i. Railway-hospitals, health units, clinics and large stations health inspectors for sanitation;
- ii. Shipping- individual medical services, affiliated hospitals, dock labour welfare hospital;
- iii. Aviation- individual medical services affiliated hospital.

Ministry of Home Affairs

Under which Directorate of Fire service & Civil Defense provide OSH services in case of emergency & also training programs for industrial workers against fire protection.

Ministry of Local Government

Every Deputy Commissioner is declared as Factory Inspector (General) for that district as per provision of Factory Act of 1965. Services provided generally include medical services through clinics and medical centers , first aid , medical examination, determination of losses, medical benefits , appointing full time or part time Medical Officers in enterprises etc.

Ministry of Health & Family Welfare

- a. Health care as part of national health services is provided through hospitals, dispensaries, clinics, etc., but does not have any special role in terms of occupational health services viz. in industries, factories and agriculture, etc.
- b. Civil Surgeon acts as factory inspector (Medical) for the district.
- c. One Assistant Director, Industrial Hygiene is posted in the office of the Director General of Health Services,
- d. Department of Occupational & Environmental Health (DOEH) of National Institute of Preventive & Social Medicine (NIPSOM) conducts a course on Master of Public Health in Industrial Health i.e. MPH (IH) where in each year about 15-20 doctors are enrolled for one year postgraduate study program on Occupational & Environmental Health. This department also conducts workshops, seminars and short trainings.

4.6 Bangladesh Occupational Safety Health and Environment Foundation (OSHE)

OSHE promotes human rights at workplace with special focus to special focus to work place safety, workers health and environments. According to the ILO (2013), it is estimated that 11.7 thousand workers suffer fatal accidents and a further 24.5 thousand die from work related diseases across all sectors each year in Bangladesh. It is also estimated that a further 8 million workers suffer injuries at work – many of which will result in permanent disability. Although little research has taken place in Bangladesh, it is internationally recognized that most occupational deaths and injuries are entirely preventable, and could be avoided if employers and workers took simple initiatives to reduce hazards and risks at the workplace.

The ILO Country Office for Bangladesh in cooperation with the Ministry of Labour and Employment, Bangladesh Employers' Federation (BEF), National Coordination Committee for Workers Education (NCCWE), and social partners such as the Occupational Safety and Health and Environment (OSHE) Foundation and the Bangladesh Institute of Labour Studies (BILS), work to foster a preventative safety and health culture by strengthening national occupational safety and health (OSH) systems

Work areas:

1. Labour standards and workplace rights
2. Occupational safety
3. Labour and Environment Climate change
4. Workers health Gender and workplace
5. Globalization and social safety net
6. Corporate social accountability
7. Poverty reduction and labour
8. Migrant labour and decent work

CHAPTER FIVE:

THEROTICAL AND CONCEPTUAL FRAMEWORK

5.0 Introduction

This chapter is presented with the theoretical analysis and conceptual framework of the study. Theories are formulated to explain, predict, and understand phenomena and, in many cases, to challenge and extend existing knowledge within the limits of critical bounding assumptions. The theoretical framework is the structure that can hold or support a theory of a research study. The theoretical framework introduces and describes the theory that explains why the research problem under study exists (Swanson 2013). Thus Theoretical perspectives is very important because it gives us a new way of understanding the occupational health hazards of the computer professionals in Dhaka city, along with the association between external variables like technology, work environment, work duration and social interactions with health hazards.

5.1 The Precaution Adoption Process Model

The Precaution Adoption Process Model (PAPM) seeks to identify all the stages involved when people commence health-protective behaviors and to determine the factors that lead people to move from one stage to the next. Advocates of stage theories, like PAPM, claim that there are *qualitative* differences among people and question whether changes in health behaviors can be described by a single prediction equation. They suggest, in effect, that we must develop a series of explanatory equations, one for each stage transition. This is a much more complicated goal than finding a single prediction rule, but it offers the possibility of greater accuracy, greater intervention effectiveness, and greater intervention efficiency. Stage theories have four principal elements and assumptions (Weinstein, Rothman and Sutton 1998).

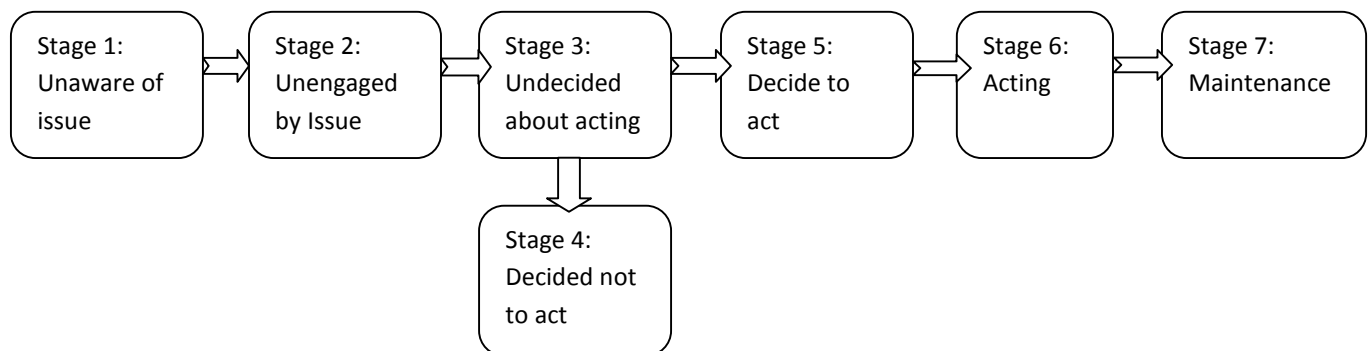
Description of the Model

The PAPM attempts to explain how a person comes to decisions to take action and how he or she translates that decision into action. Adoption of a new precaution or cessation of a risky behavior

requires deliberate steps unlikely to occur outside of conscious awareness. The PAPM applies to these types of actions, not to the gradual development of habitual patterns of behavior, such as exercise and diet, in which health considerations may play little role (though it would apply to the initiation of a new exercise program or a new diet). Nor does the PAPM explain the commencement of risky behaviors—such as a teenager accepting her first cigarette--which seem to be better explained in terms of a “willingness” to act rather than in terms of any plan to act (Gibbons, Gerard, Blanton and Russell 1998).

Initial work on the PAPM was stimulated by Irving Janis and Leon Mann (1977) who tried to explain responses to threats by proposing discrete categories determined by people’s beliefs about their capacity to cope with the threats.

Figure 5.1: Stages of the Precaution Adoption Process Model



Source: Weinstein, Rothman and Sutton (1988)

Although several aspects of the Precaution Adoption Process Model were first discussed in 1988 (Weinstein, 1988), the present formulation, published in 1992 (Weinstein and Sandman, 1992), differs in some respects from the initial version. The current PAPM identifies seven stages along the path from lack of awareness to action (see Figure 5.1). At some initial point in time, people are unaware of the health issue (Stage 1). When they first learn something about the issue, they are no longer unaware, but they are not yet engaged by it either (Stage 2). People who reach the decision-making stage (Stage 3) have become engaged by the issue and are considering their response. This decision-making process can result in one of three outcomes: They may suspend judgment, remaining in Stage 3 for the moment. They may decide to take no action, moving to

Stage 4 and halting the precaution adoption process, at least for the time being. Or, they may decide to adopt the precaution, moving to Stage 5. For those who decide to adopt the precaution, the next step is to initiate the behavior (Stage 6). A seventh stage, if relevant, indicates that the behavior has been maintained over time (Stage 7). The stages have been labeled with numbers, but these numbers have no more than ordinal values. They would not even have ordinal value if Stage 4 were included, since it is not a stage on the path to action.

The numbers should never be used to calculate correlation coefficients, calculate the mean stage for a sample, or conduct regression analyses with stage treated as a continuous, independent variable. All such calculations assume that the stages represent equal-spaced intervals along a single underlying dimension, which violates a fundamental assumption of stage theory. Although not shown in Figure 6.1, movement backward toward an earlier stage can also occur, without necessarily going back through all the intermediate stages, although obviously it is not possible to go from later stages to Stage 1.

On the surface, the PAPM resembles another stage theory, the Trans theoretical Model developed by Prochaska, DiClemente, Velicer, and their colleagues. However, it is mainly the names that have been given to the stages that are similar. The number of stages is not the same in the two theories, and even those stages with similar names are defined according to quite different criteria. For example, the PAPM refers primarily to mental states whereas the TTM emphasizes days or months until intended action. We are not aware of any research directly comparing the two theories' predictions.

Justification for the PAPM Stages

There should be good reasons to propose the separate stages that make up a stage theory.

Stage 1 (unaware)

Much health research deals with well known hazards, like smoking, AIDS, and high-fat diets. In such cases, asking someone about his or her beliefs and plans is quite reasonable; most people have considered the relevance of these threats to their own lives. But if people have never heard of a hazard or a potential precaution, they cannot have formed opinions about it. The reluctance of respondents to answer survey questions about less familiar issues suggests that investigators

ought to allow people to say that they "don't know" or have "no opinion" rather than forcing them to state a position. Participants in many health behavior investigations are not given this opportunity. Even when participants are permitted to say that they "don't know," these responses are often coded as missing or are collapsed into another category. To say "I don't know" indicates something important and is real data that should not be discarded. Media often have a major influence in getting people from Stage 1 of the PAPM to Stage 2 and from Stage 2 to Stage 3, and much less influence thereafter.

Stage 2 (unengaged) versus Stage 3 (undecided)

Once people have heard about a health precaution and have begun to form opinions about it, they are no longer in Stage 1. However, so many issues compete for their limited time and attention that people can know a moderate amount about a hazard or a precaution without ever having considered whether they need to do anything about it. This idea parallels a well-established finding with respect to mass media effects. The media are better at "agenda-setting"--persuading people that they ought to consider an issue and have an opinion about it, (i.e., moving from Stage 2 to Stage 3)--than they are at influencing the opinion itself, which tends to require more individual sorts of influences (see also Chapter Sixteen on Communication Theory). We believe that this condition of awareness without personal engagement is quite common. In a 1986 survey of radon testing (Weinstein, Sandman and Klotz 1987), for example, 50 percent of respondents in a high-risk region said that they had never thought about testing their own homes even though all had indicated that they knew what radon was, and most had correctly answered more than half of the questions on a knowledge test.

The PAPM suggests further that it is important to distinguish between the people who have never thought about an action and those who have given the action some consideration but are undecided. There are several reasons for making this distinction. First, people who have thought about acting are likely to be more knowledgeable. Also, getting people to think about an issue may require different sorts of communications (and entail different sorts of obstacles) than getting them to adopt a particular conclusion. Thus, whether a person has or has not thought about taking action appears to be an important distinction.

Stage 3 (undecided) versus Stage 4 (decided not to act) and Stage 5 (decided to act)

Research reveals important differences between people who have not yet formed opinions and those who have made decisions. People who have come to a definite position on an issue, even if they have not yet acted on their opinions, have different responses to information and are more resistant to persuasion than people who have not formed opinions (Anderson 1983; Brockner and Rubin 1985; Cialdini 1988; Ditto and Lopez, 1992; Jelalian and Miller, 1984; Nisbett and Ross 1980). This widely-recognized tendency to adhere to one's own position has been termed "confirmation bias," "perseverance of beliefs," and "hypothesis preservation." It manifests itself in a variety of ways.

According to Klayman (1995), these include: overconfidence in one's beliefs; searches for new evidence that are biased to favor one's beliefs; biased interpretations of new data; and insufficient adjustment of one's beliefs in light of new evidence. For these reasons, the PAPM holds that it is significant when people say that they have decided to act or have decided not to act, and that the implications of someone saying that they have decided not to act are not the same as saying it is "unlikely" they will act. We believe that cost-benefit theories of health behavior, such as the Health Belief Model, the Theory of Reasoned Action, Protection Motivation Theory, and Subjective Expected Utility Theory, are dealing mainly with the factors that govern how people who get to Stage 3 decide what to do.

Determinants of this regression to an earlier stage might be different from the factors that lead people toward Stages 4 or 5. Perceived susceptibility (or, equivalently, "perceived personal likelihood") is one factor that can influence what people decide, and is included in most theories of health behavior (Connor and Norman 1995). People are reluctant to acknowledge personal susceptibility to harm even when they acknowledge risks faced by others (Weinstein, 1987). Consequently, overcoming this reluctance is a major barrier to getting people to decide to act.

Stage 5 (decided to act) versus Stage 6 (acting)

The distinction between decision and action is common to most stage theories. For example, Schwarzer's Health Action Process Approach (Schwarzer 1992; Schwarzer and Fuchs 1996) distinguishes between an initial, motivation phase, during which people develop an intention to act, based on beliefs about risk, outcomes, and self efficacy, and the volition phase in which they plan the details of action, initiate action, and deal with the difficulties of carrying out that action successfully.

According to Rogers and Prentice-Dunn,, "PMT experiments always present information in the same order, threatening information followed by coping information" (Rogers and Prentice-Dunn, 1997, p. 116). These researchers also speak of first developing motivation and then developing coping skills. A growing body of research (Gollwitzer 1999) suggests that there are important gaps between intending to act and carrying out this intention, and that helping people develop specific implementation plans can reduce these barriers. The PAPM suggests that detailed implementation information would be uninteresting to people in early stages. Yet, for people who have decided to act, such information is often essential to produce the transition from decision to action. This claim is echoed by temporal construal theory (Trope and Liberman 2003), which asserts that decisions about action are based initially on abstract construal of the options but become more focused on concrete event details when the actual choice comes near.

Stage 6 (acting) versus Stage 7 (maintenance)

For any health behavior that is more than a one-time action, adopting the behavior for the first time is different from repeating the behavior at intervals, or developing a habitual pattern of response. Once a woman gets her first mammogram, for example, she will have acquired both more information in general and personal experience (perhaps positive as well as negative). These will play a part in the decision to be re-screened. Similarly, a man who stops smoking or loses weight must deal with the acute withdrawal experience and/or the glow of success in the early stage of taking action, but must address different challenges in the maintenance stage. The distinction between action and maintenance is widely recognized (e.g., Dishman 1988; Marlatt and Gordon 1985; Meichenbaum and Turk 1987).

Stages of inaction

One value of the PAPM is its recognition of differences among the people who are neither acting nor intending to act. People in Stage 1 (unaware), Stage 2 (unengaged), Stage 3 (undecided), and Stage 4 (decided not to act) all fit in this broad category. Those in Stage 1 obviously need basic information about the hazard and the recommended precaution. People in Stage 2 need something that makes the threat and action seem personally relevant. As stated earlier, people who have thought about and rejected action, Stage 4, are a particularly difficult group. Evidence shows that they can be quite well informed (Blalock et al. 1996; Weinstein and Sandman 1992), and, as noted earlier, they will tend to dispute or ignore information that challenges their decision not to act.

5.2 Ecological models and multilevel interventions

The importance of Ecological models in Social sciences is that they view behavior as being affected by, and affected the social environment. Many of the models- like Broffenbrenner's- also divide the social environment in the analytical levels that can be used to focus attention on different levels and types of social influences, and to develop appropriate interventions. Thus, ecological models are systems models, but they differ from traditional systems models by viewing patterned behavior- of individuals or aggregates- as the outcomes of interest.

The Social Ecological Model (SEM) of McLeroy et al. 1988

Two key concepts

- **Multiple levels:** Behavior affects and is affected by multiple levels of influence
- **Reciprocal causation:** Individual behaviors shapes, and is shaped by, the social environment.

