

**PERCEPTION OF NUTRITIONAL STATUS AND  
PERSONAL HYGIENE PRACTICES OF FEMALE  
GARMENTS WORKER IN CHATTOGRAM CITY,  
BANGLADESH**



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**A thesis submitted in the partial fulfillment of the requirements for the degree of  
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**DECEMBER, 2019**

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**This is to certify that we have examined the above Master's thesis and have found that is complete and satisfactory in all respects, and that all revisions required by the thesis examination committee have been made**

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# *Dedication*

*DEDICATED TO MY RESPECTED  
AND BELOVED PARENTS,  
TEACHERS AND HUSBAND*

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## List of abbreviation

ARI	Acute Respiratory Infection
BBS	Bangladesh Bureau of Statistics
BDHS	BDHS Bangladesh Demographic Health Survey
BGMEA	Bangladesh Garment Manufacturers and Exporters Association
BMI	Body Mass Index
FAO	Food and Agriculture Organization
GDP	Gross Domestic Product
HNPSP	Health, Nutrition and Population Sector Programme
HPSP	health and population sector program ()
HPNSDP	Health, Population and Nutrition Sector Development Programme
ILO	International Labor Organization
MoHFW	Ministry of Health and Family Welfare
NGOs	Non-Governmental Organizations
NNP	National nutrition programme
NIPORT	National Institute of Population Research and Training
PHC	Primary Health Care
SEAR	Region of Southeast Asia
SVRS	Sector Wide Approach
SDGs	Sustainable Development Goals
UHC	Upazila Health Complex
UNHFWC	Union Health and Family Welfare Center
UNICEF	United Nations International Children's Emergency Fund
USDA	United States Department of Agriculture
WHO	World Health Organization

## Abstract

Garments industry is the foremost economic sector of Bangladesh. Female workers are the crucial part in this sector to enhance economy. This effortful sector has progress here rapidly due to its ordinary technology, inexpensive labor and small scale area. The prime aim of this study was to perception of nutritional status and personal hygiene practices of female garments workers at Chattagram, Bangladesh. A cross-sectional study was carried out among the selected 382 female garments worker from different factories situated in Chattagram. A pre-prepared questionnaire was used to find out the association among various factors such as age, marital status, level of education etc with nutritional status and personal hygiene. Body mass index (BMI) was used to explore the nutritional status of female garments workers. This study revealed that 46.34% were normal weight, 3.14% were underweight, 38.74% were preobese and 11.78 % were obese respectively. It also presented that age, marital status had statistically significant ( $p < 0.001$ ) with body mass index. Most of the respondent's body contains 56.54 % normal level of hemoglobin. It is also found that 75.39% were in normal range of blood pressure. There was significant association ( $p < 0.028$ ) of body mass index with blood pressure of participants. Furthermore, the hygiene practices were nearly 90%. The result showed that sources of drinking water were statistically significant ( $p < 0.05$ ) with level of education, mother's occupation, marital status, monthly expenditure for family and water purification was significantly associated ( $p < 0.05$ ) with level of education, mother's occupation, marital status. It also found that used sanitary napkin in menstruation was statistically significant ( $p < 0.05$ ) with types of family. Finally, it can be concluded, collaboration between them is needed to improve coverage within limited resources. Essential policies already exist to that support them for the achievement of better education and women's rights, but their implementation needs to be strengthened.

**Keywords:** Perception, Female garments workers, Sociodemographic factors, Nutritional status, Personal hygiene

## **Chapter-1: Introduction**

In the context of Bangladesh, the garments industry is now the main economic sector. This labor-intensive sector has developed rapidly here through its ordinary technology, low-cost labor and small area. A large number of young workers, about 4 million, worked in the export-based garment industries in Bangladesh. About 66% of Bangladesh's total exports are garments oriented. Bangladesh exports 73 garments items. Almost 70% of workers have a rural background. Perhaps the most striking feature of this sector is the intensive use of women workers, it is estimated that between 70% to 80% of employees in the sector are women. Due to the explosive growth of the garment industry in Bangladesh, the number of working women is increasing every day. Formerly the progress of garment industries, countries female population had no sector to work in vast number. This sector has given employment to a big part of women folk, which in turn has helped in the socio-economic development of the country. The high rate of ignorance and low level of education of these female workers almost predetermined their placement in low paid unskilled jobs. The majority of these women workers needed to enter wage employment to liberate their family from starvation. These women usually work between 14:00 and 16:00 / day in a poor, congested and poorly ventilated environment. In 1985 garments factories were 384 but just now increased more than 5400 garments factories (BGMEA, 2013). About 35 varieties of garments products of Bangladesh are exported to 31 countries throughout the world. This sector peak the list of manufacturers of garments worldwide and grade it at the second after China (Ahmed, 2008). Two groups of women were particularly inclined to participate in these jobs; Women in families headed by men and low-income householder's workers in Bangladesh tend to have very little education as they leave school early to help support their families, and some are illiterate. The female health situation is far below the conditions of the total population because a woman has to endure the worst part of poverty more than its male counterpart.

Malnutrition is very common among women in our country. Participation of women in the labor market is becoming a necessity for a better lifestyle. Currently, 41% of the total workforce in the country is female. The recent entry of women into the formal urban sector viz. garments production; most of these workers are rural migrants. Malnutrition among women of reproductive age, compared to deficiencies in reduced

weight, anemia and micronutrients, is associated with numerous negative health outcomes, such as cognitive problems, reduced working capacity and immunodeficiency responses leading to reduced resistance to infections (WHO, 2001). A recent study of teenagers in garments factories revealed surprisingly lower energy consumption (27%) than the WHO / FAO recommendations (Karim, 1993). As a result, most of the female population is below the BMI limit point. During pregnancy, it is also associated with an increase in maternal morbidity and mortality, low birth weight, premature birth and higher fetal and neonatal deaths (Black et al., 2013). Although an important part of the garments workers in Bangladesh are young women, so far few studies have been conducted to study the nutritional status and personal hygiene practices among them. Therefore, it is very necessary to update the nutritional status of the future generation. This is why we need to do this research considering the nutritional status and personal hygiene practices of female garments workers in Bangladesh.

## **1.1.Aims and Objectives**

### **1.1.1 General Objective:**

The main objective of this study is to identify perception of nutritional status and practices personal hygiene of female garment workers in order to provide nutritional knowledge to improve their present health conditions. The specific objectives of this study are as follows-

### **1.1.2 Specific Objectives:**

- To explore the status of education of female garments worker.
- To assess nutritional status of female garment workers in Chattogram, Bangladesh.
- To evaluate the status of personal hygiene practices of female garments worker.

## Chapter-2: Review of Literature

### 2.1 Background Information about Bangladesh

#### 2.1.1 Geography and Population

Bangladesh is a densely populated South Asian country surrounded by India and Myanmar. It has 147,570 square kilometers of area. The population is almost 164.6 million and around 1,077 people live per square kilometer. The country is divided into 8 divisions, 64 districts and 491 Brazil for administrative purposes (SVRS, 2018). Almost 72% of people live in rural areas. Islam is the most dominated religion and 90% of people are Muslim, followed by Hindus (9%) and other religions (1%) (BBS, 2014).



Figure 2.1: Map of Bangladesh (Source: Worldatlas, 2013)

#### 2.1.2 Socio-economic Situation

##### 2.1.2.1 Housing Characteristics

The characteristics of housing and household goods can be used to measure the socioeconomic status of family members. According to the National Institute for Population Research and Training (2016), the average member of the family in a family is 4.5 and about 87% of the family is led by men and only 13% is led by women. Access to electricity increases and there is a disparity between the urban area (93%) and the rural area (65%) with respect to access to electricity. Currently, the mobile

phone user is 89%. In rural areas, the cell phone user is 87 percent, while in urban areas it is 93 percent.

#### **2.1.2.2 Water and Sanitation**

Access to drinking water and sanitation are basic determinants for better health. Limited access to drinking water and sanitation and lack of hygiene are associated with skin diseases, acute respiratory infections (ARI) and diarrheal diseases, the main preventable diseases in Bangladesh. ARI remains the leading cause of infant death in Bangladesh. Deaths from diarrhea and the prevalence of diarrheal diseases among children under 5 years of age have decreased, although it has been reported that 5% of children under 5 years of age had diarrhea over the two-week period in 2011 (NIPORT et al., 2013). Access to a better source of drinking water is almost universal in Bangladesh (98 percent). The most common source of drinking water in urban areas is a well or tubular well (67 percent), followed by water piped into the house (14 percent), water piped to the courtyard or plot (9 percent) and a tap public or vertical pipe (8 percent) (NIPORT et al., 2016). Families without adequate healthcare facilities have a higher risk of diseases such as diarrhea, dysentery and typhoid fever than families with improved sanitation facilities that are not shared with other homes. About 45 percent of families have an improved (not shared) bathroom. . About a third of households use an unimproved bathroom (31 percent); 22 percent of households use pit latrines without slabs and 3 percent use a suspended toilet and 4 percent of families have no health facilities (NIPORT et al., 2016).

#### **2.1.2.3 Food Production**

Rice is the most dominant crop and over 80% of the land is used for rice production. The very limited soil is used for the production of crops rich in micronutrients, such as vegetables, fruit, legumes and oil seeds. The production of non-agricultural crops, such as meat, fish, milk and eggs, is well below the real needs of people (Profile, 2014).

#### **2.1.2.4 Education**

In 1990, the government of Bangladesh adopted a primary education policy to achieve universal primary enrollment in 2005. The government offers free and fair primary education for all children. Almost 95% of people attended school. At primary level, there is no gender difference based on school enrollment. But more men usually

complete secondary or higher education than women. According to NIPORT et al., (2016) in general, the percentage of completion of secondary or higher education has increased among men and women. For men it increased from 12% to 15% in 2011 and for women it increased from 7% to 10% in 2011. The completion of secondary or higher education and the level of education achieved are higher in urban areas than in rural.

### **2.1.3 Health and Health Care System**

The health system is essentially centralized in nature and both the public and private sectors provide health services. The Ministry of Family Health and Wellness (MOHFW) plans and manages the country's curative and promotional health services. But the provision of health services, including basic health care services (PHC) in the urban area, is managed by the Ministry of local administrations, rural development and cooperatives (LGRD & Co). Since 1998, the government has followed a sectoral approach (SWAP) to improve the effectiveness of the service and provide a service that responds to the demand of the country's population. With the inclusion of nutrition, the initial health and population sector program (HPSP) for the period 1998-2003 was reformed by the health, nutrition and population sector program (HNPS) in the period 2003-2010 (WHO, 2010 ). Bangladesh spends only 3.0% of its GDP in the health sector, while public health expenditure in relation to GDP is only 0.69%, placing Bangladesh among the countries that spend less on health in the Region of Southeast Asia (SEAR) (WHO, 2016).

PHC services are provided in three levels: community (neighborhood), union and upazila. To revitalize PHC services, the government took the initiative to make community clinics work. These community clinics, which serve 6000 rural people, are the only example of community participation. As leaders and representatives of the local community, called the Community Clinic Management Group, they are responsible for managing these clinics (WHO, 2010). Healthcare workers (HA) and social workers (FWA), or home health workers, provide services in community clinics each for 3 days a week, alternately. The Union Health and Family Welfare Center (UNHFWC) provides outpatient services and oversees community-based fieldwork and has staff of medical assistants (MAs) and family-care visitors (midwives). According to the Health Bulletin (2018), the Upazila Health Complex (UHC), attended by a qualified



doctor, provides health services for outpatients and hospitalized patients at sub-district level and acts as the first reference center level. Private sector facilities mainly provide for-profit curative services and gradually take over most services at all levels. In the private sector, there is a wide range of private health professionals, traditional healers, homeopathic professionals, local doctors and pharmacists. They vary based on the qualification, skill, experience and type of medical care practiced.

## **2.2 Garments industry in Bangladesh**

The garments sector in Bangladesh is a key export sector of Bangladesh's economy which is creating job opportunities and a source of foreign currency (Kamal et al., 2010). It started in the late 1970s. This industry has contributed to socioeconomic prospects, creating a large number of job opportunities mainly for the poor illiterate female workforce in the country. Therefore, the RMG sector has played a vital role in empowering women by providing them with jobs. Although this sector has a major impact on Bangladesh's economy, its working conditions, safety and well-being programs at work are below the ILO standard (Ahmed, 2012). More than 20 million people, directly or indirectly, 2.88 million women depend directly on this sector (BGMEA, 2016). This sector contributes about 78% of total exports and about 10% of the GDP of the Bangladesh economy (BGMEA, 2016).