Figure 5.2: Reciprocal causation example

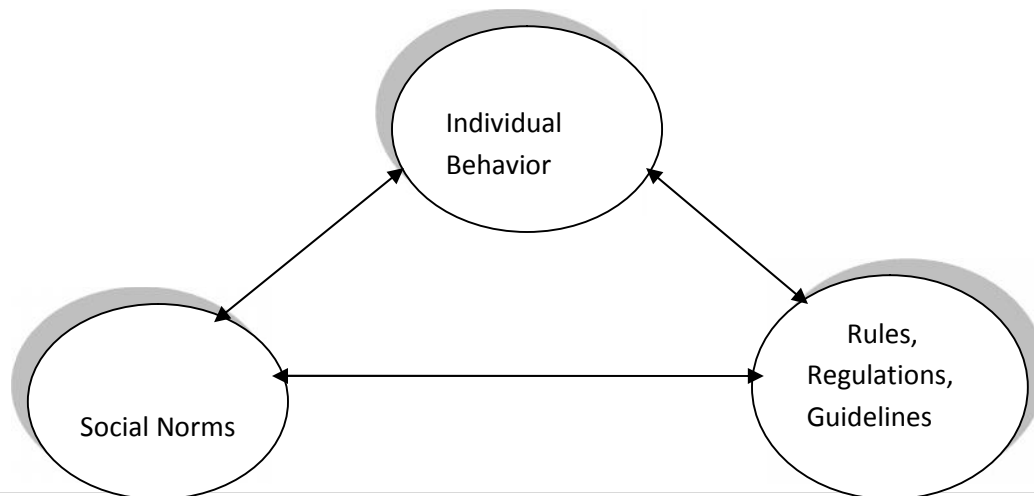
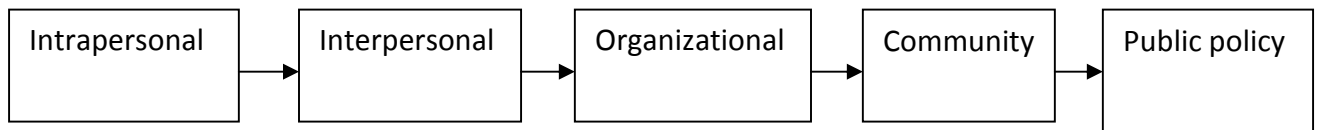


Figure 5.3: Five levels in The SEM of McLeroy 1988



The levels Interpersonal, Organizational, and Community have slightly different meanings, depending on the author

– Variation in what fits in Organizational and what fits in Community.

Not clear where culture, social class, racism, gender, economics/employment are supposed to fit, or if they fit anywhere

Table 5.1: The SEM: McLeroy 1988

Level of influence	Description
Intrapersonal	Individual characteristics that influence behavior: Knowledge, skills, self-efficacy
Interpersonal : Family, friends, peers	Interpersonal processes and groups providing identity and support
Organizational: Churches, stores, community orgs.	Rules, regulation, policies, structures constraining or promote behaviors
Community: Social networks	Community norms (community regulations)
Public policy: Local, state, federal	Policies and laws that regulate or support healthy practices/actions

Source: McLeroy theory, 1988

INTRAPERSONAL FACTORS

When psychological theories are applied to specific health problems or health related behaviors, the resulting models may incorporate physiological processes and/or interpersonal influences. Models of smoking acquisition and maintenance, for example, may include concepts of nicotine

metabolism and excretion, and the role of family and peers as role models or social influences in the acquisition of smoking behavior by teens.

Table 5.2: SEM application: Adolescent smoking

Level	Description
Intrapersonal	Knowledge about smoking and health, perceived risk of smoking-related disease, self-efficacy to refuse cigs.
Interpersonal Family, friends, peers	Smoking patterns/support in household and among friends and peers
Organizational Stores, community orgs., tobacco companies	Cigarette availability and prices in local stores, actions by community groups, insurance policies/prices for smokers, marketing of cigarettes by companies
Community	Community norms regarding smoking
Public policy Local, state, federal	Regulations on smoking in schools, offices, restaurants; taxes and warning labels on tobacco products

INTERPERSONAL PROCESS

Interpersonal relationships with family members, friends, neighbors, and contacts at work, and acquisitions –are important sources of influence in the health related behaviors of individuals. For example, significant others are important influences in the decision to visit a physician for non-emergency care, and the timing of doctor visits. Social relationships affect: How individuals cope with stress, the acquisition.

Social relationships are essential aspects of social identity. They provide important social resources, including emotional support, information, access to new social contacts and social roles, and tangible aid and assistance in fulfilling social and personal obligations and responsibilities. These social resources, frequently referred to as social support, are important mediators of life stress and important components of overall well being.

Table 5.3: Interpersonal process

Level of Influence	Concepts from this course
Intrapersonal	Individual behavior change models, empirical efficacy, risk perception, stages of change
Interpersonal Family, friends, peers	Household roles/structures, self construal, kinship systems, public/private domain, peer education, intimate partner violence
Organizational Churches, stores, community orgs.	Social capital (organizations)
Community Social networks	Social networks, social norms, social capital (networks), other factors (???)
Public policy Local, state, federal	

ORGANIZATIONAL FACTORS

Implicit in the preceding discussion is the assumption that an ecological perspective tends to refocus attention away from strictly intra-individual factors and processes which affect behavior and more towards environmental determinants of behavior, such as the effects of interpersonal relationships. A third level of environmental considerations within the ecological framework concerns organizations. Specific areas of concern include: how organizational characteristics can be used to support behavioral changes; the importance of organizational change as a target for health promotion activities; and the importance of organizational context in the diffusion of health promotion programs.

Organizations may have positive as well as negative effects on the health of their members. Organizations provide important economic and social resources. Organizations are important

sources and transmitters of social norms and values, particularly through individual work groups and socialization into organizational cultures.. Organizational memberships are also an important component of social identity, and free time may be organized around participation in voluntary associations, such as churches, professional groups, and local neighborhood organizations.

Organizations provide the opportunity to build social support for behavioral changes, particularly if the new behavior is a group norm. Organizational characteristics, such as the use of incentives, management and supervisor supports, changes in rules and regulations (e.g., smoking restrictions), changes in benefits (e.g., insurance coverage and child care), and changes in structure of work may all be used to support behavioral changes. (Health Education Quarterly 1988)

COMMUNITY FACTORS

An important component of community includes what have been “mediating structures”. These includes family, informal social networks, churches, voluntary associations and neighborhoods, that may be important sources of social resources and social identity.

Because mediating structures represent strong ties, changes in individuals without the support of these mediating structures is difficult to achieve. Mediating structures also serve as connections between individuals and the larger social environment. Health promotion programs may use these mediating structures to deliver services within communities, or may attempt to develop or strengthen existing neighbourhood organizations. Carleton and Elder have also discussed the use of churches as intervention sites in a spin off of the pawtucket Heart Health program. A community organization approach is represented by Minkler’s work in the Tenderloin District. (Health Education Quarterly 1988)

PUBLIC POLICY

One of the defining characteristics of public health-apart from its emphasis on the health of populations rather than the health of individuals-is the use of regulatory politics, procedures, and laws to protect the health of the community. This use of regulatory policies has had a dramatic effect on the health of the population. McKinlay and McKinlay, for example, have estimated that the most of the decline in mortality that occurred in the United States between 1900 and 1973

occurred as a result of improvements in water supply, sanitation, housing, and food quality, including laws governing the pasteurization of milk.

These include: policies that restrict behavior, such as prohibition; policies which contain behavioral incentives, both positive and negative, such as increased taxes on cigarettes and alcohol; and policies that allocate programmatic resources, such as the prevention Block Grants, Establishments of health promotion centers in selected universities, the establishment of health promotion offices and agencies in federal and state government.

There is an important link among these policy roles and the concepts of community discussed earlier. Policy development, public advocacy, and policy analysis have important implications for communities. As Milio notes, “ the task for public policy becomes one of creating environments-all of which have biotic and constructed socioeconomic and interpersonal facets-that are likely to elicit health responses for most people most of the time (page 4)”. While Milio is generally speaking of the larger social environment, her statement also applies to the mediating structures in community.

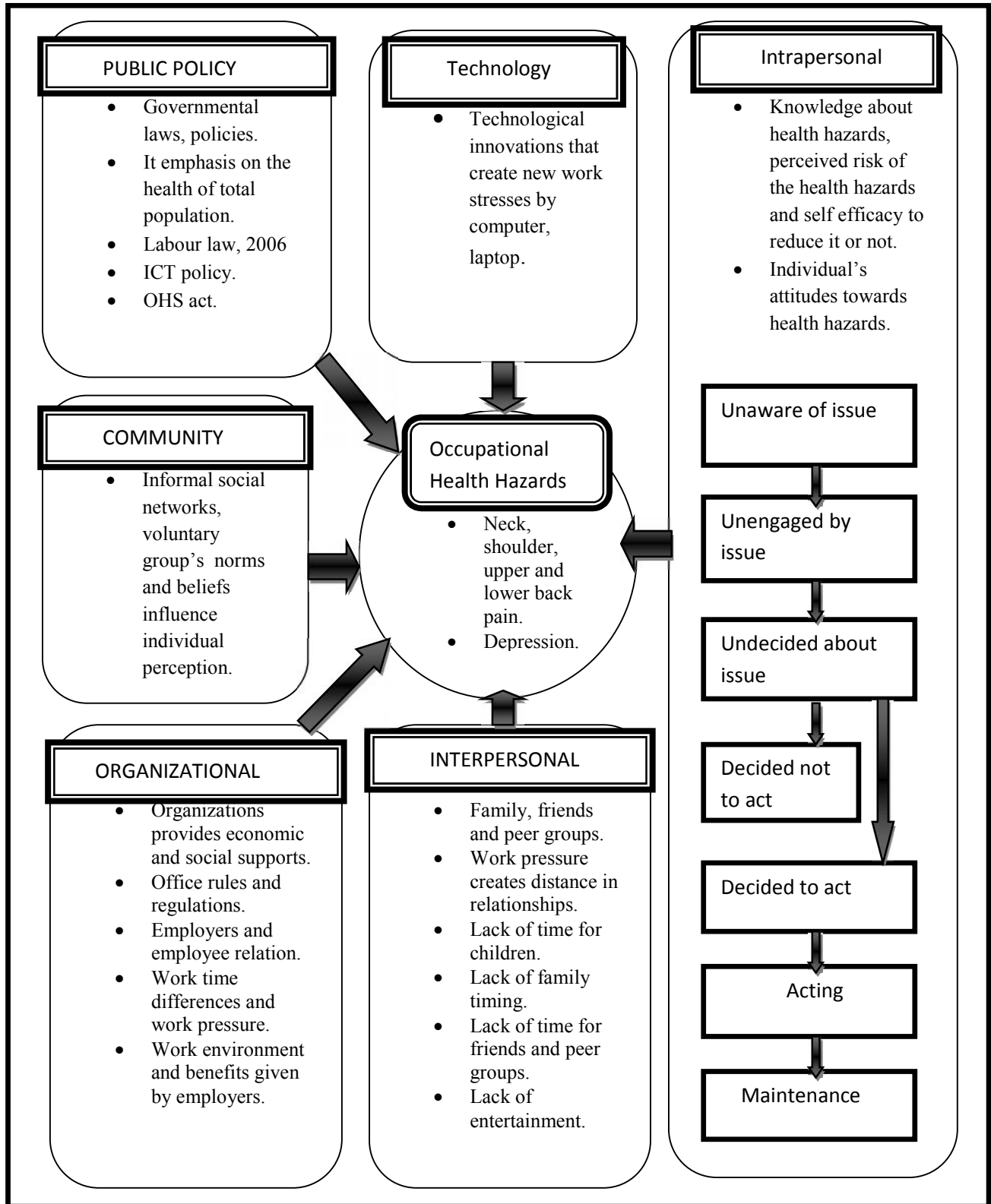
5.3 Conceptual Framework

The most basic of ethical principles deals with avoiding doing harm to others. It has been an unfortunate but common occurrence however, for these moral codes to be kept in the realm of —personall codes, and not always applied to business dealings. Clearly, creating a healthy workplace that does no harm to the mental or physical health, safety or well-being of workers is a moral imperative (WHO, 1999).

All organizations and institutions are in business to be successful at achieving their missions. All these workplaces require workers in order to achieve their goals, and there is a strong business case to be made for ensuring that workers are mentally and physically healthy through health protection and promotion.

OHS is important not only to individual workers and their families, but also to the productivity, competitiveness and sustainability of enterprises or organizations, and thus to the national economy of countries and ultimately to the global economy at large. The framework in Figure 2.3 represents the necessity of Health and Safety Interventions

Figure 5.4: Conceptual framework of the study



Source: Author's Construct (2014)

From figure 5.1, Occupational health hazard is closely connected with different variables, like technology play an important role by producing computer, laptop and other electronic gadgets. This created a very different kind of risk perception among the health of the individuals. However, Individual attitudes toward any health problem also related to the severity of the health hazards. Intrapersonal factors which is combined with the knowledge and attitude of the individuals and their self efficacy to reduce it or not. Interpersonal level analyses the family, friends and peer group influence and response towards health hazards. Health hazards also create several problems like distance in relationships, lack of entertainment and so on. These resulted in psychological disorders like depression and anxiety. Organizational factors like work environment, employers and employee relationships, work time, organization rules and responsibilities also impact upon the occupational health hazards. Community factors are the informal social networks and voluntary groups influenced the individual perception towards any health problems. Health hazards also influence the social life of the personal. Public policy, such as governmental laws and regulations which determine the work environment and it's features. National constitutions, different labour acts and policy has significant impact upon the occupational health hazards. Occupational health hazards like Neck and shoulder trouble, wrists problem, upper and lower back pain can reduce the work capacity of the professionals. A central belief in most of the occupational health promotion literature is that people perform better when they are physically and emotionally able to work and want to work, which in turn leads to higher productivity, which can lead to higher profits. The effectiveness of human resource depends on the organizational climate and relationships as well as strategies put in place to ensure their well being.

5.6 Operational Definition

Computer professionals-

In this study computer professionals refers to the professionals who has been working as a computer professional for at least six months without any break of service and working for at least 4 hours/day in computer related jobs.

Computer related health hazards

Carpal Tunnel Syndrom

The carpal tunnel is an area on the palm side of the wrist bordered on one side by the carpal bones and on the other side by the *flexor retinaculum*. If the available space within the strong-walled tunnel is reduced the nerve is compressed. It has been recognized that repetitive movement at the wrist, as occurs with prolonged use of a computer keyboard can lead to inflammation in the carpal tunnel leading to carpal tunnel syndrome.

Repetitive strain injuries

Repetitive strain injuries are on the rise with increased computer use, faulty typing techniques, poor body posture and positions. Lack of adequate rest between work and excessive use of force while using the mouse or the keyboard can lead to repetitive stress injuries (RSI). The symptoms of RSI are tightness, discomfort, stiffness, burning in the hands, wrist, fingers, forearms and elbows. Tingling, coldness and numbness of the hands with loss of strength and lack of coordination occurs. There is pain in the upper back, shoulders and neck and a need to massage them (Chowdhury, Rao and Suneetha 2003)

Computer Vision Syndrome

There is no scientific evidence to indicate that regular use of computer threatens eye health or results in permanent visual damage. Computer vision syndrome is the complex of eye and vision problems related to near work which are experienced during computer use. The symptoms consists of fatigue, headache, dry eyes, eye strain, blurred vision, neck pain, backache, altered colour perception, double vision, etc. People who use computers for more than two hours per day can develop computer vision syndrome (Greenwald and Blake 1983).

Depression

A recent study has found a high degree of co-relation between the time spend on-line and an increased incidence of depression. It is believed that these individuals lead an unfulfilled social life, which leads to further loneliness and depression.

CHAPTER SIX: METHODOLOGY

6.1 Introduction

This chapter describes the profile of the study area and the methodology adapted to the study. Specifically, the methodology included the following elements; the research design, data sources, study population, sampling and sample site and the data analysis techniques. It also describes the research instrument and their application as well as validity and reliability of the study.

6.2 Study population

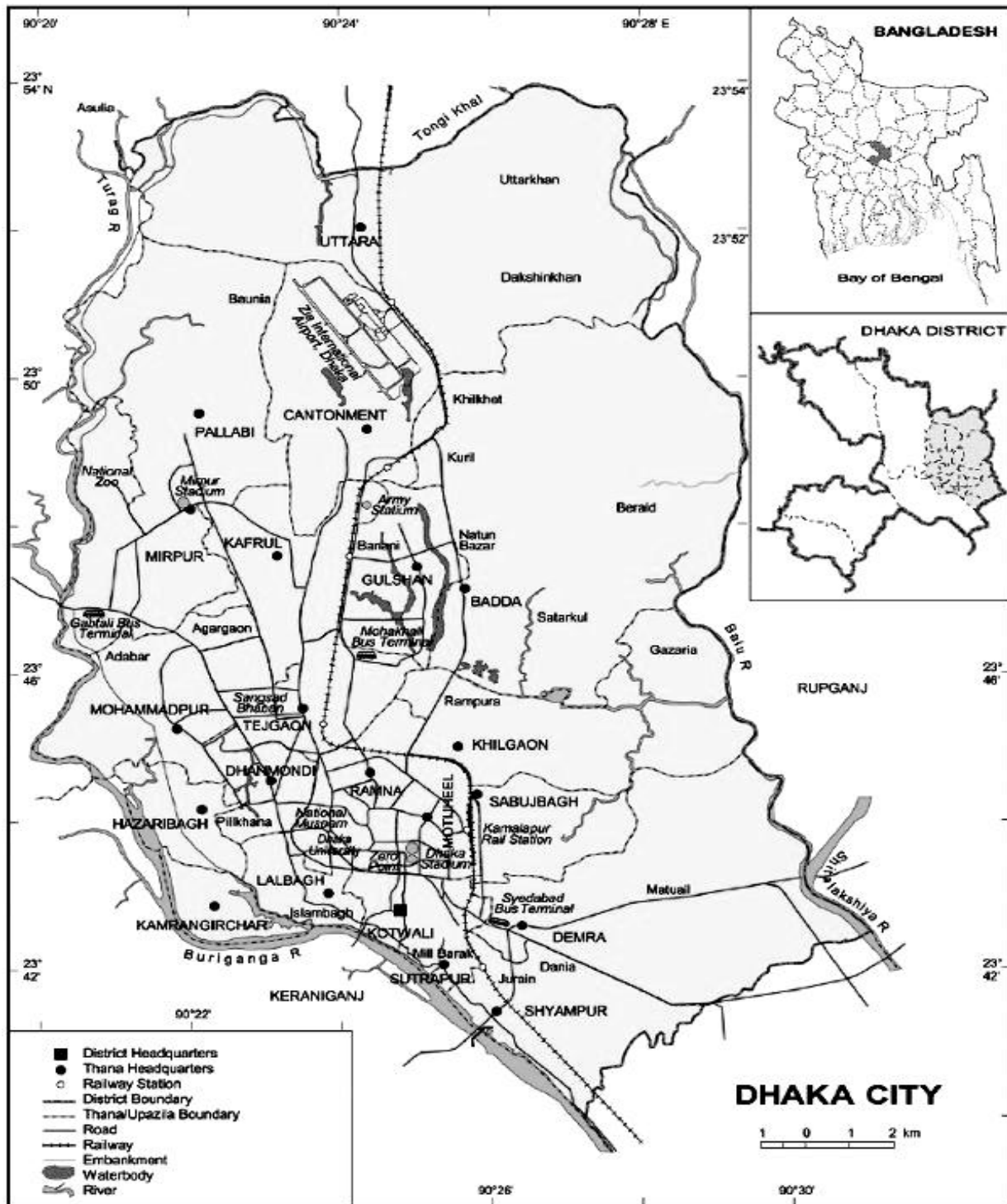
Around 5,500 software professionals are employed in more than 300 registered software firms in the country. Total number of IT professionals in the country is estimated to be more than 25,000 a large portion of which are working in IT responsibilities at different government and non government organizations as well as hundreds of large and small private business enterprises. Diagram below shows the technical job distribution in software companies (BASIS 2006).

The study is about exploring the prevalence of health hazards among the computer professionals in Dhaka city; it also examines the patterns of health hazards among computer professionals and their attitudes towards taking preventive actions against health problems. Focus has also been given to examine the association between their health hazards and their working environment. Though the general target population indicates the entire computer professional's in Dhaka city. However, the study includes 105 Computer professionals working with multiple private firms located in Dhaka city as subjects.

6.3 The Study site

The study was conducted among multiple private firms located in Dhaka city. The private firms were selected from the northern and southern parts of metropolitan Dhaka city.

Figure 6.1: The map of Dhaka Metropolitan area.



Source: www.maps.google.com.bd

6.4 Study design

A cross-sectional study of 4 months duration was undertaken with 105 Software professionals working with multiple private firms as subjects. Permission for conducting the study was obtained from the Head of the Managing Director of the firm office prior to the initiation of the study. Professionals working in different departments were selected in the study and these include – Human Resource, Sales, Marketing, Software development and Content development were selected randomly using lottery method.

Inclusion criteria

The following are criteria for the inclusion of study subjects.

- a) Subject has been working as a computer professional for at least six months without any break of service.
- b) Subject has been working for at least 4 hours/day in computer related jobs.

The study involved both quantitative and qualitative approaches to research. Burns and Groove (1993) define quantitative research as a formal, objective, systematic process to describe and test relationship and to examine cause and effect interactions among variables.

Quantitatively, the study captured occupational injuries and diseases by specifically considering long term health injuries among the professionals. Qualitative research which is also descriptive in nature was used because it provides accuracy of research attributes such as behaviors, opinions, perceptions and knowledge of a particular individual or group on a phenomenon.

6.5 Sampling Procedure and Sample Size Distribution

The design of the study was interview-based cross-sectional survey. Males and female professionals were recruited from 6 software companies located in Dhaka city metropolitan area. After the selection of locations, 105 professionals were selected purposively comprising 83 males and 22 females. Precision level was determined based on secondary information. Thus, a total of 105 interviews were conducted. The 12 companies were chosen on the basis of their different departments were selected in the study and these include – Human Resource, Software Programming, Content development, UI designing, Project manager and so on. They would therefore provide the basis for assessing factors contributing to the differential knowledge level,

pattern and prevalence rates of health hazards among the computer professionals of Dhaka city. The distribution of sample by companies and sex is presented in the table below (Table 6.1).

Out of the private and public software and hardware companies in Bangladesh, 12 companies were selected purposively. By multi-staged cluster sampling, 6 types of professionals were selected randomly from the companies. The 6 type of professionals were software programmer, Web developer, UI designer, Network engineer, Business analysts, project manager. To meet the target of 105, male and female professionals were interviewed proportionately from each of the types. But it is a matter of fact that in this service sector in Bangladesh, the number of female professionals is still very low. This new and emerging service sector is still not favorite among the women. Gradually the number of female professional are increasing. A purposive sampling technique was used to select the sample. The study needed the computer professionals to assess their health hazards due to their profession and their attitude towards combating the health hazards, along with the relation between their work environment, work hour duration with health hazards.

Sample size = $p \times q \times z^2 / e^2$, where p= Population estimate, q= 100 – p, z = value of confidence level (if the estimates are correct 95% of cases the value is 1.96), e = Maximum deviation from the true proportion tolerated in the study (sample error=0.05)

Table 6.1 : Distribution of sample by software firms and sex

Software firms	Male	Female	Total
Orion Information Ltd	9	0	9
REVE Systems	7	3	10
SSL WIRELESS	10	2	12
Southern Ltd	5	3	8
Kaz Software	10	0	10
Panacea Systems Ltd	4	2	6
Eyeball Networks	7	4	11
Data Soft	7	5	12
Beyond Technologies	6	2	8
Four-D Communications	7	0	7
Comfosys Ltd	4	1	5
Divine IT Limited	7	0	7
Total	83	22	105

6.6 Data Sources

Relevant information for the study was obtained from both primary and secondary sources. Questionnaires and interviews were the main tools to gather information from the professional's in the Information Technology service sector as well as institutions that oversee the activities of the sector. Questionnaires were both structured and unstructured. Structured questionnaires usually make analysis easier whilst unstructured ones allow respondents to give all relevant information without restrictions. Secondary sources of data such as periodicals, journals, reports, publications and unpublished thesis were also consulted to supplement the primary data.

6.7 Methods of data collection

The decision of using both quantitative and qualitative methods of data collection was because of their appropriateness for examining different facets of the phenomena under study, for triangulation of the data, and for adding breadth and depth to the examination of the issues being studied. These purposes are consistent with the suggestions made by Green (1990) about the use of the both quantitative and qualitative methods of research in a singular study. Such pluralism in methodology or triangulation, is not aimed merely at validation but at deepening and widening one's understanding about the phenomena being studied.

The most common example of this is the recognition by survey researchers that the formation of questions for questionnaire or interview schedule is benefited by using qualitative research methods (Patton, 1990). The aim of such mixing methods is to reduce misreporting and cross-cultural confusion and thus the qualitative element is designed to improve the main technique which is quantitative in the study.

6.7.1 The questionnaire

A detailed study based on a modified Nordic Standardized questionnaire was performed among these professionals for study period to measure the outcome of epidemiological studies on musculoskeletal disorders. Whereas, to identify the psychological work related stress and disorders Hamilton Depression Rating scale was performed among the respondents. Work related musculoskeletal discomfort and occupational stress of the subjects was assessed by Cornell University's musculoskeletal discomfort questionnaire (CMDQ) respectively.

The aim of the questionnaire was to generate reliable and valid data from a high proportion of population within a reasonable time period at a minimum cost. The use of a questionnaire is relatively cheap and a quick way of obtaining information. The questionnaires were both closed ended and open ended. The closed ended questionnaires aided the coding and analysis of responses whilst the open ended facilitated richness and intensity of responses.

Considering the objective of the study a semi-structured questionnaire (for questionnaire interview) was prepared for the survey. There were 6 sections in the questionnaire such as,

1. Background demographic information,
2. Occupational health hazard and working environment,
3. Knowledge and practices related to health hazards,
4. Social interactions and social relations,
5. Depression analyses,
6. Interventions by Government, employers and employee.

There were total 52 questions both consist of close and open ended questions. In questionnaire interviews the context, the participants, the way the interview was conducted, and when it took place were as important as the questions themselves. For the study, the researcher used structured questionnaire interviews to the individual participant. The interviews were conducted through face-to-face. Some sample questions of the questionnaire is given below.

- How many years/months have you been working in this organization?
- Number of work hours per day? (on average)
- Head and neck to be upright or in-line with the torso (not bent down/back)...yes/no
- Top of the screen is at or below eye level so you can read it without bending your head or neck down/back..yes/no
- Have you at any time during last 12 months had troubles (ache, pain, discomfort) in neck/shoulder/elbow/upper back?
- Have you been seen by a doctor or physio-therapists or other such persons because of troubles during last 12 months?
- Does computer related job create problems with your family or social relations? (e.g., Distance in relationship, lack of time for children, lack of social interactions)
- Do the Employers have required appropriate measures to protect workers from danger and damage due to fire?

6.7.2 Interview

Research interviews try to understand something from the subject's point of view. For conducting the survey, a semi-structured interview schedule was developed. The Interview schedule four parts with quick response open-ended questions and close ended questions containing the information on:

- Socio-demographic characteristics
- Occupational health hazard
- Responses towards the health hazard
- Association between the health hazard and the work environment

6.7.3 Administering the Fieldwork

The field work for the present study was conducted for a period of 2 months during August and September, 2014. The researcher administered the survey among the respondents according to the sampling plan set out earlier. Before approaching the sample respondents, the researcher took the permission from the Head/Managing Director of the firm office prior to the initiation of the study. The researcher then sought their cooperation to administer the survey.

6.8 Pre-testing

Pre-testing was done in order to finalize the study instrument. The researcher designed the draft interview schedule and checked the translation, consistency and integrity of the instruments. After getting approval of the supervisor the Bengali version of the interview schedule was printed and translated it later into English. During Pre-testing of the survey instruments, the following issues were considered:

- The language necessary to address the sensitive issues (monthly income, health problems and so on).
- The sequencing of questions.
- The techniques or options for documenting responses.

6.9 Non-response

Every effort was made to interview all the sample respondents. Gaining access to a computer professional in extreme work urgency, accuracy and demands, made it very tough for anybody to collect information about any issue. In this stage the interviewer is needed to mould a good rapport with respondents in order to collect fruitful data collection. So the interviewer tried to introduce her identity to the respondents as a graduate student of the Department of Sociology, University of Dhaka. However, there were causes of non-response from the respondents including cases of non-availability of respondents in selected organizations. In this situation, the interviewer selected alternative respondent so that the overall sample size achieved. Therefore the overall non-response rate in this study was 5%.

6.10 Case Study

The case study aims to understand the case in depth, and in its natural setting, recognizing its complexity and its context. It also has a holistic focus, aiming to preserve and understand the wholeness and unity of the case.

The purpose of case study is to collect information from a group of people or even an individual. Case study have had an ambiguous place in social science (Reinharz, 1992), and historically there has been a disapproving attitude towards the case study. Case study offer several advantages. The first is what we can learn from the study of a particular case, in its own right. Second, only the in-depth case study can provide understanding of the important aspects of a new or persistently problematic research area. Third, the case study can make an important contribution in combination with other research approaches. The rationale for conducting case study was;

- Professionals who are only in the 6 months of their job and those who were already been in the profession for a long period can be highly useful in understanding the changing pattern of occupational health hazard.
- Their attitude, knowledge helps to determine the association between the occupational health hazard and the working environments or ergonomics setting.

6.11 Data processing and analysis

After completion of data collection, all the questionnaires were taken together for processing. The filled up questionnaires were finally checked again to minimize the data processing error. All the levels of processing data were handled with great care so that any wrong or unwanted data might not remain in the database. All these answers and questions were then categorized and divided in the broader categories of the original checklist. Also conducted necessary editing of the questionnaire to make that consistent and ready for encoding.

Upon the successful completions of data processing, all the data were analyzed by using SPSS version 17.0 (SPSS Inc. Chicago, Illinois, 2008). The analysis was done two stages: descriptive statistics and bivariate analysis. Besides case studies were conducted and the results were analyzed in a detailed way.

Finally, prevalence and pattern of the computer professional's health hazard, attitude towards health hazard, association between the occupational health hazard and work environment and socio-demographic variables are analyzed with the help of bivariate analysis. In the process of analysis, relationships supporting or refusing the pre-formulated hypotheses were subjected to statistical tests of significance. Computer programs using SPSS were run to determine the relationship between variables. Pearson chi-square test was used to compare data among the computer firm's professionals. All tests were 2 sided and the statistical significance was considered at $p < 0.05$.

The collective case study was used to learn more about the phenomenon, population or general condition. As part of the supplement of quantitative data some professional's were interviewed in detail. In the first phase, the researcher introduced herself and established rapport carefully with the respondents. Having taken permission from the employers and the managerial body, researcher recorded the answers with a recorder in addition to writing notes. Earlier researcher assured the professionals of confidentiality.

In addition, in line with study design qualitative data were also gathered. After completing the fieldwork for quantitative survey, some case studies were also conducted among the professionals.

6.12 Reliability and Validity of data

According to Polit and Hungler (1993), reliability is the degree of consistency with which an instrument measures the attribute it is designed to measure. The questionnaire that was administered to workers in the various categories were consistent and followed a logical pattern such that responses did not contradict or conflict each other. Biases in data collection were also reduced to the barest minimum by ensuring that questionnaire was administered by the researcher only. The researcher was conscious about the internal of the current research. Due to lack of resources multiple researchers could not be applied, but instruments like electronic recorder was used to ensure the reliability of the data collected. The researcher also used multiple indicators to investigate each variable.

The validity of a research instrument determines whether the research truly measures that which it was intended to measure. The study sought to achieve both content and external validity. Questions were based on information gathered during the literature review to ensure representativeness. They were also based on the objectives and the data requirement as presented. External validity refers to the extent to which study findings were generalized beyond the sample used. Therefore based on the sample and the information gathered the study was generalized.

To ensure the validity of the questionnaire, a pre-test was conducted. This helped to check the appropriateness of the language used in constructing each item. The researcher also consulted further with the study supervisor for further insight into the validity of the instrument and then made the appropriate modifications. This is how the researcher had addressed the issue of reliability and validity of the study. Selection of the respondents was also very carefully done so that the best quality of data could be collected.

6.13 Ethical Considerations

Research requires not only expertise and diligence but also honesty and integrity. Ethics in research refers to the norms for conduct that distinguish between acceptable and unacceptable behavior (David and Resnik, 2010). This is done to protect the rights of respondents. To render this, the rights to anonymity, confidentiality and informed consent were observed.

Permission was sought or obtained from the Head/ Managers of the various associations as well as employers. Respondents were well informed about the purpose of the study, the required data and were assured that there would be no potential risks or costs associated with the exercise.

6.14 Limitations of the Study

It is perhaps one of the studies done with the competitive and emerging IT industry in Bangladesh. Occupational health hazard among the computer professionals was self reported as the researcher is a sociology student. Despite all efforts made to obtain relevant information, the findings of the study, the conclusion and recommendations should be considered in the light of the following limitations:

- The study was limited to selected few numbers of private firms in Dhaka city. Consequently, the findings cannot be generalized to computer professionals of the whole country.
- The respondents were selected from selected number of private firms and the views of these respondents cannot be considered representative of all professionals of Bangladesh.
- Work environments differs from office to firms, thus the generalization should not be done.
- The study also limited to time and resource materials.

CHAPTER SEVEN: RESULTS OF THE STUDY

7.0 Introduction

Taking into account the major objectives of the study and hypotheses too, this chapter assesses selected demographic and socio-economic background characteristics of the respondents; prevalence and pattern of health hazards, attitudes of the respondents towards health hazards and treatment the association between the computer professionals' health hazard and their working environment.