### **2.2.1 Contribution of Garments Industry in Bangladesh Economy**

The garment industry occupies a unique position in Bangladesh's economy. It is the largest export industry in Bangladesh, which has experienced phenomenal growth over the past two decades. Industry plays a key role in generating employment and providing income for the poor. Almost two million workers are direct workers and over ten million inhabitants are also indirectly associated with industry. The sector also played an important role in the socio-economic development of the country (Hossain et.al, 2007).

### **2.2.2 Participation of Woman in Garments Sector**

The garments sector is the main female employer in Bangladesh. The garments sector has provide job opportunities to women in rural areas who previously did not have the opportunity to be part of the formal workforce. This gave women the opportunity to be financially independent and have a voice in the family because they are now

contributing financially. Most of the women come from low-income families, so a small amount of money has helped them a lot. At the same time, the low wages of female workers and their compliance allowed the industry to compete with the world market by decreasing the total cost of production. Women are paid far less than men, mainly because of their lack of education and are also reluctant to join because factory owners threaten to fire them. After all, female participation has really become part of modernization. Just to see this scenario, women are encouraged to participate in other places of work. A few years ago, it was quite difficult to find a woman in the workplace, but today it has become a common trend to earn money and contribute to the family as a male family member. However, this trend also maximizes their freedom and independence, as they easily contribute to the family and the economy as a whole. Hence, this sector empowers women and also offers the opportunity to take a step forward for them.

## **2.3 Nutrition Situation in Bangladesh**

### **2.3.1 Nutritional Status of Bangladeshi Women**

The health status and nutritional level of women are very low in our country. The average weight of women in Bangladesh is around 40.90 kg, which is lower than the average weight of women in most third world countries. The low weight is a reflection of years of food deprivation. The average height of women in Bangladesh is 151 centimeters, which is above the critical height of 141 centimeters. A proportion of women (16%) measure less than 145 centimeters. 34% of women are chronically malnourished. 37% of women in rural areas are considered thin (<18.5), compared to 25% of their urban counterparts. Among the division, Sylhet has the highest percentage of thin women (48%) and Khulna the lowest (29%). Although Bangladeshi women with children under five are not getting taller, there is a subsequent improvement in the mother's nutritional status measured by the IMC from 1996-1997. The percentage of mothers below the BMI limit of 18.5 continued to decline from 52% in 1996-97 to 38% in 2004, a decrease of 27% in less than ten years. Malnutrition, bad environmental health and lack of medical services and, above all, a negative attitude towards female health have been the main causes of the poor health of women in Bangladesh (Riaduzzaman, 2017)

### **2.3.2 Macronutrient malnutrition**

Macronutrient malnutrition results from macronutrient deficiencies (calories and proteins). This is jointly known as protein-energy malnutrition (PEM). Malnutrition rates in children under 5 years of age (strong indicators of national development) showed a downward trend between 1990 and 2005. The underweight rate decreased from 68% in 1990 to 48% in 2005. In terms of growth delays, the image is a little brighter, as the decline rate between 1990 and 2005 was 1.37%.

### **2.3.3 Poverty and Nutrition**

Nutrition and poverty are two closely related topics. Many elementary aspects of being poor, such as hunger, inadequate medical care, poor hygienic living conditions and the stress and strain of precarious life tend to influence a person's nutritional status. Consequently, being poor almost always means being deprived of complete nutritional abilities, of the ability to avoid premature mortality in order to live a life devoid of preventable morbidity and have the energy for work and leisure. Malnutrition in rural and urban areas is a dimension of poverty. Urban poor people are generally considered to be at nutritional risk and urban poverty is the result of an overflow of rural poverty. An increasing number of rural poor people live in overcrowded and abusive urban slums with extremely limited or no access to basic services and structures for a healthy and productive existence. Therefore, the study of poverty is largely a study of people's nutritional status. The axiology of malnutrition that widely prevails among socially and economically disadvantaged population groups around the world is associated with a group of related and coexisting factors that together make up what could be called "poverty syndrome". The major attributes of which are:

- Income levels that is inadequate to meet basic needs of food, clothing and shelter.
- Diet that are quantitatively and after qualitatively deficient.
- Poor environment, poor access to safe water and sanitation.
- Poor access to health care and
- Large family size and high levels of illiteracy especially female illiteracy.

### **2.3.4 Socialization and Female Nutrition**

Mother is the primary teacher of children. She teaches the children how to imagine how to behave. As our society is patriarchal society, women get less priority in all stage. It is

a common belief among poor people that as male are the head of the household and as young boys are growing up and they will become the head of the household at a time they need more and nutritious food. On the other hand as women should stay at home and should not involve in paid employment they need not nutritious food. Though female garments worker are involved in productive income earning work this believes are also present among them. As a result, women's nutritional status is very low in Bangladesh.

### **2.3.5 Conditions of the Garments Worker**

In fact, the conditions of garments workers in Bangladesh are very bad. Most garment factories do not follow ILO labor laws and conventions. In most cases, workers cannot enjoy weekly vacations. According to labor law, the maximum working time per day is 10, including the 2 extra hours. But in most cases, workers are forced to work between 14 and 16 hours a day. Sometimes they work all night. Overtime is mandatory and valid. There are no housing facilities for the owners. In most cases, maternity leave is absent. In most cases there is no doctor, emergency room, sufficient light and ventilation, drinking water and toilets for workers. Most factories don't have nursery schools. Most case management does not pay monthly wages and overtime by 7 am the following month. In many cases, monthly wages and overtime are pending for two to three months. The workers are deprived of equal pay, equal dignity, equal rights and equal promotions.

### **2.3.6 Nutritional Status of Female Garment Worker**

Numerous surveys show that wage employment in the garments sector in Bangladesh has significantly improved the living standards of women workers. Paid employment in the garments sector has been found to have a very favorable impact on the social prestige of women in society, married life, marital relationships, fertility and the age of marriage, domestic decision making, etc.

The study reported that women workers in the garments industry claim to have a great social honor in society, although there is a widespread belief that women lose their status if they work in the garments factory (Paul et al., 1996 ) The most common objection is that people speak badly of the garments industry. The other negative comments about them are that women are spoiled in the garments sector and that night

work ruins women. But opinions change day by day due to social status. The upper class still sees bad work in clothes. Another study indicated that wage employment in the garments sector increases the status of women in the family (Paul et al., 1994). Control over one's earnings and decision making are an important criterion for measuring the social status of female workers. Women have no control over money that has no voice in family decision making.