PART ONE: BACKGROUND CHARACTERISTICS

7.1 Demographic characteristics of the respondents

Table 1, shows the demographic characteristics of the respondents (n=105). Overall, the sample has the number of males (n=83, 79%) and the female respondents (n=22, 21%). The ages of the participants ranged from 20 to 45 years (Mean = 29.27yrs, median = 28yrs, SD= 5.7). The age group to which the highest number of respondents belonged to was 25 to 29 years (40%). Of the respondents a small proportion (n=3, 2.9%) belonged to 40 to 44 yrs and 45 years age groups. The majority of respondents indicated that they were single (n=54, 51.4%), with 42.9% (n=45) reported that they were married. Only 5 (4.8%) respondents reported that they were divorced, and only 1 (1%) reported that he was widowed. Most of the respondents of the sample reported that they were not the bread winner of the family (58.1%), with rest of the (41.9%) reported to be the bread winner of the family. In the case of highest level of education most of the respondents 46 (43.8%) were M Sc level, followed by 38 (36.2%) were graduates, and 21 (20%) were belonged to others category. Only 48 (45.7%) respondents had professional degree, whereas 57 (54.3%) did not have any professional degree. According to Table 5, most of the respondents 70 (66.67%) earned 10,000 to 50,000 BDT. However, 28 (26.67%) respondents earned 51,000 to 100000 BDT. Whether only 3 (2.86%) earned 110000 to 150000 BDT and 4 (3.8%) earned 151000 to 200000 BDT respectively. (Mean= 5.25 BDT, SD= 4.08, Median= 4).

Table 7.1: Socio-demographic characteristics of the sample (n =105)

Variables	Number	Percentage
<i>Age (in years)</i>		
20-24	20	19.0
25-29	42	40.0
30-34	25	23.8
35-39	12	11.4
40-44	03	2.9
45+	03	2.9
Mean = 29.27 years, SD = 5.71, Range = (20-45)		
<i>Sex</i>		
Male	83	79.0
Female	22	21.0
<i>Marital status</i>		
Married	45	42.9
Single	54	51.4
Divorced	5	4.8
Widowed	1	1.0
<i>Bread winner</i>		
Yes	44	41.9
No	61	58.1
<i>Highest level of education</i>		
B Sc	38	36.2
M Sc	46	43.8
Other	21	20.0
<i>Professional degree</i>		
Yes	48	45.7
No	57	54.3
<i>Monthly earnings of the respondents</i>		
Income (in Tk)		
10,000-50,000	70	66.7
51,000-100000	28	26.7
110000-150000	3	2.9
151000-200000	4	3.8
Mean = 5.25 tk, Median = 4.0, Range = (10,000-200000)		

Note: Percentage may not total 100 due to rounding

7.2 Present job category of the respondents

In table 2, respondent's present job category is presented. Most of the respondents were Software programmer (63.8%), followed by Development 63 (60.0%) and UI designer 42 (40.0%). Whereas many of them were Business analysts 36 (34.3%). 28 (26.7%) and 21 (20.0%) respondents reported to be Network engineer and Project manager respectively. Only 12 (11.4%)

respondents stated that they worked in other category. In this case the respondents provided multiple responses.

Table 7.2: Job category of the respondents (n = 105)

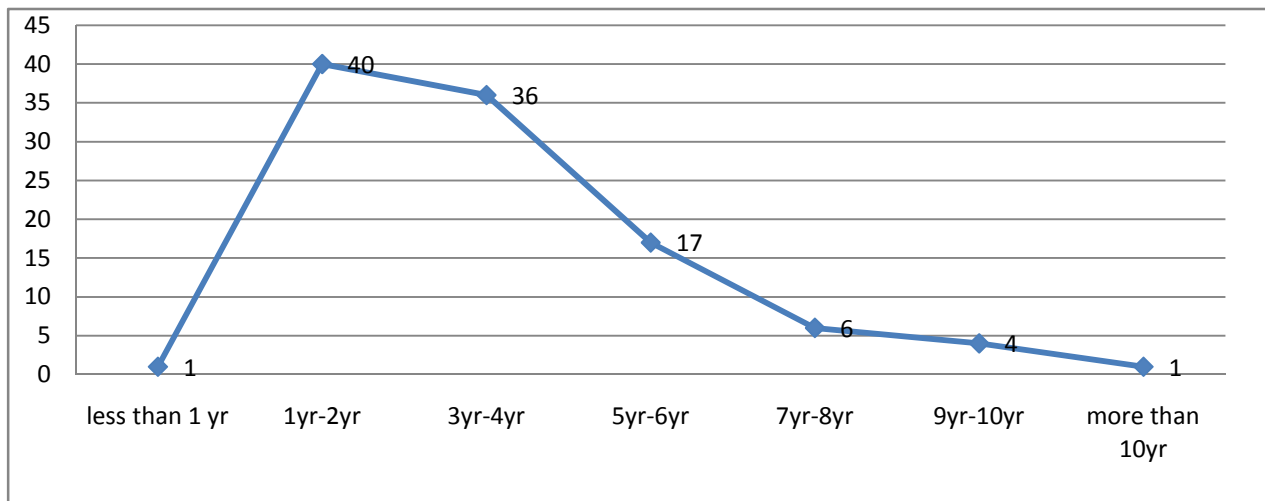
Job category	Yes		No	
	Frequency	Percentage	Frequency	Percentage
Software Programming	67	63.8	38	36.2
Development	63	60.0	42	40.0
UI designer	42	40.0	63	60.0
Network engineer	28	26.7	77	73.8
Business analyst	36	34.3	69	65.7
Project manager	21	20.0	84	80.0
Other	12	11.4	93	88.6

Note: Multiple responses.

7.3 Duration of work

Respondent’s duration of working year are illustrated in Figure 3. Overall, highest number of the respondents reported 40 (38.1%) 1-2 years of working in the organization. Followed by, 36 (34.3%) respondents worked for 3-4 years in the organization. However, 17 (16.2%) respondents stated to work for 5 to 6 years respectively. Whereas the lowest number of respondents (1.0%) worked for less than 1 year and 6 (5.7%) worked for 7-8 years respectively. Only 1% respondents reported to work for more than 10 years in the organization.

Figure7.1: Duration of work among the respondents



7.4 Daily working hour of the respondents

IT or computer professionals used to work for a long hour of the day in front of the computer. Thus their working hour varies from other professionals. In Table 4, the daily working hour of the respondents is presented. Where most of the respondents 17 (16.2%) worked for 10 hours a day. Followed by, 15 (14.3%) respondents worked for 8, 12 and 14 hour respectively. However, 7 (6.7%) respondents worked for both in 15 and 16 hours per day. But most alarmingly, 9 (8.6%) respondents reported to work for 18 hours daily.

Table 7.4: Distribution of work hours (n=105)

Hours	Frequency	Percentage
5	1	1.0
6	7	6.7
7	1	1.0
8	15	14.3
9	8	7.6
10	17	16.2
11	1	1.0
12	15	14.3
13	2	1.9
14	15	14.3
15	7	6.7
16	7	6.7
18	9	8.6
Total	105	100.0

PART B: WORK POSTURES OF RESPONDENTS

7.5 Work postures of respondents in the organization

Working postures have direct impact upon the health of any professionals. In the Table 5, respondents work posture is presented. 58 (55.2%) respondents stated that during work in front of the computer their head and neck remain upright or in line with torso and 69 (65.7%) answered that their head, neck, trunk to face forward. Whereas, only 35(33.3%) respondents reported their upper arms and elbows to be close to body and only 39 (37.1%) indicated that their thighs have sufficient clearance space between the top of the thighs and their computer table. Most of the respondents 92 (87.6%) respondents indicated that backrest provides support for their lower back, but only 48 (45.7%) stated that their thighs to be parallel to the floor. Whether

in case of Monitor distance, 79 (75.2%) participants reported that their monitor distance allows them to read the screen without leaning their head, neck or trunk forward or backward. Following that 76 (75.2%) respondents said that top of the screen is at or below eye level.

Table 7.5: Knowledge on the work postures of respondents in the organization (n=105)

<i>Work posture</i>	Yes		No	
	Frequency	Percentage	Frequency	Percentage
Head-neck in line with torso	58	55.2	47	44.8
Face forward	69	65.7	36	34.3
Upper arms and elbows close to body	35	33.3	70	66.7
Thighs to be parallel to the Floor	48	45.7	57	54.3
Backrest support low back	92	87.6	13	12.4
Top of the screen at the eye Level	76	72.4	29	27.6
Monitor distance allow to read screen	79	75.2	26	24.8
Thighs have sufficient clearance space	39	37.1	66	62.9

Note: Multiple responses.

7.6 Experience of health hazards

Questions were asked among the respondents whether they had experienced any health hazards in the last one year preceding the interview.

On the respondents responses about the health troubles (ache, pain or discomfort) during last 12 months in their different locomotive organs, Table 6 indicates that, a good number of respondents 43 (41.0%) had neck pain. However, 26 (24.8%) had trouble in both shoulders and 17 (16.2%) reported to had trouble in right shoulder. Only 9 (8.6%) respondents stated they had trouble in right elbow. Whereas, in the case of wrists trouble a large number of respondents 44 (41.9%) reported to have trouble in the right wrist, compared to only 2 (1.9%) reported to have trouble both in left wrist and in both wrists. According to the table, most of the participants 59 (56.2%) reported that they had upper back trouble, followed by 46 (43.8%) stated that they had lower back trouble and pain. In the case of hips or thighs trouble, 13 (12.4%) stated that they had trouble and 10 (9.5%) reported that they experienced ankles/feet pain. Only 7 (6.7%) indicated that they suffered knees trouble during last 12 months.

Table 7.6: Health hazards in the last one year (n=105)

Locomotive organs	Yes		No	
	Frequency	Percentage	Frequency	Percentage
Neck	43	41.0	62	59.0
<i>Shoulder</i>				
In the right shoulder	17	16.2	55	52.4
In the left shoulder	7	6.7	0	0.0
In both shoulders	26	24.8	0	0.0
<i>Elbow</i>				
In the right elbow	9	8.6	96	91.4
In the left elbow	0	0.0	0	0.0
In both elbows	0	0.0	0	0.0
<i>Wrists/hands</i>				
In the right wrist	44	41.9	57	54.3
In the left wrist	2	1.9	0	0.0
In both wrists	2	1.9	0	0.0
Upper back	59	56.2	46	43.8
Low back	46	43.8	59	56.2
Hips/thighs	13	12.4	92	87.6
Knees	7	6.7	98	93.3
Ankles/feet	10	9.5	95	90.5

Note: Multiple responses.

Health hazards are common now-a-days among the computer professionals. During the study, respondents reported different types of health hazards. The following examples illustrate respondents' experiences of health hazards due to their work postures and working hours. Some of their experiences have been included in the following discussion in order to establish their views. Commenting on his experiences of health hazards, one man reported:

I couldn't seat for a long time. As being a designer and a full time job holder I have to seat in chair for long hours, it resulted terribly in my health. I have been suffering from neck pain and back pain and day by day my condition is becoming worse.

In discussing health problem, another respondent reported:

I have been suffering from elbow and thigh pain for 1 year. Repeated physical movements as working on computer and keyboard resulted in these problems. But I couldn't help skipping my work in any case. This makes me more vulnerable to the problem.

7.7 Prevention from work due to health hazard

Serious health trouble may cause prevention from daily work routine. In the Table 7, the data demonstrated that 21 (20%) respondents were prevented from normal work due to neck trouble. Whereas, 15 (14.3%) respondents in both cases of shoulder and wrists trouble were prevented from normal work. On the other hand 5 (4.8%) respondents reported that elbow and thigh pain prevented them from normal work. Most of the participants 35 (33.3%) reported that they were prevented from normal work due to upper back pain, followed by 24 (22.9%) responded to lower back trouble caused their prevention from work. Only 2 (1.9%) reported that Knees pain caused their prevention from work during last 12 months.

Table 7.7: Distribution of responses regarding prevention from work due to health hazards

Have you been prevented from doing your normal work?	Yes		No	
	Frequency	Percentage	Frequency	Percentage
Neck	21	20.0	84	80.0
Shoulders	15	14.3	90	85.7
Elbows	5	4.8	100	95.2
Wrists/hands	15	14.3	90	85.7
Upper back	35	33.3	70	66.7
Low back	24	22.9	81	77.1
Hips/thighs	5	4.8	100	95.2
Knees	2	1.9	103	98.1
Ankles/feet	0	0.0	105	100.0

Note: Multiple responses.

Prevention from work due to health hazards occurs only when the health problem is very much severe and intolerable. Sometimes doctors prevent the patient from doing work. In this present study, some of the respondents expressed their situations. A 28-year-old male respondent explained his experience as:

I have been suffering from severe lower back pain that I can't work properly and even can't seat. Then i to take 8 months of break from my job because my doctor forbids me from any further difficulties and prescribed me to take rest.

7.8 Respondent’s experience of health hazards in the last week

Table 8 outlined the respondents health trouble in last week, where a good number of respondents 15 (14.3%) stated that they had upper back pain in last week, followed by 8 (7.6%) reported to have low back pain. On the other hand, 9 (8.6%) respondents suffered from shoulder trouble in last week and 6 (5.7%) from neck pain. 4 (3.8%) respondents reported to have both elbows and wrists pain, where 6 (5.7%) reported to have ankle trouble in last week.

Table 7.8: Respondent’s health hazards in the last week

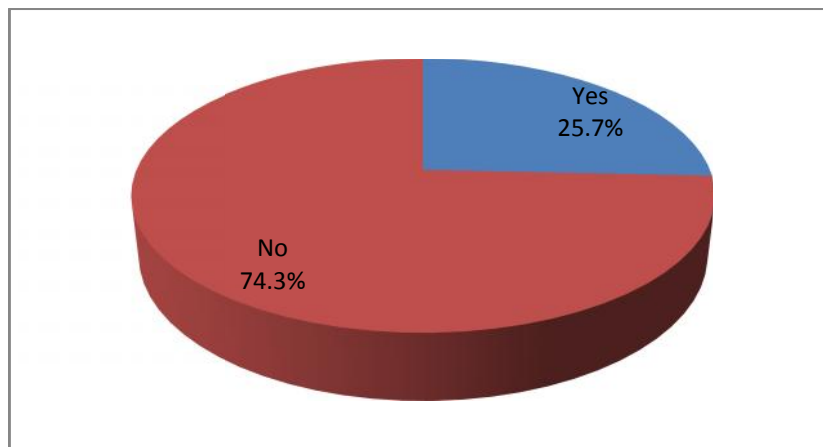
Locomotive organs	Yes		No	
	Frequency	Percentage	Frequency	Percentage
Neck	6	5.7	99	94.3
Shoulders	9	8.6	96	91.4
Elbows	4	3.8	101	96.2
Wrists/hands	4	3.8	101	96.2
Upper back	15	14.3	90	85.7
Low back	8	7.6	97	92.4
Hips/thighs	0	0.0	105	100.0
Knees	0	0.0	105	100.0
Ankles/feet	6	5.7	99	94.3

Note: Multiple responses.

7.9 Switching jobs due to health hazards

The chart showed that among the 105 respondents only 27 (25.7%) reported to change of their job or duties due to health trouble. Compared to 78 (74.3%) reported not changed.

Figure 7.2: Responses regarding switching jobs due to health hazards (n=105)



People switch job for many reasons. Severity of health hazards is one of the main reasons. Some of the views are expressed by the computer professionals' switching their jobs due to health hazards. According to a respondent:

I can't compromise with my work and even I can't bear the health trouble too. Finally I decided to quit my job and change it to a more comfortable with my health condition.

PART C: ATTITUDES OF THE RESPONDENTS TOWARDS HEALTH HAZARDS

7.10 Consultation with a doctor/physio-therapist

On the respondents responses Table 10 presented the knowledge whether the respondents seen doctor or physio-therapist. The table illustrated that 42 (40.0%) respondent visit doctors due to their health problems during last 12 months.

Table 7.10: Consultation with a doctor/physio-therapist due to health hazards in the last 12 months

Response	Frequency	Percentage
Yes	42	40.0
No	63	60.0
Total	105	100.0

7.11 Reasons for consulting a doctor/ physio-therapist

Knowledge and practices related to health problems. Usually the work posture and work duration create different health problems among the professionals. Suffering from acute health problems then they visit the doctors. Table 11 indicates that 42 (40%) respondents seen doctors during last 12 months. Now, Table 12 is presented with the name and the percentages of the health problem of the respondents. According to the table, most of the respondents 13 (12.4%) seen the doctors due to upper back problem, along with 11 (10.5%) visited doctors due to low back problem. Whereas, 7.6 percent suffered from shoulder trouble, in other case 6.7 percent due to neck trouble. Only 2 (1.9%) had seen doctor due to wrists pain and only 1 respondent due to thigh trouble. The data demonstrated that upper back problem and low back problem, along with shoulder and neck pain are the common health problems among the respondents.