The contribution of the garments worker to household income is generally said to be very insignificant. But in his family, the male worker contributed 65% of the family income, while a worker contributed 46% of the family income. Therefore, the fact that women contribute half of the household income earned in urban areas is a definitive positive burden that has occurred with the advent of the garments industry. Even workers with lower incomes, such as sewing assistants, contribute about 30% to family income. All of this suggests that parents are sending their daughters and sons to the garments industry to improve family income. Not only are they becoming an additional source of income, but they are no longer treated like another oral feeding. In this sense, especially women see themselves freed from the patriarchal family system.

The study showed that 76% of working women had a normal BMI level and 24% malnutrition. It also indicates that only 6% had a normal hemoglobin level, 12% were slightly anemic (Sharmin et al., 2001).

### **2.3.7 Poverty and Health Status of Garment Workers**

Hassan and Ali (1996) reported that the widespread poverty existing in the country is often believed to be responsible for the poor health of workers in the sector, since most workers come from poor rural areas from Bangladesh. Around 55% of women workers it comes from rural areas, poverty and disease prevalence are strongly correlated. Diseases and diseases are more frequent among those who suffer from a negative energy balance (Karim, 1993). There was a significant difference between energy intake and energy expenditure.

### **2.3.8 Socio-Economic Characteristics of Women Garments Workers**

Khan and Hossain (2003) showed that available studies indicate members of poor families. This fact suggests that female workers enter the garments sector with health, since the many dangers such as inadequate imbalance or impotence, etc., which could have seriously compromised their health, were acute. The researcher observed that

garments workers, especially garments workers, are young, single, less educated, of rural origin and very poor families. Studies also indicate that most women working in the government sector had no previous work experience. However, some characteristics of the garments workers have changed over time and some of these characteristics differ between the workers employed in the garment factories located in the DEPZ and those located outside the DEPZ. The main socio-economic characteristics of garments workers are as follows.

**Age:** In general, the age limit for garments workers is up to 40 years. After 1995, the work of child labor in the ready-made garment industries has been significantly reduced due to the agreement of the government, BGMEA and UNICEF and the ILO to eliminate child labor in the RMG sector. In 1997, the average age of garments workers was 20 years

**Marital status:** In ready-made garments industries, marriage is considered the main restriction of the employer and the employee, but there are still about 38 percent of married workers and the rest of them are single, divorced, widowed or abandoned by husbands

**Education Level:** Garments workers are less literate than their male colleagues. Many of them can only sign their name. The literacy rate among female workers (over 15 years) is 56.8, which is higher than the total female literacy rate in our country (Paul et al., 1994). In some cases, women completed secondary and higher education and did better jobs than other women in the garments sector.

**Migration:** About 83 percent of women workers in the garments sector are migrants from rural to urban areas (Paul et al., 2000). Many women are still migrating to urban areas, especially in the city of Dhaka to find work in the garments sector.

**Poverty:** There is no doubt about the poverty of garments workers in Bangladesh. Rural poverty drives them to the city of Dhaka to find work in the garments sector (after 2000). Daily income is less than one US dollar (\$) in most cases.

**Health and Nutrition:** The health and nutrition conditions of garments workers are very poor. Research has shown that over 40% of factory workers suffer from chronic diseases such as sexually transmitted and gastrointestinal infections (STIs), reproductive tract infections (RTIs), menstrual and blood pressure problems, anemia

and family planning problems ( Bayard Roberts, Marie Stopes Clinical Society (MSCS) 2001). Female workers cannot follow an adequate nutritional diet because of their low income.

**Living Condition:** About 90 percent of garments workers live in slums and squatters in Dhaka City (after 2000, [www.nadir.org](http://www.nadir.org)). The rest live in crowded situations where there is no adequate municipal structure.

#### **2.4 Personal hygiene practices female workers**

Currently, the garments sector plays a pioneering role in improving Bangladesh's economic conditions. Women are the main participants in the garments sector, so correct personal hygiene practices are important. The study showed that 89.0% of garments workers used sanitary latrine, 9.1% used water-sealed latrine and 1.9% of girls used latrine (Hossain, 2015) regarding their menstrual hygiene so that they use unsanitary garments or sanitary kits. Since they will work in the garment factory for a long time and there is an inappropriate and unhealthy environment in the bathroom facilities, they cannot change their bearings in time. Therefore, they cannot maintain good menstrual hygiene practice. Another study revealed that 98% of adolescent drinking water sources were deep wells and WASA, and only 2% used rivers and other sources (Hossains, 2015).

The study also indicates that 10.8% of women suffer from menstrual problems. About 69.5% did not use clean materials and 30.5% used clean materials during menstruation, most of them used 78.5% of old cloths and 20.5% used sanitary towels to maintain cleanliness during menstruation. He also showed that 74.5% of them had washed with soap and water, 16% only with water and 9.5% with soap and savlon. A maximum of 87.26% of respondents dried the cloth correctly and 12.74% of respondents did not dry clothes. A total of 87.26% of respondents who dried the cloth correctly, almost all respondents, 91.24% kept the cloth in a safe place during menstruation (Aktaruzzaman and Hossain, 2018).

#### **2.5 Causes associated with malnutrition**

Multiple causes influenced Malnutrition which is a complex condition. Women suffer from malnutrition due to diseases associated with inadequate food intake. Domestic food insecurity, inadequate knowledge due to lack of education, lack of drinking water

and sanitation and lack of health services can be considered as potential underlying causes that can lead to malnutrition. Since there are some common causes associated with malnutrition of women and children living in poor families, the UNICEF conceptual framework(WHO / UNICEF, 2019) for child malnutrition may be applicable for malnutrition of women with some modifications.

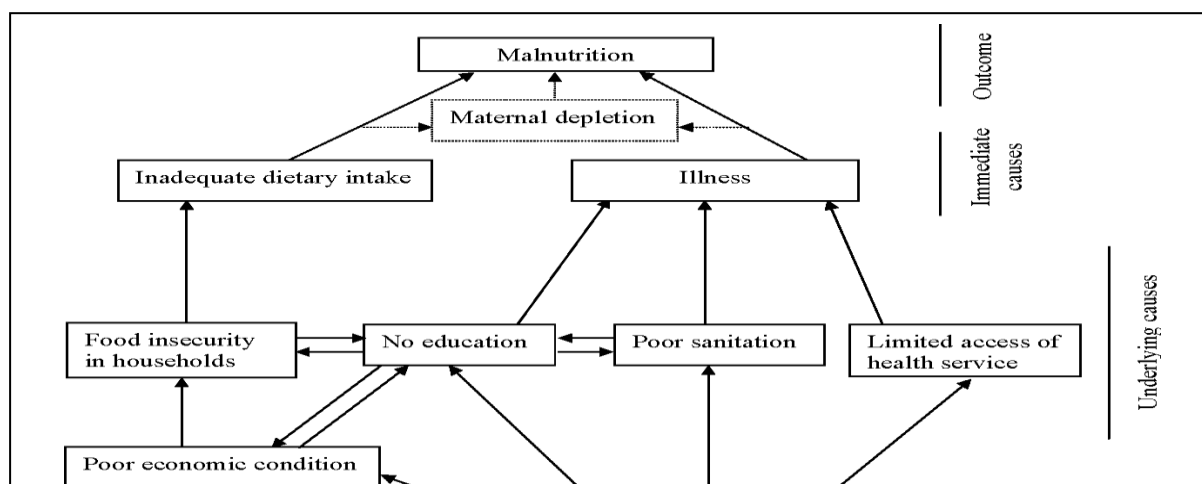
According to this framework, developed by UNICEF, malnutrition occurs when food intake is inadequate and health is unsatisfactory, being the two immediate causes of malnutrition. In developing countries, infectious diseases, such as diarrheal diseases (DD) and acute respiratory diseases (ARI),are responsible for most nutrition-related health problems.

Easily available foods, adequate health systems and a "healthy" environment are ineffective unless these resources are used effectively. Consequently, the absence of adequate care in homes and communities is the third necessary element of the underlying causes of malnutrition.

Finally, this conceptual model represented that human and environmental resources, economic systems and political and ideological factors are fundamental causes that contribute to malnutrition.

This model relates the causative factors of malnutrition to different socio-organizational levels. The immediate causes affect individuals, the underlying causes are related to families and the underlying causes are related to the community and nation. Consequently, the more indirect the causes, the larger the population whose nutritional status is affected.

The conceptual frameworks of food safety and malnutrition, which are the most used in this field, show significant differences. The food security framework emphasizes an economic approach where food as a commodity is at the center. The structure of malnutrition adopts a biological approach in which the human being is the starting point. However, both managers have in common the promotion of an interdisciplinary approach to guarantee food and nutritional security.





**Figure 2.1: Causes associated with malnutrition (Source: WHO/UNICEF, 2019)**

### **2.5.1 Food insecurity and dietary intake**

Food security refers to the access of all people at all times to sufficient food for an active and healthy life (Nord et al. 2009). Depending on the classifications obtained with the USDA Food Security Survey, a family with food security can also be classified as high food security or marginal food security. People or families with limited or uncertain access to adequate food are considered insecure. Low food security (LFS) or very low food security (VLFS) food insecurity are two categories of food insecurity.

**Table 2.1: Food security categories and description of domestic conditions**

<b>Category</b>	<b>Descriptions</b>
Food security	High food security No reported indication of food-access problems or limitations.
	Marginal food security One or two reported indications- typically of anxiety over food sufficiency or shortage of food in the house. Little or no indication of changes in diets or food intake
Food insecurity	Low food security Reports of reduced quality, variety or desirability of diet. Little or no indication of reduced food intake.
	Very low food security Reports of multiple indication of disrupted eating eating patterns and reduced food intake.

In 2010, 14.5 percent of U.S. families.UU. He had food insecurity at least a few times during that year, of which 5.4 percent experienced VLFS (Coleman-Jensen et al. 2010). As described in Figure 2.3, VLFS occurs when family members cannot feed properly due to economic shortages or lack of resources. This results in a reduction in food intake or an interruption in eating patterns. Members of families with very low food security can experience hunger because they cannot afford enough food.

A constant relationship between food insecurity and poor health has been demonstrated in a wide range of publications. Numerous studies have shown that people who live in families with food insecurity are more likely to report poor physical and mental health than those who live in families with food security (Stuff et al. 2004). Food insecurity has been associated with an increased risk of obesity, heart disease, type 2 diabetes mellitus, hypertension and food allergies. (Stuff et al. 2004; Martin et al. 2007). However, these relationships have been found more frequently among adults, especially mothers, than children.

The benefits of having access to a better source of drinking water can only be fully achieved when there is also access to improved sanitation and compliance with good hygiene practices. Beyond the immediate and obvious benefits that people are hydrated and healthier, access to water, sanitation and hygiene, collectively known as WASH, have profound and wider socio-economic impacts, in especially for women and girls.

The fact that WASH is subject to specific objectives within the sustainable development objective (SDG 6) testifies to its fundamental role in public health and, therefore, in the future of sustainable development. Indeed, access to drinking water and sanitation are human rights, as recognized in 2010 by the United Nations General Assembly. For universal fulfillment of these rights to become reality, we will need the right systems: well-equipped and capable institutions that provide services and change behavior in a resilient and appropriate way(WHO / UNICEF, 2019).

### **2.5.2 Current situation Water and Sanitation**

A person who does not have access to improved drinking water, for example from a protected borehole or from a municipal supply of pipelines, is forced to rely on sources such as surface water, unprotected and possibly contaminated wells, or vendors selling water from origin and quality not verifiable (WHO / UNICEF, 2019).

For many communities, water sources are generally far from their homes, and it is generally for women and girls to spend much of their time and energy looking for water, a task that often exposes them to attack by men and even wild animals.

Improved sanitation facility is important for everyone because it safely separates human waste from human contact, people have no choice but to use inadequate

community latrines or practice open defecation. “For women and girls, finding a place to go to the outdoor toilet, often having to wait until dark, can make them vulnerable to abuse and sexual assault.”