Table 7.11: Nature of health problems experienced by the respondents (n = 42)

Health problems	Frequency	Percentage
Shoulder trouble	8	7.6
Neck trouble	7	6.7
Wrists pain	2	1.9
Thigh trouble	1	1.0
Upper back problem	13	12.4
Low back problem	11	10.5
Total	42	40.0

Note: Multiple responses.

Severe health problems lead the patient to consult with doctors. Many respondents in the present study reported to visit the doctor for different health issues. Some of the respondents discussed about the reasons of consulting doctors or physio-therapists. One respondent reported:

Doctors defined my health condition as a common problem among the computer professionals who works for long hours on computer and use key boards. Cervical Spondylitis (neck pain) is diagnosed by the doctors. They prescribed me with proper rest, adjusting the proper level of computer screen and eye, with other medications.

7.12 Eye restrains

Here in the Table 7.12, the knowledge about the respondents visit to doctor due to eye problem during last 12 months is presented. The data demonstrated that, among the 105 (100%) respondents majority of them 78 (74.3%) in number suffered eye restrains due to computer related work hour and work pressure.

Table 7.12: Experience of eye problem among the respondents (n= 105)

Response	Frequency	Percentage
Yes	27	25.7
No	78	74.3
Total	105	100.0

Eye restrains are common symptoms among the computer professionals. Respondents shared their experience in the study. A male respondent expressed:

My eyes were red, itchy and constantly irritating. Sometimes tears started dropping for no reason and I suffered mostly the headache.

PART D: SMOKING CIGARETTES

7.13 Smoking cigarettes

Table 7.13 illustrated that among the 105 respondents 66 (62.9%) smoked cigarettes.

Table 7.13: Response about cigarette smoking of the respondents (n=105)

Response	Frequency	Percentage
Yes	68	64.8
No	37	35.2
Total	105	100.0

7.14 Relation between working hour and cigarette smoking

Smoking cigarettes is a common habit found among the computer professionals. Regular long and pressurized work hours sometimes lead the participants to smoking. Association between the number of work hour daily and smoking cigarettes are illustrated in Table 14. The association is defined by the two category of respondents as, who works for below 10 hours and those who works for more than 10 hours. Chi-square analysis of the results indicated that smoking

cigarettes is related to work hour of the respondents ($\chi^2 = 27.19$, $df = 1$, $p = <0.05$)

Table 7.14: Association between the number of daily work hour and smoking cigarettes

Number of work hour daily	Smoking cigarettes		Total
	Yes	No	
<10 hours	19	30	49
>10 hours	49	7	56
Total	68	37	105

$$\chi^2 = 27.19, df = 1, p = <0.05$$

Respondents smoking habit is related to their working hours, which is also supported by the respondents. Some of the respondents expressed their experiences. One respondent reported:

During the long work hour I felt very monotonous. Smoking cigarettes reliefs me from my boring work time and also reduce my work pressure. I like to smoke because it also gives me company.

7.15 Smoking behavior and stress

Smokers used to smoke for different reasons. Table 15 demonstrated the response of smoking cigarettes with stress, tension and fatigue on the basis of the opinions of the respondents. 49 (46.7%) respondents replied that smoking relieves from stress, whereas 27 (25.7%) and 33 (31.4%) stated that smoking cigarettes relieves them from tension and fatigue respectively.

Table 7.15: Response related to smoking behavior (n= 68)

Response	Yes		No	
	Frequency	Percentage	Frequency	Percentage
Stress	49	46.7	19	18.1
Tension	27	25.7	41	39.0
Fatigue	33	31.4	35	33.3

Note: Multiple responses.

Some of the respondents also expressed their views about the smoking behavior and stress. Stress, tension and fatigue can be reduced by the smoking reported by many respondents. One male respondent expressed:

Smoking cigarettes diverts my mood and it also reduces my stress. Smoking always refreshes me from my stressful work hour. My colleagues enjoy it too.

PART E: SOCIAL RELATIONSHIPS

7.16 Dynamics of social relationships

Table 16 presented that, among the 105 respondents majority of them 61 (58.1%) reported that computer related job create problem in their social life, whereas other 41.9% reported no social problems.

Table 7.16: Problem in social relationships due to lengthy working hour (n = 105)

Response	Frequency	Percentage
Yes	61	58.1
No	44	41.9
Total	105	100.0

Nature of problem experienced

Table 17 is presented with the type of problem in social relation due to work is illustrated. According to the table, 21 (20.0%) respondents replied computer related job create distance in relation (with spouse), whereas 5 (4.8%) stated that lack of time for social interactions (with friends/ relatives or peer groups). However, 2 (1.9%) respondents identified lack for time for children as a problem. But most of the respondents around 31.4% answered multiple option with all the other problems.

Table 7.17: Nature of problem experienced in social relations (n = 61)

Problems in social relation	Frequency	Percentage
Distance in relation	21	20
Lack of time for children	2	1.9
Lack of time for social interaction	5	4.8
Multiple	33	31.4
Total	61	58.1

Note: Multiple responses.

Respondents in this present study expressed their views about the impact in social and personal relations due to their work. Distance in relation, lack of time for children and parent , lack of social interactions are the most common problems. Commenting on his experience in social relation, one respondent reported:

I felt stress to communicate with others during work. Sometimes I switched off my phone. All these communication gap creates a lot of misunderstanding and psychological problems. I want to balance my life and want some peace.

7.17 Association between sex of the respondents and computer job related problems with social relation

Computer job related problems in social relation have different impact upon the male and female respondents. Table 18, is presented with the association between the sex of the respondents and computer job related problems with social relations. Among 83 male respondents, 31 people replied that they had social relation problem due to work pressure and work related health hazards. Whereas, among 22 female participants, 13 female stated that they faced social

problems. Chi-square analysis of the results indicated that female respondents are more likely to face social problems than male respondents ($\chi^2 = 3.38$, $df = 1$, $p = <0.05$)

Table 7.18: Association between sex and problems arising out from computer related job (n = 61)

Sex	Problem in social relation		Total
	Yes	No	
Male	31	52	83
Female	13	9	22
Total	44	61	105

$$\chi^2 = 3.38, df = 1, p = <0.05$$

Computer related job creates problem more or less in both female and male respondents. However, female respondents reported to face more difficulty with balancing their job and personal or social life. One female respondent commented:

I always remain in anxiety for the security of my child. As I leave my child with the maid servant for a long time in a day due to office. Even I asked for a daily child care zone in office but the employers didn't pay heed to it.

PART F: DEPRESSION AMONG THE REASPDENDENTS

7.18 Hamilton Depression Rating Scale (HDRS): the level of depression among respondents

According to Hamilton Depression Rating Scale (HDRS. 1960), the level of depression had been analyzed in the Table 19. Mild depression was observed among most of the respondents 57 (54.3%) and severe depression among only 7 (6.7%). However, a good number 41 (38.0%) reported to have moderate depression.

Table 7.19: Level of depression among the respondents using HDRS

Level of depression	Frequency	Percentage
Mild	57	54.3
Moderate	41	38.0
Severe	7	6.7
Total	105	100.0

Note: Mild = 0-17 points, Moderate = 17-25 points, Severe = above 25

7.19 Association between the number of daily work hour and the level of depression of the respondents

Long work hour and excessive work pressure create high depression and health problems. In Table 20, the association between the number of daily work hour and the level of depression had been analyzed. The data demonstrated that, the gradual increase of depression with the increase of work hour. Most of the respondents suffered from mild depression but moderate depression was found among the long hour workers more often. Chi-square analysis of the results indicated that moderate depression is more likely to find among the respondents who worked more than 10 hours daily ($\chi^2 = 36.34$, $df = 24$, $p = <0.05$)

Table 7.20: Association between duration of working hour and level of depression

Level of depression	Working hour		Total
	<10 hours	>10 hours	
Mild	29	28	57
Moderate	16	25	41
Severe	4	3	7
Total	49	56	105

$$\chi^2 = 36.34, df = 2, p = <0.05$$

Long working hour creates many types of health problem along with depression and anxiety. Most of the respondents reported to suffer from depression due to work hour. Commenting on the experience of depression, one respondent reported:

I have no good connection with my friends and relatives due to busy in my day long working hours. I think, I am living an unfulfilled social life, which leading me to further loneliness and depression.

Other respondent reported:

My profession benefits me with economic solvency and luxurious life style but in the mean time, I have lost my good health to enjoy it and yes, I am depressed about it.

PART G: WORK ENVIRONMENT

7.20 Work environment and facilities

Table 21, is presented with the respondent's work environment facilities. According to the table, 49 (46.7%) respondent reported that they had regular lunch on time in office. However in case medical support, 58 (55.2%) reported to have medical first aid box in office, whether 5 (4.8%) replied to have medical first aid box with one trained person and only 1 respondent stated to have dispensary with patient room, doctor and nursing staff. Most of the respondents 73 (69.5%) and 84 (80.0%) reported to have fire safety and clean establishment in the office respectively. In the case of provident / employees welfare fund only 22 respondents replied positively. However emergency support was available for 50 (47.6%) respondents in their offices.

Table 7.21: Work environment facilities

Work environment facilities	Yes		No	
	Frequency	Percentage	Frequency	Percentage
Medical first aid box	58	55.2	47	44.8
Medical first aid box with one trained person	5	4.8	100	95.2
Dispensary with availability of doctors and nurse	1	1.0	104	99.0
Fire safety	73	69.5	32	30.5
Clean establishment and free from nuisance	84	80.0	21	20.0
Provident fund/ welfare support	22	21.0	83	79.0
Emergency support/ compensation	50	47.6	55	52.4

Note: Multiple responses.

Work environment plays a significant role in the health and mental well being of computer professionals. Respondents in this study, stated about their work environment. One respondent stated:

My office is decorated with fine furniture and clean texture. But it is matter of fact that we don't have a canteen facility. During the long work hour, I use to skip my lunch because of unavailability of food in office.

7.21 Government and organization's intervention for better working environment

Table 22 shows the knowledge on the respondents' expectations from the organization. The table demonstrated that only 46 (43.8%) respondents expected the governments, employers interventions.

Table 7.22: Expectations of employees from government and organization for enhancing better work condition (n=105)

Response	Frequency	Percentage
Yes	46	43.8
No	59	56.2
Total	105	100.0

Expectations of the respondents

Table 23 shows that 14 (13.3%) respondents expected employers support for infrastructural development of the organization. Whereas, 13 (12.4%) respondents expected to have governments initiatives in the betterment of this service sector. Increased training is another important initiative that was expected by 7 (6.7%) of the respondents. Followed by 5 (4.8%) and 4 (3.8%) respondents expected to have provident/ welfare fund and salary increased support respectively. Only 3 (2.9%) respondents expected work environment for women.

Table 7.23: Type of initiatives expected by the respondents (n = 46)

Type of initiatives	Frequency	Percentage
Employers support	14	13.3
Salary increased	4	3.8
Provident/ welfare fund	5	4.8
Work environment for women	3	2.9
Increased training	7	6.7
Government support	13	12.4
Total	46	43.8

Note: Multiple responses.

Respondents shared their expectations in this study. One of the respondents reported:

I wish my employers allow us provident fund with emergency compensations. I think our government should also contribute more in this service sector.

CHAPTER EIGHT: DISCUSSION

8.0 Introduction

This chapter presents the key findings emanating from the data analysis. A comparative discussion is done between the present study and some previous studies done in USA, UK and India. This discussion shades lights on the health hazards of the Bangladeshi computer professionals and their occupational health and safety risks in work environment.

8.1 Discussion

Software industry in Bangladesh has come a long way over the last few decades. The industry has become dynamic with a significant number of energetic entrepreneurs making their mark. Software has become a growing industry in Bangladesh over the last two decades. Recent trends indicate that the industry has reached a take off stage and poised for high growth. Market size of the total ICT industry in the country is estimated to be approximately Tk 1,100 crore (excluding the telecom sector). Of the total ICT market, the size of software segment (mainly comprising customized and packaged software) is estimated to be around Tk. 170 crore (BASIS, 2006).

But it is a matter of fact that this industry and its large number of labour are still unnoticed by the researcher of different fields. Every emerging industry boost up the economy of the country, in the mean time it creates also some radical impact upon its labour force, their socio-psychological and economic life. Here in this research paper the health hazards of the computer professionals of Dhaka city is analyzed. From the survey, the following major findings have been outlined. This has been done according to the objectives of the study.

This study is subject to several limitations that are mainly related to unavailability of the respondents specially the female respondents. The first limitation was unwillingness of the computer professionals to participate in the survey due to heavy work load of the respondents. The second most foremost limitation is the low number of female respondents. As this particular sector is still an emerging sector women did not show much interest in it still. Though day by day like other challenging sector the number of female professionals is also increasing in a slow but steady rate.

Many studies have been done by the researchers of different countries like USA, UK, Australia, India and so on, on this particular study. Studies show that on an average an IT professional will work fifty hours per week with six hours on Saturday and Sunday, as well as seventy percent of the time working while ill. However, in this particular issue there was no specific study in Bangladesh. Whereas, Bangladeshi researcher keep themselves engaged in garments and construction sector like shipyards to determine our countries present scenario of occupational health hazards, the health and safety risk of the computer professionals still in darkness. The reason behind this darkness seems to be the emerging condition of the industry. In other countries like India, particular rules and regulations are already made due to their importance. This study provides the health and safety risk of Bangladesh computer professionals. The results provided baseline data on the prevalence and patterns of health hazards among the computer professionals of Dhaka city. Among the 105 respondents, 83 males and 22 females participated from 12 different software companies located in both southern and northern part of Dhaka city corporation. The prevalence and pattern of health hazards among the computer professionals related with their working hour and work environment.

8.2.1 Posture

Although it is unlikely that computer equipment will be dangerous itself, it can be used in ways which can be hazardous to health of staff ("Computer health and safety policy," 2003). Ergonomics is an applied science devoted to incorporating comfort, efficiency, and safety into the design of items in the workplace (Shelly and Vermaat, 2008). Studies done in India, using ergonomics show that using the correct chair, keyboard, display device, and work surface configurations helps computer users work comfortably and efficiently and also preserve their health.

The result provided 55.2 percent of the respondents reported that during work on the computer their head and neck remain upright or in line with torso and 65.7 percent answered that their head, neck and trunk to face forward. Whereas, only 33.3 percent reported that their arms and elbows to be close to body, only 37.1 percent indicated that their thighs have sufficient space. Top of the screen to the eye level was not for 27.6 percent respondents and 24.8 percent said that monitor distance allows reading screen.

8.2.3 Health hazards

A study done in India by Giri et al reported one or more computer related health problem in 93.3% of the study subjects, the commonest complaint being musculoskeletal (73.3%) followed by ocular (65.3%) and psychosocial (46.0%)(7). Sivaraman G. et al in their study observed musculo-skeletal discomfort in 75.5% respondents and computer vision syndrome in 59.4% subjects (8). Prevalence of Carpal Tunnel Syndrome was found to be 13.1% in a study done by K. Mohamed Ali and B.W.C. Sathiyasekaran. According to the Centers for Disease Control and Prevention's National Health and Nutrition Examination Survey USA, in 2005-2006 the prevalence of obesity among adult men was 33.3% and 35.3% among adult women. According to a May 2008 CareerBuilder.com survey of approximately 7,700 employees, 34% of respondents who identified themselves as IT workers said they had gained more than 10 pounds in their current job, and 17% had packed on more than 20 pounds. While IT workers' weight gain was less than those in financial services and government, it was still above the average, for all workers who took the online survey, where 26% said they had gained 10 pounds and 12% had gained 20 or more. Weight gain, particularly when around the middle, where it tends to collect in middle age, has been directly linked to metabolic syndrome, a group of risk factors that increase propensity for heart diseases and diabetes, among other problems. Diabetes, in turn, opens the door to a host of other issues, including blindness, sores that don't heal and more serious maladies. Type 2 diabetes occurs most frequently in people who are 45 or older and overweight, according to the American Heart Association. Another unpleasant side effect of obesity, especially as it relates to diabetes and metabolic syndrome, is testosterone deficiency, which can lead to erectile dysfunction and lowered libido, according to reports from endocrinologists.

- **Musculoskeletal disorders**

The office life is hard on your muscles and skeleton, thanks to the prolonged computer use that's so common among IT workers. When the body is still, circulation slows, reducing the supply of oxygen and nutrients to the muscles. This scenario, coupled with poor posture, can produce a number of musculoskeletal disorders (MSD), according to the National Institute for Occupational Safety and Health, which manifest with pain, tingling, discomfort, numbness and swelling in the joints and muscles. More than 1 million people lose time from work each year due to

musculoskeletal disorders, which can be easily avoided with proper attention to workplace ergonomics and with regular exercise that includes back-strengthening routines, according to "Musculoskeletal Disorders and the Workplace," a report published by the National Research Council and the Institute of Medicine of the National Academies.

From the present study the results indicated that a good number of respondents 41.0 percent had neck pain. However, 24.8 percent had trouble in both shoulders and 16.2 percent reported to had trouble in right shoulder. Only 8.6 percent respondents stated they had trouble in right elbow. Whereas, in the case of wrists trouble a large number of respondents 41.9 percent reported to have trouble in the right wrist, compared to only 1.9 percent reported to have trouble both in left wrist and in both wrists. Most of the participants 56.2 percent reported that they had upper back trouble, followed by 43.8 percent stated that they had lower back trouble and pain. In the case of hips or thighs trouble, 12.4 percent stated that they had trouble and 9.5 percent reported that they experienced ankles/feet pain. Summarizing the total scenario it can be said that, neck pain, shoulder trouble, wrists pain, upper back and lower back pain are the most common health troubles among the professionals.

- **Eye restrain**

According to the American Optometric Association, people who use computers daily at work or at home could suffer from computer vision syndrome, which leaves them vulnerable to problems like dry eye, eyestrain, neck and backaches, light sensitivity and fatigue. The AOA's 2007 American Eye-Q survey reveals that 41% of Americans experienced eye strain after prolonged computer or handheld device use, while 45% cited neck or back pain. While many of these symptoms cease once the sufferer is off the computer, some people will continue to experience visual problems, such as blurred distance vision.

Present study among the computer professionals of Dhaka city revealed that among the 105 respondents majority of them 74.3 percent suffered eye restrains due to computer related work hour and work pressure.

- **Prevention from work**

Computer related injuries which began to be reported in India five years ago are now developing into an epidemic among computer users. It is estimated that world-wide, 25% of computer users are already suffering from computer related injuries. The United States has to shell out more than 2 billion US dollars annually for having ignored these computer related problems. It is now proved that the duration of work and computer-related problems are positively correlated. It is not uncommon these days for people having to leave computer-dependent careers or even be permanently disabled and unable to perform tasks such as driving or dressing themselves. Occupationally caused RSI rank first among the health problems, in the frequency with which they affect the quality of life.

The data demonstrated that 20 percent respondents were prevented from normal work due to neck trouble. Most of the participants 33.3 percent reported that they were prevented from normal work due to upper back pain, followed by 22.9 percent responded to lower back trouble caused their prevention from work.

- **Consulting doctor or physio-therapists**

The result of the study showed that 40 percent respondent visit doctors due to their health problems during last 12 months, which is very alarming. Most of the respondents 12.4 percent seen the doctors due to upper back problem, along with 10.5 percent visited doctors due to low back problem. Whereas, 7.6 percent suffered from shoulder trouble, in other case 6.7 percent due to neck trouble. The data demonstrated that upper back problem and low back problem, along with shoulder and neck pain are the common health problems among the respondents. The knowledge about the respondents visit to doctor due to eye problem during last 12 months is presented. The data demonstrated that, among the 40 percent respondents majority of them 26 in number suffered eye restrains due to computer related work hour and work pressure.

- **Smoking cigarettes**

Smoking cigarettes is a common habit found in the professionals. Among the 105 respondents 62.9 percent smoked cigarettes. Overall, 46.7 percent respondents replied that smoking relieves

from stress, whereas 25.7 percent and 31.4 percent stated that smoking cigarettes relieves them from tension and fatigue respectively.

- **Health hazard and social life**

The results provided that among the 105 respondents majority of them 58.1 percent reported that computer related job create problem in their social life, whereas other 41.9 percent reported no social problems. Knowledge on the respondents type of problem in social relation due to work is illustrated. 20.0 percent respondents replied computer related job create distance in relation (with spouse.. But most of the respondents around 31.4 percent answered multiple options with all the other problems. Among 83 male respondents, 37.4 percent people replied that they had social relation problem due to work pressure and work related health hazards. Whereas, among 22 female participants, 59.09 percent female stated that they faced social problems. Thus female faced much social problem than the males.

- **Mental health and stress**

Working 10-plus-hour days and maintaining a 24/7 umbilical cord to BlackBerry amounts to some serious overstimulation for the brain. Without implementing a consistent exercise regimen to boost brain endorphins or allotting the proper downtime for mental relaxation, overworked IT professionals leave themselves vulnerable to increased stress.

During times of stress, the brain releases adrenaline and other hormones to heighten senses and boost strength. While experts consider the normal stress response healthy, chronic stress can harm the immune and cardiovascular systems, and increase vulnerability to heart disease, depression, exhaustion, sleep deprivation.

Work-related stress, while motivating in manageable doses, can grind down your health over time. Undue stress can lower your immune defenses, increase the risk of heart disease and bring on anxiety, depression and difficulty sleeping, according to the Mayo Clinic.

According to Hamilton Depression Rating Scale (HDRS), the level of depression had been analyzed in the pie chart. Mild depression had found among most of the respondents 54.3 percent and severe depression among only 6.7 percent. However, a good number 38.0 percent reported to have moderate depression.

- **Work environment and facilities**

The knowledge about the work environments facilities provides that 46.7 percent respondent reported that they had regular lunch on time in office. However in case medical support, 55.2 percent reported to have medical first aid box in office, whether 4.8 percent replied to have medical first aid box with one trained person and only 1 respondent stated to have dispensary with patient room, doctor and nursing staff. Most of the respondents 69.5 percent and 80.0 percent reported to have fire safety and clean establishment in the office respectively. In the case of provident / employees welfare fund only 22 respondents replied positively. However emergency support was available for 47.6 percent respondents in their offices.

CHAPTER NINE: CONCLUSIONS

9.1 Conclusions

Technology has benefited us with numerous inventions which makes our life more comfortable and livable. In this modern era computer and internet plays the most significant role in communication, economics, and industrialization so on. This competitive world making us always remains in a constant race to increase our living condition. We are rushing after better job, promotion, money and luxurious life style. In this crucial race we are losing so many important part of us like health, family and social life. Computer professionals are the white collar job holders in the modern globalized world. As their work directly and in many case indirectly day by day controlling the world's economy and social life. Work urgency, accuracy and demands compel the computer professionals to spend longer hours before computers without giving importance to their health, especially body weight. Like many other developed countries IT industry in Bangladesh is emerging as a fastest growing economic sector. The youths of this country are very much enthusiastic to be a part of this industry. Even the Government of Bangladesh also leading the tagline of "Digital Bangladesh" as a promotion to uphold the nations developing scenarios.

Available literature from chapter two, three and four revealed the emergence of this giant industry in Bangladesh. This was confirmed by the empirical data from the health and safety issues of the computer professionals in Dhaka city metropolitan area still in preliminary stage and was realized that all activities of OHS institutions were geared towards the garments and construction sector.

The findings served to illuminate important points about the prevalence and pattern of health hazards among the computer professionals in Dhaka city. Although, these kind of desk jobs are never treated as a risky job like garments and construction sectors. There are still no empirical study about these particular sector's pupil's health and safety risks in Bangladesh. Here the present study provided the health and safety risks of the computer professionals', also providing the relation between their work environment and work hour pattern. Neck pain, eye restrain, back pain, carpel tunnel syndrome, headaches, heart problem seems to be the prime health

problems due to long work hours and wrong work postures. Even their smoking habit also analyzed. Impact of health hazards and work pressure upon their social life also determined and work related depression was proved to be there among the professionals. The injuries and diseases as indicated in the analysis is alarming and therefore requires immediate attention from employers and employees through the use policy of ergonomics work station, and the government by the formulation and implementation of an OHS policy. It is therefore hoped that if the recommendations in this chapter are implemented the health and safety of computer professionals will be ensured and Bangladesh's Health for All policy will be achieved.

9.2 Recommendations

Occupational health hazards have a clear effect on employees, employers, society and the nation at large. Though Bangladesh is still in a primary phase of occupational health hazards among the computer professionals, these recommendations should be implemented by government and all other OHS stakeholders, employers and employees within the short term to help reduce. The recommendations include the following:

9.2.1 Role of Government

1. Formulation and Review of OHS Policy and Act

The formulation of a comprehensive OHS policy will render policy makers and all OHS institutions a sense of direction in their service delivery.

2. Reforms of OHS Institutions

There is the need for government to set up an institution which will be solely in-charge of national OHS issues, headed by a senior official in-charge to establish mechanisms for monitoring the success of occupational health and safety programmes.

3. Effective Collaboration among OHS Institutions

All OHS institutions should initiate a concerted effort to address the health and safety hazards and the risks of occupational illness and injury that are associated with this sector to reduce the risks to an acceptable level. However OSHE is collaborating various agendas referring occupational safety and health, it should be promoted more by the government.

4. Awareness Creation

Awareness creation using advertisements, radio and television talk shows as well as drama to understand the ergonomically settings of work environment among the professionals should be done. This could be done by employers or OHS institutions, non-governmental organizations and civil societies.

9.2.2 Role of Employers

Healthy and comfortable workstation that fits the worker who uses it, should be the main concern of the employers. Since people are not all the same shape or size, the workstation needs to be adjustable. Ergonomics should be considered new computers or furniture are purchased or older equipment is replaced. During buying new or fixing old equipment, the ergonomics committee along with other employees should evaluate the products. The following recommendations should make computer work safer and more comfortable for the vast majority of computer operators (Hedge, Morimoto and McCrobie 1999)

1. Monitor

- viewing distance should be 18–30 inches
- eyes level with top of monitor — able to see top
- monitor tilt is adjustable
- contrast/brightness controls
- document holder
- should be placed directly in front of user to eliminate twisting the neck to view

2. Keyboard

- adjustable surface to hold the keyboard
- keyboard slope 0°–25°
- keyboard surface adjustable 23–28 inches above floor
- padded wrist rests

3. Chair

- seat height adjustment 16–20.5 inches
- seat width a minimum of 18 inches
- contoured, cushioned seat pan

- space between the back of the knees and the front edge of the seat
- angle between seat pan and seat back 90°–105°
- backrest contoured in shape and supports lumbar region
- foot rests
- armrests adjustable for height and width

4. The Office Environment

Many offices that were originally designed for tasks such as reading printed document and typing need to be modified to address the special lighting requirements of computer work, excess noise and proper indoor air quality.

5. Lighting

Inappropriate office lighting is probably the most widespread environmental problem for computer workers. There are a number of ways to correct lighting problems.

- Eliminate glare and bright sunlight from windows by using curtains or shades and positioning the screen at a 90 degree angle to windows. Screens should never be placed with a window directly in front or behind the terminal.
- Reduce glare from overhead lighting by using indirect lighting or by shielding overhead tubes with shields or parabolic louvers.
- Try glare screens, if needed, after attempting to eliminate bright light and glare.
- Use a desk lamp (task lighting) when more light is needed for working with printed material.
- Furnish offices with colors and materials that absorb rather than reflect light.

6. Indoor air quality

A comfortable temperature should be maintained, with humidity around 50 percent. The ventilation should be properly maintained, filters regularly changed, and enough air exchanges provided to prevent the buildup of air contaminants.

Provident fund and emergency support

For any kind of emergency or health and welfare support the employers should have some schemes. Along with the provident fund other facilities like canteen facility, fire safety should be provided to the employees.

9.2.3 Role of Employees

To reduce health hazards some straight forward precautions should be taken by computer users to avoid problems.

1. Avoiding Musculoskeletal problems

- Taking regular breaks from working at computer - a few minutes at least once an hour
- Regular stretching to relax body
- Using equipment such as footrests, wrist rests and document holders if need to
- Keeping mouse and keyboard at the same level
- Avoiding gripping mouse too tightly - hold the mouse lightly and click gently
- Familiarizing with keyboard shortcuts for applications regularly use (to avoid overusing the mouse)

It is also important to have the workstation set up correctly. Workstation includes monitor, keyboard, mouse, seating, desk, and where appropriate, footrest (to enable one to put his feet flat if he would otherwise not reach the floor), wrist rest, and document holder.

2. Avoiding Eyestrain

- Exercising the eyes by periodically focusing on objects at varying distances
- Blinking regularly
- Keeping the air moist - for example using plants, open pans of water or a humidifier (spider plants are said to be particularly good for this and removing chemical vapours from the air)
- Adjusting the screen height / seating so that when sitting comfortably eyes are in line with the top of the monitor screen
- Adjusting the brightness control on monitor for comfort
- Adjusting the refresh rate of your monitor to stop it flickering
- Positioning monitors to avoid glare (e.g. not directly in front of windows)
- Keeping monitor the screen clean
- Keeping the screen and document holder at the same distance from eyes
- Regular eye testing - do this at least once every 2 years and more frequently if necessary - especially if one is experiencing eye problems related to using display equipment. Indicate the distance from eyes to the monitor to the optician and talk to them regarding special lenses or the use of bifocals.

3. Preventing computer-related overuse injuries

- Have the mouse at the same height as correctly positioned keyboard.
- Position the mouse as close as possible to the side of the keyboard.
- Use whole arm, not just your wrist, when using the mouse.
- Type lightly and gently.
- Remove hands from the keyboard when not actively typing, to let the arms relax.

4. Exercise

- Doing free hand exercise like yoga and others to keep the blood circulation regular in body.
- Balanced diet with healthy eating habit

5. Things to remember

- Be aware of the computer related injuries like back, neck and shoulder pains, headache, eyestrain and overuse injuries of the arms and hands.
- Start taking measures (like ergonomically workstation) before it too late.

REFERENCES

- Ali, B.O. (2008). *Fundamental Principles of Occupational Health and Safety*. International Labour Office- Geneva: ILO.
- Bakhtiar, C.S., Rao, V. and Suneetha S. (2003). Attitude Alters the Risk for Development of RSI in Software Professionals. *Indian Journal of Occupational and Environment Medicine*, 7(1), 11-15.
- Bangladesh Association of Software and Information Services (BASIS) (2006). *The Cost and Management*. Dhaka: BASIS, Nov-Dec.
- Bangladesh Association of Software and Information Services (BASIS) (2014). *ICT Sector Study Bangladesh: Bridging the Gap between Dutch and Bangladeshi ICT Sectors*. Dhaka: BASIS, January. Available at: www.basis.org.bd/resource/ICT%20Sector%20Study%20Bangladesh.pdf (Accessed on: 20 October 2014)
- Bangladesh Bureau of Statistics (BBS) (2009). *Gender Statistics of Bangladesh 2008*. Dhaka: BBS. Government of Bangladesh.
- Biddle, E.A. (2001). *The Economic Cost of Fatal Occupational Injuries in the United States*. WV, Morgantown.
- Blalock, S.J., DeVellis, R.F., Giorgino, K.B., DeVellis, B.M., Gold, D., Dooloy, M.A., Anderson, J.B., & Smith, S.L. (1996). Osteoporosis Prevention in Premenopausal Women: Using a Stage Model Approach to Examine the Predictors of Behavior. *Health Psychology*, 15, 84–93.
- Blinder, A.S. and Quandt, R.E. (1997). The Computer and The Economy. *The Atlantic Monthly*, December, 280 (6), 26-32.
- Chowdhury, A.K.M.M.A. (1996). Labour and Industrial Law of Bangladesh. *Bangladesh Labour Journal*, 17, 234-278.
- Chowdhury, M.S. and Alam, Z. (2009). ICT-Driven Knowledge Economy In Bangladesh: Issues And Constraints. *Journal of Knowledge Management Practice*, March, 10 (1).
- Cruickshank, B. (2010). *Occupational Health Management*. Warwick Medical School, UK.
- Das, R. (2012). Occupational Health Concerns of Software Professionals and Their Coping Strategies. *International Journal of Management Research and Business Strategy*, 1(1), October. Available at: www.ijmrbs.com (Accessed on: 7 September 2014)