In the immediate environment, exposed faecal matter will be transferred back to people's food and water resources, which will help spread serious diseases such as cholera. Beyond the community, the lack of effective waste or sewage disposal systems can contaminate ecosystems and contribute to the disease pandemic

Today 2.2 billion people do not have access to safely managed drinking water services and 4.2 billion people do not have safely managed hygiene services. Unsafe hygiene practices are widespread and aggravate the effects on people's health. The impact on infant mortality rates is devastating with over 297,000 children under the age of five who die each year from diarrheal diseases due to lack of sanitation, lack of hygiene or unsafe drinking water.

- Currently, 1 in 3 or 2.2 billion people worldwide have no drinking water (WHO/ UNICEF, 2019).
- Over half of the world's population or 4.2 billion people do not have safe sanitation (WHO/ UNICEF, 2019).
- About 50 liters of water per person per day are needed to ensure that most basic needs are met and to keep public health risks low(WHO, 2017).
- About 207 million people spent more than 30 minutes going and returning to collect water from an improved. Worldwide at least 2 billion people uses a people use a source of drinking water contaminated with feces (WHO/ UNICEF, 2019).
- Children under 5 years of age in countries where protracted conflicts occur are 20 times more likely to die from unsafe water and sanitation causes than direct violence (UNICEF, 2019).
- One million deaths each year are associated with impure births. Infections represent 26% of neonatal deaths and 11% of maternal mortality (WHO/ UNICEF, 2019).
- Promoting hygiene is the most profitable health intervention (World Bank, 2016). About 2 out of 5 or 3 billion people worldwide do not have basic washing facilities at home (WHO/ UNICEF, 2019).

- Productivity loss due to water and sanitation-related diseases costs many countries up to 5% of GDP (WHO, 2012).
- Universal access to safe drinking water and adequate hygiene and hygiene would reduce the overall burden of disease by 10% (WHO, 2012).

## **2.6 Nutritional status of garment workers in Bangladesh**

Sharmin et al. (2001) studied the socio-economic and nutritional status of women workers in the Dhaka City garments factory. According to the observation of this study, the age of the interviewees was between 14-30 years. Half of the respondents (56%) were teenagers. Of these, approximately 37% were illiterate and 45% were educated up to the food class. Although the average income was 1150 taka per month, 43% get less than 1000 taka. As a result, most workers (62%) lived in the slums. According to the body mass index (BMI), 24% of respondents were malnourished. In this study, the average height and body weight were slightly higher than previously known data. The prevalence of anemia was also higher among workers. About 51% of subjects had a hemoglobin level in the blood of less than 12 g / dl.

Chowdhury and Ullah(2010) evaluated a survey of 151 workers from 29 industrial garments units located in different parts of the Chittagong metropolitan area. This study suggested that the living standards of garments workers were still in precarious conditions and that they were not free from the vicious cycle of poverty and face extreme difficulties in obtaining their basic survival needs as well.

Haque et al. (2017) studied the nutritional status, personal hygiene and health research behavior of workers at the British American Tobacco Company, Dhaka, Bangladesh. The results of this cross-sectional study showed that out of 179 respondents 89 (49.7%) were in the age groups of 30-39 years and the average age of the respondents was  $31.99 \pm 6.01$  years. A large number of respondents (55.9%) had a monthly family income of Taka 10001-20000 and the average family income was Taka  $12776.54 \pm 5230.13$ . The maximum number of respondents (73.7%) was Muslim, over half (54.2%) were responsible, 39.1% of respondents were made up of 4 family members, 43.6% of respondents were accustomed to other types of eating habits and 38.5% of respondents knew that malnutrition was the effect of lack of adequate nutrition, 59.8% of respondents knew that night blindness was the disease due to malnutrition, the most

respondents (91.6%) performed tasks to maintain health, the majority (62.0%) of respondents did nothing to maintain their children's health care and 35.9% visited the doctor only once a month, 40.2% of respondents said The regular toothbrush is a kind of healthy habits. Most respondents (64.8%) washed twice a day, most (50.8%) of respondents washed their hands after using the bathroom, most respondents (62.08%) washed daily, 43.0% and 31.8% Respondents said that dysentery and diarrhea were due to eating without washing their hands properly, respectively. Most of the interviewees (53.6%) reported having learned about personal hygiene on television, 45.8% of the interviewees understood that the use of safe water in every job as hygiene. The majority (50.84%) came from the nuclear family; the majority (84.92%) had an exercise habit and 40.22% had a class VIII education level. The majority (75.42%) of the interviewees had semi-pucca houses and the majority (69.83%) of the interviewees used only water as hand washing material.

Akter et al. (2017) evaluated a survey on the cross-sectional study among the 100 teenage workers selected from different sectors located in Dhaka and Tangail, Bangladesh, to assess their nutritional status and food consumption model. The average age of the respondents was  $15.5 \pm 1.2$  years. The hemoglobin level of the workers was very low (33.7% of the workers had mild anemic anemia, 59.8% had moderate anemic anemia and 6.5% had severe anemic anemia) compared to national prevalence of anemia. Furthermore, the nutritional knowledge of the workers was not of a satisfactory level, only 15% of the workers knew the adequate nutritional knowledge. About 76% of workers suffered from various diseases, including 33% had a fever and 21% had a cold. Analysis of the food frequency questionnaire from this survey revealed that their diet was monotonous, meaning most workers drank rice three times a day without or with a small amount of meat, fish, eggs or other good sources of nutrients. .

A survey on the socio-economic conditions of garments workers in the Bangladesh capital conducted by Sikdar et al. (2014). The observations of this study represented that Ready-to-wear (RMG) achieved the highest gains from exports to Bangladesh, where 4,825 garments factories operate, employing over three million people, of whom 85% of the workers are women. The RMG industry is considered the backbone of the country's economy, while it plays an important role in the socio-economic well-being of many people in the back door. Women work on average 11.12 hours a day in the

garment factory / industry, but receive an average salary of less than Tk. 7000 per month

The garment industry is Bangladesh's main economic sector. The most remarkable feature of this sector is the intensive use of working women, it is estimated that between 70 and 80% of the people employed in the sector are women (Riaduzzaman, 2017).

In 2015, Hossain studied the perception and practice of the eating habits and nutritional status of teenage girls: a comparative study between garments workers and girls going to school. Teen health has become one of the most discussed and sensitive issues. The results found in this study suggested that the total sample size was 210 and the study was based on the age of teenagers between 10 and 19 years old. 110 teenage girls from the 2 garment industries and 100 teenage girls from the 5 schools in the city of Dhaka were chosen at random. According to their study, both groups had a good perception of nutritious foods.