- David, B. and Resnik, J.D. (2011). *What is Ethics in Research & Why is It Important?* Research Triangle Park: National Institute of Environmental and Social Sciences, USA.
- Ditto, Peter H.; Lopez, David F. (1992). Motivated Skepticism: Use of Differential Decision Criteria for Preferred and Non-preferred Conclusions. *Journal of Personality and Social Psychology*, 63(4), 568-584.
- Doan. (2001). *Occupational Health & Safety: An Overview of Employers' Obligations*. Thomson Reuters, Australia.
- Gibbons, F. X., Gerrard, M., Blanton, H., and Russell, D. W. (1998). Reasoned Action and Social Reaction: Willingness and Intention as Independent Predictors of Health Risk. *Journal of Personality and Social Psychology*, 74, 1164-1181.
- Gollwitzer, Peter M. (1999). Implementation Intentions: Strong Effects of Simple Plans. *American Psychologist*, 54(7), July, 493-503.
- Greenwald, M.J. and Blake, R. (1983). Long Lasting Visual Aftereffects from Viewing a Computer Video Display. *New England Journal of Medicine*, 309-15.
- Hamilton M. (1960). A Rating Scale for Depression. *Journal of Neurol Neurosurg Psychiatry*, 23, 56–62.
- Hassan, S. A. (2012). *Health, Safety and Environmental Practices in the Construction Sector of Pakistan*. Uppsala, Sweden: Department of Earth Sciences, 85, 47-30.
- Hedge, A., Morimoto, S. and McCrobie, D. (1999) *Effects of Keyboard Tray Geometry On Upper Body Posture and Comfort*, *Ergonomics*. 42 (10), 1333-1349.
- Hobday, M. (1995). East Asian Latecomers: Learning The Technology Of Electronics. *World Development*, Washington DC, 23 (7), 1171-1193.
- Hogstedt, C. and Pieris B. (2000). *Safety and Health in Developing Countries: Review of Strategies, Case Studies and Bibliography*. National Institute for work life, 17. Available at: <http://www.niwl.se,arb/> (Accessed on: 19th November 2014)
- Hossain, J., Ahmed, M. and Akter, A. (2010). Decent Work and Bangladesh Labour Law: Provisions, Status, and Future Directions. *Bangladesh Labour Law Studies*, April.
- International Labour Organization (ILO) (1999). *Report of the Director-General: Decent Work, International Labour Conference*, 87th Session. Geneva: ILO.
- International Labour Organization (1996). *Your Health and Safety at Work*. Geneva: ILO. Available at: <http://www.ilo.org/safework/info> Date (Accessed on: 2 august 2014)

- International Labour Organization (ILO) (2002). Guidelines on Occupational Safety and Health Management Systems. Geneva: ILO.
- International Standardization Organization (ISO) (2007). *How ISO/IEC Guides Add Value to International Standards, International Organization for Standardization and International Electrotechnical Commission*. Geneva: ISO.
- Islam, M. (2005). ICT in Bangladesh: Waiting to Take Off. *The Daily Star*, 6 February.
- Karim, H. N. (2010). Bangladesh IT Industry Going Global. *The Daily Star*, 6 January.
- Klayman, J. (1995). Decision making from a Cognitive Perspective. New York: Academic Press (Psychology of Learning and Motivation) 32, 365-418.
- Kuorinka, Jonsson, B., Kilbom, A., Vinetberg, H., Biering, F-Sorensen, Andersson, G. Jorgensen, k. (1987). Standardized Nordic Questionnaire For The Analysis Of Musculoskeletal Symptoms. *Applied Ergonomics*, 18(3), 233-237
- Laila, N. (2008). It Has Good Prospects In Bangladesh. *The Financial Express*, 11 May.
- McLeroy, K.R, Bibeau, D., Steckler, A., Glanz, K. (1988). An Ecological Perspective on Health Promotion Programs. *Health Education Quarterly*, 15(4), 351-77.
- Ministry of Planning (MOP) (2002). *Fifth Five Year Plan. (1997-2002)*. Dhaka: Planning Commission, MOP, Government of Bangladesh.
- Ministry of Health and Family Welfare (MOHFW) (1995). *Occupational Health and Safety*. Dhaka: Directorate General of Health Services, MOHFW.
- Ministry of Finance (MOF) (2009). *Bangladesh Economic Review 2009*. Dhaka: Finance Division, MOF, Government of Bangladesh.
- Ministry of Finance (MOF) (2013), *Journey Towards A Digital Bangladesh : Update 2013*. Dhaka: Finance Division, MOF, Government of Bangladesh. Available at: www.mof.gov.bd/en/budget/ebook/digital_journey.pdf (Accessed on: 20 September 2014)
- Muyid, A.A. (2014). Occupational Safety and Health Awareness Plans to Prevent Accidents in the RMG Factories. *Media Advisory*, 26 May.
- Occupational Safety and Health Environment Foundation (OSHE) (2014). Occupational Safety and Health Environment Foundation. Available at: www.oshebd.org, (Accessed on : 12 October 2014)
- Prasad, M A., Wagh, V., Mudey, A. (2014). Study on Prevalence and Health Problems among

Computer Professionals in Selected Information Technology (IT) Company in Nagpur District of Central India. *Innovative Journal of Medical and Health Science*, 4 (3), 96 - 98.

Raskin, J. (2000). *The Human Interface : New Directions for Designing Interactive Systems* (1st ed.). Mass : Addison Wesley.

Reinharz, S. (1992), *Feminist Methods in Social Research*, New York: Oxford University Press, 413.

Stokols, D (1996). Translating Social Ecological Theory into Guidelines for Community Health Promotion. *American Journal of Health Promotion* , 10, 282–98.

Schwarzer, R., & Fuchs, R. (1995). *Changing Risk Behaviors And Adopting Health Behaviors: The Role of Self-Efficacy Beliefs*. New York:Cambridge University Press,259-288.

Sharma, A.K., Khera, S. and Khandekar, J. (2006). Computer Related Health Hazards Among Information Technology Professionals in Delhi. *Indian Journal of Community Medicine*, 31 (1), 36-38.

Shelly, Gary, Vermaat and Misty. (2008). *Discovering Computers*. Boston, MA: Course Technology.

Shrivastava. S.R. (2012). Computer Related Health Problems among Software Professionals in Mumbai- A Cross-sectional Study. *Safety Science Monitor*, 16 (3), 2012.

Stigliani. J. (1995). *The Computer User's Survival Guide: Staying Healthy in a High Tech World* (1st Edi). Sebastopol: O'Reilly and Associates, 277.

Swanson, R.A. (2013). *Theory Building in Applied Disciplines*. San Francisco, CA: Berrett Koehler Publishers.

Thiebaud, J.R. (2010). Effects of Technology on People: Living F2F Conversation and Social Interaction Proceedings. *Media Ecology Association*, 11.

Weinstein, N.D., Rothman, A. J. and Sutton, S. R. (1998). Stage Theories Of Health Behavior: Conceptual and Methodological Issues. *Health Psychol* ,17(3), 290-9.

Weinstein N.D., Peter M. Sandman, and Susan J.Blalock, in Karen Glanz, Barbara K. Rimer, and World Health Organization (WHO) (1994). Declaration on Occupational Health For All. Beijing: WHO.

World Health Organization (WHO) (1999). *Occupational Health: Ethically Correct, Economically Sound*. Geneva: WHO.

www.maps.google.com.bd (Accessed on: 29 November 2014)

APPENDIX 1

QUESTIONNAIRE ON COMPUTER PROFESSIONAL'S HEALTH HAZARDS

Section: 1 Information (*in years*)

1. Age:
2. Sex: [] Male [] Female
3. Marital Status [] Married [] Single [] Divorced [] Widowed
4. Are you the breadwinner of your family? [] Yes [] No
5. If yes, how many dependents do you have? (*Including children*)
.....
6. What is your highest level of education?
7. Any Professional Degree/ Training? (*Title of Degree/ Training*)
.....
.....
8. How many years/months have you been working in this organization?
9. Number of work hours per day? (*on average*).....
10. How much do you earn a month?
.....

Section: 2 Occupational health hazard and working environment

Working Postures- The workstation is designed or arranged for doing computer tasks so it allows your...

11. Head and neck to be upright or in-line with the torso (*not bent down/back*).

YES

NO

12. Head, neck, and trunk to face forward (*not twisted*).

YES

NO

13. Upper arms and elbows to be close to the body (*not extended outward*).

YES

NO

14. Thighs to be parallel to the floor and the lower legs to be perpendicular to floor (*thighs may be slightly elevated above knees*).

YES

NO

SEATING—Consider these points when evaluating the chair:

15. Backrest provides support for your lower back (*lumbar area*).

YES

NO

MONITOR—Consider these points when evaluating the monitor. The monitor is designed or arranged for computer tasks so the

16. Top of the screen is at or below eye level so you can read it without bending your head or neck down/back.

YES

NO

17. Monitor distance allows you to read the screen without leaning your head, neck or trunk forward/backward.

YES

NO

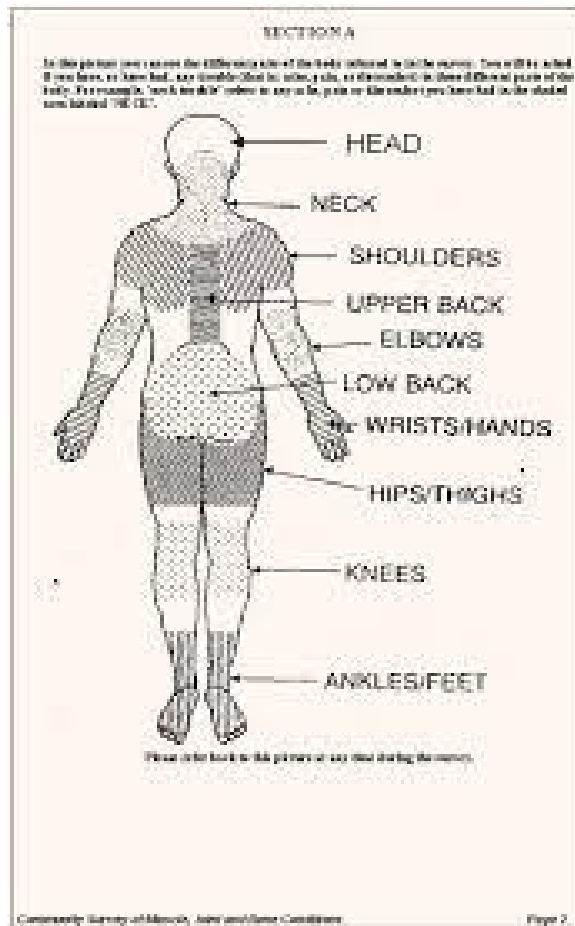
WORK AREA—Consider these points when evaluating the desk and workstation. The work area is designed or arranged for doing computer tasks so the

18. Thighs have sufficient clearance space between the top of the thighs and your computer table/keyboard platform (*thighs are not trapped*).

YES

NO

Section: 3 Knowledge and Practices related to Health Hazards



In this picture you can see the approximate position of the parts of the body referred in the questionnaire. Limits are not sharply defined and certain parts overlap. You should decide for yourself in which part you have or have had trouble (if any).

How to answer the questionnaire:

Please answer by putting a tick mark in the appropriate box—one tick for each question. You may be in doubt as to how to answer, but please do your best anyway. Please answer every question, even if you have never had trouble in any part of your body.

Trouble with the locomotive organs

Have you at any time during last 12 months had troubles (ache, pain, discomfort) in:	To be answered only by those who have had troubles	
	Have you at any time during the last 12 months been prevented from doing your normal work (at home or away) because of the trouble?	Have you had trouble at any time during last 7 days?
Neck		
1.No 2.Yes	1. No 2. Yes	1. No 2. Yes
Shoulders		
1.No 2.Yes,in the right shoulder 3.Yes, in the left shoulder 4.Yes,in both shoulders	1. No 2.Yes	1. No 2. Yes
Elbows		
1.No 2.Yes in the right elbow 3.Yes,in the left elbow 4.Yes, in both elbows	1. No 2. Yes	1. No 2. Yes
Wrists/Hands		
1.No 2.Yes, in the right wrist/hand 3.Yes,in the left wrist/hand 4.Yes,in both wrists/hands	1. No 2. Yes	1. No 2. Yes
Upper back		
1.No 2.Yes	1. No 2. Yes	1. No 2. Yes
Low back (small of the back)		
1.No 2.Yes	1. No 2. Yes	1. No 2. Yes
One or both hips /thighs		
1.No 2.Yes	1. No 2. Yes	1. No 2. Yes
One or both knees		
1.No 2.Yes	1. No 2. Yes	1. No 2. Yes
One or both ankles/feet		
1.No 2.Yes	1. No 2. Yes	1. No 2. Yes

19. Have you ever had to change your job or duties because of work related health troubles?

YES

NO

20. Have you been seen by a doctor or physio-therapists or other such persons because of troubles during last 12 months?

YES

NO

21. If 'yes', then why? (*mention the health problems*)

.....

22. Do you smoke cigarettes? (*current behaviors*)

YES

NO

23. If 'yes', then why? (*any relationship with the present job*)

.....

24. Do you think smoking give you relief from--- Stress / Tension / Fatigue?

	Stress	Tension	Fatigue
YES			
NO			

25. Can you have your lunch on time at the office?

YES

NO

26. What kind of job are you current doing? (*multiple response is possible*)

Software programming / Development/ UI designer/ Network engineer/ Business analyst/
 Project manager/ Others

.....

Section: 4 Social interactions and Social relations

27. Does computer related job create problems with your family or social relations?

(*e.g., Distance in relationship, lack of time for children, lack of social interactions*)

YES

NO

28. If 'yes', then how?

.....
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.....

Hamilton Depression Rating Scale (HDRS)

Main purpose: The following section aims to assess severity of, and change in, depressive symptoms Population Adults.

PLEASE COMPLETE THE SCALE BASED ON A STRUCTURED INTERVIEW

Instructions: for each item select the one "cue" which best characterizes the respondent. Be sure to record the answers in the appropriate spaces (positions 0 through 4).

29. DEPRESSED MOOD (*sadness, hopeless, helpless, worthless*)

- 0| Absent.
- 1| these feeling states indicated only on questioning.
- 2| these feeling states spontaneously reported verbally.
- 3| communicates feeling states non-verbally, i.e. through facial expression, posture, voice and tendency to weep.
- 4| respondent reports virtually only these feeling states in his/her spontaneous verbal and non-verbal communication.

30. FEELINGS OF GUILT

- 0| Absent.
- 1| Self reproach feels he/she has let people down.
- 2| Ideas of guilt or rumination over past errors or sinful deeds.
- 3| Present illness is a punishment. Delusions of guilt.
- 4| Hears accusatory or denunciatory voices and/or experiences threatening visual hallucinations.

31. SUICIDE

- 0| Absent.
- 1| Feels life is not worth living.
- 2| Wishes he/she were dead or any thoughts of possible death to self.
- 3| Ideas or gestures of suicide.
- 4| Attempts at suicide (any serious attempt rate 4).

32. INSOMNIA: EARLY IN THE NIGHT

- 0| No difficulty falling asleep.
- 1| Complains of occasional difficulty falling asleep, i.e. more than 1/2hour.
- 2| Complains of nightly difficulty falling asleep.

33. INSOMNIA: MIDDLE OF THE NIGHT

- 0| No difficulty.
- 1| Patient complains of being restless and disturbed during the night.
- 2| Waking during the night – any getting out of bed rates 2 (except for purposes of voiding).

34. INSOMNIA: EARLY HOURS OF THE MORNING

- 0| No difficulty.
- 1| Waking in early hours of the morning but goes back to sleep.
- 2| Unable to fall asleep again if he/she gets out of bed.

35. WORK AND ACTIVITIES

- 0| No difficulty.
- 1| Thoughts and feelings of incapacity, fatigue or weakness related to activities, work or hobbies.
- 2| Loss of interest in activity, hobbies or work – either directly reported by the patient or indirect in listlessness, indecision and vacillation (feels he/she has to push self to work or activities).
- 3| Decrease in actual time spent in activities or decrease in productivity. Rate 3 if the patient does not spend at least three hours a day in activities (job or hobbies) excluding routine chores.
- 4| Stopped working because of present illness. Rate 4 if patient engages in no activities except routine chores, or if patient fails to perform routine chores unassisted.

36. RETARDATION (*slowness of thought and speech, impaired ability to concentrate, decreased motor activity*)

- 0| Normal speech and thought.
- 1| Slight retardation during the interview.
- 2| obvious retardation during the interview.
- 3| Interview difficult.
- 4| complete stupor.

37. AGITATION

- 0| None.
- 1| Fidgetiness.
- 2| playing with hands, hair, etc.
- 3| moving about can't sit still.
- 4| Hand wringing, nail biting, hair-pulling, biting of lips.

37. ANXIETY PSYCHIC

- 0| No difficulty.
- 1| Subjective tension and irritability.
- 2| Worrying about minor matters.
- 3| Apprehensive attitude apparent in face or speech.
- 4| Fears expressed without questioning.

38. ANXIETY SOMATIC (*physiological concomitants of Anxiety*) such as: gastro-intestinal

- Dry mouth, wind, indigestion, diarrhea, cramps, belching cardio-vascular
- Palpitations, headaches respiratory
- Hyperventilation, sighing urinary frequency sweating

- 0| Absent.
- 1| Mild.
- 2| Moderate.
- 3| Severe.
- 4| Incapacitating.