Khan and Ahmed. (2005) studied the physical conditions, nutrient intake and dietary pattern of working women in urban areas of Bangladesh. This research reported that sixty-five percent of the girls were low (height by age, <3rd percentile of the NCHS reference values). The prevalence of short stature was higher in older girls. The average body weight was 38 kg for 14-year-old girls, who gradually increased in the age groups to about 42 kg for 18 and 19 year-olds. About 17% of the girls were thin (BMI by age <5th percentile of the NCHS reference values). Above all, approximately 23% were thin (TSFT by age <5th percentile of the NCHS reference values). Food consumption data revealed a deficit of 1.62 MJ / day in energy. The average protein, calcium, iron, vitamin A, thiamine, riboflavin, niacin and vitamin C intake was less than the recommended daily amount. Most of the energy and nutrients come from cereals. The usual food intake pattern revealed poor intake of eggs, milk, meat and green leafy vegetables.

## Chapter-3: Materials and Methods

### 3.1 Study Area and Period

A Cross-sectional study was carried out from July 2019 to December 2019 at Chattagram. Chattagram is a second largest city of Bangladesh with a population 2.6 million. It is a major coastal city and financial Centre in southeastern Bangladesh. Garments industry is the main economic sector of Bangladesh where upto 80% employee are female. The samples were drawn from different garment factories situated in different locations of Chattagram Metropolitan area using a convenient sampling technique. “Chittagong region was selected as research area because researchers’ working place is Chattagram and it was convenient for the researchers to collect data by self-financing.”



Figure 3.1: Study area (Chattagram Metropolitan area)(Source:Wikipedia)

### 3.2 Sample Size

The sample size was estimated by using web based Automated Raosoft sample size calculator. In this calculator, 5% is margin of error acceptance and a confidence level of 95% (Raosoft, 2011). The population size is select randomly from different garments factory.

### 3.3 Data Collection instrument

A self constructed questionnaire was administrated to gather primary data considering the objectives of the study. The questionnaire consists of maximum close-ended and a

little bit open ended questions, which was distributed among the female garment workers. The respondents were personally questioned and the questionnaires were filled in by the interviewer based on the response of the respondents.

Out of the number of factors that influence socio-economic conditions, the following factors have been selected from each condition respectively for the study purpose: age and marital status, family members and earning members, level of education, dietary information, sources of drinking water, washing hand with soap after visiting toilet, was using pad during menstruation etc.

### **3.4 Anthropometric Measurements**

#### **3.4.1 Weight:**

Weight machine was used to measured body weight. The weight was recorded bare footed and the scale was calibrated to zero marking every time before use. The weight was recorded in kilogram.

#### **3.4.2 Height:**

Height of the study population were measure in standing position with hanging by the side and bare footed, relaxed way, the vertebral column touching the scale. Height was measured to the nearest 0.1 cm.

#### **3.4.3 BMI:**

Body mass index (BMI) was calculated by dividing weight expressed in kilograms by square of height in meters.

$$\text{BMI} = \frac{\text{Body weight in Kg}}{(\text{Height in meter})^2}$$

### **3.5 Biochemical Analysis**

For measurement of hemoglobin level capillary blood samples will be collect in strip of easy touch GCHB (Bioptik Technology, Inc., Taiwan). The hemoglobin values were recorded in the provided log sheet. The blood pressures were measure through Sphygmomanometer by using Auscultatory method.



### **3.6 Personal Hygiene Assessment**

Personal hygiene assessment of female garment workers was done by menstruation hygiene practices such as-use sanitary pads, frequency of changing pads. Another information such as- washing hand with soap before eating, washing hand after visiting toilet, using footwear during visiting toilet etc.

### **3.7 Statistical Analysis**

A cross-sectional study was carried out in different garment factories to know the prevalence of nutritional status and personal hygiene of female garment workers. The data were compiled from the questionnaire and fed into the Microsoft excel, 2010. Then data was exported into STATA 13.0 software for frequency, and percentages of different variables. The associations of nutritional status and personal hygiene with different variables were done by using one way ANOVA and Chi square test. The Level of significance was set at  $p < 0.05$ .

## Chapter-4: Results

These sections discuss the findings of the study. The nutritional status, personal hygiene practices of female garments workers are presented by body mass index, hemoglobin level, blood pressure level, sources of drinking water, purification of water, washing hand with soap, using pad during menstruation etc. Finally, the associations of nutritional status and personal hygiene with different variables by using one way ANOVA and Chi square test.

### 4.1 Socio-demographic Characteristics of female garments workers

**4.1.1 Age:** Majority of the female workers were belonging to young. The table shows that highest number of female garments workers were found in 26-35 years which was 46.07 % while the lowest number of workers was in age above 45 which was 1.83%. **Table 4.1** shows the age grouping, percentage and their frequencies.

**4.1.2 Religion:** The **Table 4.1** shows that 95.25% (364) female garments workers were Muslims, 2.62% (10) were Hindus and only 2.09 % (8) were Buddha.

**4.1.3 Blood group:** From this study it was found that 47.91% workers were conveying O+ blood group which number was 183 and only 0.26% of them were AB- blood group which was 1 female worker respectively. **Table 4.1** shows the Blood grouping, percentage and their frequencies.

**4.1.4 Level of education:** The level of education of participants was presented as primary, secondary and higher secondary. Among 382 respondents, greater number of workers 72.77% (278) had education primary level and only few workers 9.16% (35) complete higher secondary level.

**4.1.5 Father's occupation:** The **Table 4.1** shows that 40.31% (154) fathers of female garments worker were rickshaw puller, 36.65 % (140) were labor, 12.30 % (47) were garments worker and only 1.83 % (7) was other professions.

**4.1.6 Mother's occupation:** The **Table 4.1** indicates that major part of the female garments workers mother was housewife 88.48% (338) and 0.26% (1) were other carrier respectively.

**4.1.7 Types of family:** This **Table 4.1** reveals that 50.26% female workers were comes from nuclear family which was 192 and 49.74% of them were joint family which was 190 respectively.

**4.1.8 Marital status:** It was found that major part 87.96 % (336) of the female workers were married and lower part of workers 12.04% (46) were unmarried.