39. SOMATIC SYMPTOMS GASTRO-INTESTINAL

- 0| None.
- 1| Loss of appetite but eating without staff encouragement. Heavy feelings in abdomen.
- 2| Difficulty eating without staff urging. Requests or requires laxatives or medication for bowels or medication for gastro-intestinal symptoms.

40. GENERAL SOMATIC SYMPTOMS

- 0| None.
- 1| Heaviness in limbs, back or head. Backaches, headaches, muscle aches. Loss of energy and fatigability.
- 2| any clear-cut symptom rates 2.

41. GENITAL SYMPTOMS (*symptoms such as loss of libido, menstrual disturbances*)

- 0| Absent.
- 1| Mild.
- 2| Severe.

42. HYPOCHONDRIASIS (*a psychological disorder characterized by excessive preoccupation or worry about having a serious illness*)

- 0| not present.
- 1| Self-absorption (bodily).
- 2| Preoccupation with health.
- 3| frequent complaints, requests for help, etc.
- 4| Hypochondriacal delusions.

43. LOSS OF WEIGHT

According to the respondent:

- 0 No weight loss.
- 1 Probable weight loss associated with present illness.
- 2 Definite (according to patient) weight loss.
- 3 Not assessed.

44. INSIGHT

- 0 Acknowledges being depressed and ill.
- 1 Acknowledges illness but attributes cause to bad food, climate, overwork, virus, need for rest, etc.
- 2 Denies being ill at all

Total score:

Section: 5 Interventions by Government, Employers, Employees

45. Do you have any establishments of---

a) Medical first aid box?

YES

NO

b) One trained person per first aid box?

YES

NO

c) An equipped dispensary with a patient-room, doctor and nursing staff in your work place?

YES

NO

46. Do the Employers have required appropriate measures to protect workers from danger and damage due to fire?

YES

NO

47. Is the establishment kept clean and free from effluvia (*bad smell*) arising out of any drain, privy or other nuisance?

YES

NO

48. Do you have any Provident Fund if three-fourths / a Workers' Welfare Fund for its workers?

YES

NO

49. Does the employer provide compensation (*under insurance*) to its workers for work-related injury, disability and death?

YES

NO

50. Do you expect Government / organization's initiative for the betterment of your work environment?

YES

NO

51. If 'yes', then what kind of?

.....
.....

APPENDIX 2

CASE STUDY GUIDELINES

1. What are the background characteristics of the respondents? (e.g. name, age, sex, present occupation, daily work hour in front of computer, work duration in the organization in years, monthly income)
2. What is the health hazards experienced by the respondents due to work?
3. How much severe the health hazard is?
4. What is the respondent's attitude towards the health hazards?
5. What is the result of the doctor's diagnosis?
6. What are the treatment and suggestion given by the doctors or physio-therapists?
7. What is the impact of his work hour and health hazards in his personal and social life?
8. How much severe is the problem in social interaction and maintaining social relations?
9. Any symptoms of depression in the respondent?
10. What is the scenario of the office work environment of the respondent?
11. Does the respondent expect any kind of government or employers initiative?
12. What are the initiatives are?

APPENDIX 3

CASE STUDIES

Case study no. 1

Latiful Kabir, 28 years old married man who works as a Designer and Business analyst in a software company. He is working for more than 4 years and daily works for 18 hours in his office and home. His monthly income is around Tk. 80 thousand. During his job career he had to consult doctor for his physical discomfort and pain. Doctor diagnosed him as a patient of severe upper and low back pain and prescribed him many medicines and some physical therapies. But his poor health condition did not improve. Rather he couldn't seat for a long time. As being a designer and a full time job holder he had to seat in his chair for long hours, it resulted terribly in his health condition. Then he went to India in search of better treatment. There problems identified as cervical radiculopathy (a compression of the nerve roots in the neck) and bursitis of the shoulder on down to pulled or strained muscles, ligaments and tendons in the lower back. Doctors diagnosed his illness as a result of his long time work posture and unhealthy food habit. They prescribed him with medicines and therapists too along with regular diet chart. They also for bit him form work for a certain period. Thus in his job career he has 8 months of job break. Being as a IT professional it hampered his career as well as his economic condition. Physical illness brings mental stress too. Depression and frustration becomes his regular companion. Insomnia and lack interest in everything affecting his health improvement. He is having a very tough fight both against his illness and stress. He is a married man with a kid. His sudden break in work effect his child's education. After 8 months of break he starts working again but this time with more concern. He reduced his working hour and also makeover his work environment. He followed his doctor's instructions to maintain a proper attention to workplace ergonomics and with regular exercise that includes back-strengthening routines. Though his clients are not as enthusiastic as before with his work but he is hopeful about his job.

Case study no. 2

Nasrin Islam, 26 years old working woman who works as a software programmer in an IT company in Dhaka city. She is a graduate from University of Dhaka, department of Computer Science and engineering. She has been working for 2 years and daily work for 10 hours. Her monthly income is around Tk. 40 thousand. In her 2 years of work life she visited doctor most of the time due to her Neck pain. She has been suffering from this pain for 6 months and day by day it becomes unbearable. Doctors prescribed her a lot of medicines but it couldn't help her. Then she visited physio-therapist and they identified the problem in her work posture. As a software programmer she has to constant look on the computer screen. Thus Cervical Spondylitis (neck pain) –happens due to improper level of the computer screen and eyes. Constant looking low at the monitor causes this problem as it'll stiffen the muscles of the neck and make them rigid. Her physio-therapists suggested her some free hand exercises and movements with medicines. In the mean time she suffered eye restrain too. She used to wear glasses but radically her power in glass increases due to the radiation and light from the computer screen. She suffers from computer vision syndrome, which leaves her vulnerable to problems like dry eye, eyestrain, neck and backaches, light sensitivity and fatigue which her eye specialists diagnosed. Even though the doctor predicts that many of these symptoms result from poor workstation configuration and improper work habits. Physio-therapists suggests her that the distance should be 18-24 inches between the computer monitor and her eye to keep her eyes healthy. Taking off the keyboard from the computer desk and arranging it somewhere nearer to her, In case she has enough space on her desk, put the computer screen farthest possible. Now she is in treatment for both of her neck pain and eye restrain. Her condition didn't change radically but the breaks in long work hour and free hand exercise ease her sufferings. She also requested her boss to improve the ergonomics setting of her office first with the changing of the lights. She claims that the poor lighting of the office disturbs her health conditions a lot. Enough lighting in the room is very essential for a better work environment to work on computer.

Case study no. 3

Mobassher Chowdhury who works as a software programmer, UI designer, business analysts and project manager in 2 software firms located in Dhaka city. He is a 40 years old married man with 3 dependents in his family. He has been working for more than 14 years in these professions and his daily work hour is 12. Whereas, his monthly income is 1 lack 50 thousand Tk. He has a long history of visiting doctors due to shoulder pain, back pain, elbow trouble and leg problem. Various doctors diagnosed different problems like, epicondylitis, also known as tennis elbow, is a condition caused by overuse of the elbow. It is a very painful, inflammation of the tendons on the outside of the elbow that join the forearm muscles. These muscles and tendons become damaged from overuse and repeated motions which leads to pain and tenderness on the outside of the elbow. He has been suffering from this particular health hazard for quite a long time. Even increase in cholesterol is diagnosed in his body due to improper food timing, junk food, lack of motion and exercises. Improper breathing, chronic constipation, and poor blood circulation also cause this issue. He is a chain smoker, which also affect his lungs and hurts. According to him, smoking diverts his mood from monotonous day long works. The impact of his work pressure and health hazard in his personal and social life is also noticeable. He couldn't have good bonding time with his kids. When his kids grow up he can't remember. He used to be very busy with his projects and clients deadlines. He faced several ups and downs in relation with his wife Mira. He can't manage proper time for her and always depend on her for every family responsibility. His wife gets upset and several times she wanted to be separated. But it was always their kids that they never dare to lose. It is also said by him that he has no good connection with his old friends or any relatives. His life is confined to his business clients and their demands. Even whenever he arranges party it relates the business again. Work pressure makes him a work maniac. Although he is a patient of several health problems, he cannot compromise with his work. But as per doctor's suggestion he improved the lighting and air conditioning in the office. Along with the work environment settings he is working on the improvement of whole office.

Case study no. 4

Forhad Alam is a 24 years old software programmer who works in a software company named South Tech Ltd in Dhaka city. He has been working for 10 months as a software programmer and he daily works 8 hours. He completed his B Sc a few months ago. His monthly income is 18 thousand Tk. Still he is a newcomer in this profession and enjoying his work very much. Though work pressure disturb his normal flow of life. From few months he has been suffering from Computer Vision Syndrome (CVS) is a problem associated with repetitive or extensive computer use. CVS is the complex of eye and vision problems related to near work which are experienced during or related to computer use. CVS it characterized by visual symptoms which result from interaction with a computer display or its environment. His doctor diagnosed this particular eye restrain in him. Daily 8 hours of working on the computer without even blinking properly effect his eye tissue and the light problem also have a negative impact upon him. However this young man is already started using glasses and also tries to maintain the proper use of computer. According to Forhad Alam, daily 8 hours of working reduce his interest to go out after office and hangout with friends. He said that he can't even join any party or occasion by his friends except in the holidays. His friends become dishearten with him but he can do nothing. In his personal life he is engaged with his girlfriend who is still a student. His beloved person also disturbed with his work pressure. Day by day he is getting busy more with different projects. He also threatens with the deadlines of his client's project. Thus in his leisure even he remain busy with the anxiety of work. He believes that he is leading an unfulfilled social life, which leads to further loneliness and depression. He loves his job but he misses his social and personal life too. He wants to balance time between his work and beloved ones. Unfortunately, it's getting impossible to make out time for life out of the office for this junior software programmer.

Case study no. 5

Rehnuma Rahman is a 27 year old married woman with 1 kid. She works in a computer firm in Dhaka city. She has been working for 4 years and daily works for 8 hours. Her husband is an investment banker in a renowned bank in Dhaka. She works as a web developer and business analysts. Her monthly income is 45 thousand Tk. Very soon after her graduation she joined a software firm and then moved to this company. During this period she got married and had a kid after 1 year. According to her, life of a working woman whether she is a teacher/banker/web developer is always very tough. She wakes up at 6 am every day. After finishing the domestic chores and preparation of breakfast and lunch she goes to office by 9 am. Her kid stayed at home with her maid servant (bua). She accused that she always remain in an anxiety for the protection of her kid. Even she asked for a daily care zone in office but her employer didn't response in a good way. Work pressure and anxiety for the security of her kid always haunted her. She becomes utterly depressed. Along with this depression, she has been suffering from neck, shoulder and wrist discomfort and pain. After few months she consulted a doctor. Her doctor diagnosed Repetitive Strain Injuries (RSI), which occur from repeated physical movements which cause damage to tendons, nerves, muscles and other soft tissues. It relates to with increased computer use, faulty typing techniques, poor body posture and positions. Lack of adequate rest between work and excessive use of force while using the mouse or the keyboard can lead to repetitive stress injuries (RSI). During these 4 years of working gradually she got weight much. According to her doctor if she couldn't control her weight, it would lead her to health problem like obesity and high blood pressure. Lack of motion, activities and exercises, constant sitting on the chair in front of the computer add extra pounds to her body. She is suggested by her doctor to reduce her fat by balanced diet and regular exercise. But she feels its very difficult to do exercise after a long and tiring work day and doing all household chores with a kid of 2and half years old. Though her profession is very lucrative and flexible from others view points but still it has some alarming impact on her body and mental well being.

Case study no. 6

Imran Abdullah is 28 years old Software professional and network engineer. He works in an IT company in Dhaka city. He daily works for 12 hours both in home and office. He has been working for 5 years. His monthly income is 40 thousand Tk. According to him, he has been suffering from neck and wrists pain from last 1 and half years. In the mean time it has become so intolerable that he visited doctor. His doctor identified Carpal Tunnel syndrome is a condition that occurs when the median nerve is squeezed as it crosses the wrist to enter the hand. It has been recognized that repetitive movement at the wrist, as occurs with prolonged use of a computer keyboard can lead to inflammation in the carpal tunnel leading to carpal tunnel syndrome. Doctors defined this health hazard as a common problem for the computer professional who works for long hours on computer and use key boards. They prescribed him with proper rest, wrists movement exercise and medications. However, he suffers from Cervical Spondylitis (neck pain) –this happens due to improper level of the computer screen and eyes. Constant looking low at the monitor causes this problem as it stiffens the muscles of the neck and makes them rigid. Adjusting the level of the computer monitor and maintaining the viewing angle is the simple solution for the problem according to the therapists. If this is not possible, adjusting the chair –making it higher or shorter with the help of level provided. Moving neck up-down several times after every hour also helps. Imran Abdullah follows his doctor’s suggestions and tries to maintain the ergonomics work setting. Even he suggests his other colleagues too. He also claimed to be very upset with his social life. He got puzzle every now and then in his work. His near and dear ones find that he stop spontaneous responding verbally. He said, he felt stress to communicate with others during work. Sometimes he switched off his phone. All these behavioral change in him continuously is creating several social and psychological problems in his relationships. He wants to balance his life and wants peace too. But he remains in a hard condition where he finds no way to exist. These psychological pressure cerates moderate depression in him measured by Hamilton Depression Rating Scale used in the questionnaire. He is suggested to consult with a counselor as soon as possible.

Case study no. 7

Iftexhar Alam is a senior software programmer in a multinational software firm located in Dhaka city. He is 38 years old, divorced person. He has been working for 12 years and daily works 14 hours. His monthly income is around 2 lacks Tk. He also works as a business analysts and project manager in different projects. His life is like “sitting around playing on a computer”. The truth is there are lots of risks with “sitting around playing on a computer”. Being at a desk and in front of a computer can be just as hazardous as being a construction worker or a mover for a moving company. There are health hazards that go along with sitting all day. Blood clots from lack of movement, the lighting of the computer screen which cause headaches and eye strain. Thus ultimately he becomes a patient of High Blood Pressure with obesity. Even his doctor suspects about Diabetics too. Manly Obesity is the main problem of him as because with a busy work environment, often time there is no time for a nice long lunch hour which leads to grabbing something quick and usually not the healthiest on the menu. Thus junk food and unhygienic food adds more extra fat to the body. This obesity never comes alone; Heart problem is a regular companion of it. According to Iftexhar Alam, obesity and Heart problem disrupted his career several times. Legs and thigh pain and the back pain also the result of his work environment. Last few years he had consulted several physio-therapists to deal with these. However everyone suggest him first to have a right work posture in an ergonomically setting. Mr. Alam changed his two time for this reason. His profession benefited him with economic solvency with luxurious life style. But in the mean time he lost his sound health to enjoy this life. Not only in health but also his social and personal life is disturbed. His wife couldn't manage the timing with him. Distance in relationship results in extra marital affair. Finally it concluded in divorce. Their only kid lives with her mother. After the divorce, he lost his mental control. Even left his job then. Severe depression was diagnosed in him. Frustration and anxiety destroy his career. After couple of months of counseling he finally returns to work. Now he is conscious with his living habit and his work environment. Being a boss he always preferred the ergonomic setting of the office environment. But work load always block the way.

Case study no.8

Arif Ibne Ali , a 26 years old computer professional who works as a network engineer in a software company in Dhaka city. He has been working for 2 and half years as a computer professional. Daily he works for 6 hours in office. His monthly income is 35 thousand Tk. His work needs full concentration in the computer all day long. Even after office he has to cover all the backups ready from his personal laptop. Thus literally he works more than 10 hours on computer. This day long work pattern already showing its impact upon his body and mind. His eyes are red, itchy and constantly irritating. The simple reason is the screen, its radiation and resolution (the brightness and contrast). Thus computer related vision syndrome/ eye restrain become severe problem for him. On the basis of doctor's prescription he has started using glasses and maintaining the rule (18-24 inches) of the distance between computer screen and eyes. Again, Stiffness and pain in the wrist, numbness in the fingers and tingling sensation in the hand are few of the symptoms are experienced by him. Doctor diagnosed these symptoms as Carpal Tunnel Syndrome. Therapist suggested him that wrist should be parallel to the desk so that he doesn't from any angle while typing or moving the mouse. Along with this problem the lighting of the office also play a big part. The posture of eye, head and neck all are affected. Arif said that he was fixed to his chair and desk all the day. But after these problem arising he starts the movements and taking short breaks during heavy work. The impact of this health hazards disturbs his work definitely but he has taken measure in a very early stage which helps him to continue work. However, in personal life he is still a bachelor. He doesn't face distance in relationship with partner but in truth he passes a very short time in family. He tries to attend the family dinner every day. His old friends are also busy like him so he never gets the chance to have friendly hangouts. Although in office he managed some colleagues as friends.