**Table 4.1 : Frequency distribution of socio-demographic variables of female garments workers**

Variables	Frequency	Percentage
	N=382	(%)
Age (years)	15-25	43.46
	26-35	<b>46.07</b>
	36-45	8.64
	Above 45	<b>1.83</b>
Religion	Muslim	95.29
	Hindu	2.09
	Buddha	2.62
Blood group	A+	9.95
	B+	36.91
	O+	<b>47.91</b>
	O-	1.05
	AB+	3.93
	AB-	<b>0.26</b>
Level of education	Primary	<b>72.77</b>
	Secondary	18.06
	Higher secondary	<b>9.16</b>
Father's occupation	Garments worker	12.30
	Rickshaw puller	<b>40.31</b>
	Labor	36.65
	Business	8.90
Mothers occupation	Other	<b>1.83</b>
	Housewife	<b>88.48</b>
	Garments worker	11.26
Types of family	Others	<b>0.26</b>
	Nuclear	50.26
Marital status	Joint	49.74
	Married	87.96
	Unmarried	12.04

<b>Husband's occupation</b>	Driver	102	<b>30.45</b>
	Garments worker	102	<b>30.45</b>
	Business	41	12.24
	Rickshaw puller	38	11.34
	Labor	30	8.96
	Job	16	4.78
	Immigrant	6	<b>1.79</b>
<b>Monthly family income (taka)</b>	<10,000	44	11.52
	10, 000-19, 000	173	<b>45.29</b>
	20,000-29, 000	129	33.77
	>30000	36	<b>9.42</b>
<b>Monthly own income (taka)</b>	<10000	135	35.34
	10,000-19,000	241	<b>63.09</b>
	>30000	6	<b>1.57</b>
<b>Monthly expenditure for family(taka)</b>	<10000	219	<b>57.33</b>
	10,000-19,000	160	41.88
	>30000	3	<b>0.79</b>

**4.1.9 Husband's occupation:**As shown in **Table 4.1** 30.45 % (102) husband's occupation were driver, 30.45 % (102) were garments worker, 12.24 % (41) were businessmen and only 1.79 % (6) were immigrant respectively.

**4.1.10 Monthly family income (taka):**From 382 respondents, about 45.29 % (173) workers monthly family income were above 10, 000 taka but 9.42 % (36) workers were above 30,000 taka.

**4.1.11 Monthly own income (taka):**According to **Table 4.1**, 63.09% (241) female workers monthly own incomes were in below 20,000taka and only 1.57% (6) was below 30,000 taka.

**4.1.12 Monthly expenditure for family:** Most of the participants 57.33 % (219) were spend below 10,000 taka for their family purpose. About 0.79% (3) female workers were utilizing below 30,000 taka for their family. **Table 4.1** represented ranges of monthly family expenditure, frequencies and their percentages.

## 4.2 Nutritional and Biochemical Characteristics of female garments workers

**4.2.1 Body Mass Index (BMI):** It reveals that as stated by **Table 4.2** BMI were four categories where 46.34% (177) were normal weight, 3.14% (12) were underweight, 38.74% (148) were preobese and 11.78 % (45) were obese respectively.

**4.2.2 Hemoglobin (g/dl) level:** Among 382 respondents, greater amount of workers 56.54 % (216) were in normal hemoglobin level, 42.41 % (162) were mild, 1.05 % (4) were moderate and only 1.05% of them were moderate level of hemoglobin. But severe range (<7.0) of hemoglobin level were not found among female worker. **Table 4.2** presented limit of hemoglobin, frequencies and their percentages.

**Table 4.2 : Frequency distribution of Nutritional and Biochemical variables of female garments workers**

Variables		Frequency	Percentage
		N=382	(%)
<b>BMI (kg/m<sup>2</sup>)</b>	Underweight (<18.5)	12	3.14
	Normal weight (18.5-24.9)	177	46.34
	Preobese (25-29.9)	148	38.74
	Obese (>30)	45	11.78
<b>Hemoglobin (g/dl)</b>	Severe (<7.0)	0	0.0
	Moderate (7.0 to 9.0)	4	1.05
	Mild (9.0 to 12.0)	162	42.41
	Normal (12.0 to 16.0)	216	56.54
<b>Blood pressure (mmHg)</b>	Low blood Pressure	66	17.28
	Normal blood Pressure	288	75.39
	High blood Pressure	28	7.33

**4.2.3 Blood Pressure level:** Most of the respondents 75.39% (288) were normal blood pressure level, 17.28% (66) were low blood pressure and 7.33% (28) were high blood pressure. **Table 4.2** tabulated these result.

## 4.3 Personal hygiene practices of female garments workers

**4.3.1 Sources of Drinking water:** As shown in **Table 4.3**, 68.06 % (260) were drinking tube well water and only 0.26 % (1) was taken river water.

**4.3.2 Water purification before consumption:** It was found that most of the workers 89.53 % (342) were purify water and 10.47 % (40) were not among them.

**4.3.3 Types of latrine:** Thestudyshowed that 97.64% (373) were used sanitary latrine and 2.36% (9) were used unsanitary latrine. **Table 4.3** illustrated these frequencies and percentages.

**4.3.4 Used footwear in toilet:**As shown in**Table 4.3**majority of the workers99.21% (379) wereused footwear, 0.79 % (3) were not used respectively.

**4.3.5 Washing hand with soap after visiting toilet:** It indicates that 99.21% (379) were washed hand with after visiting toilet and 0.79 % (3) were not among them.**Table 4.3** describes these percentages.

**Table 4.3: Frequency distribution of Personal hygiene practices of female garments workers**

Variables		Frequency	Percentage
		N=382	(%)
<b>Sources of Drinking water</b>	Tube well	<b>260</b>	<b>68.06</b>
	Washa	119	31.15
	River	<b>1</b>	<b>0.26</b>
	Others	2	0.52
<b>Water purification before consumption</b>	Yes	<b>342</b>	<b>89.53</b>
	No	40	10.47
<b>Types of latrine</b>	Sanitary	<b>373</b>	<b>97.64</b>
	Unsanitary	9	2.36
<b>Used footwear intoilet</b>	Yes	<b>379</b>	<b>99.21</b>
	No	3	0.79
<b>Washing hand with soap after visiting toilet</b>	Yes	<b>379</b>	<b>99.21</b>
	No	3	0.79
<b>Washing hand with soap before eating</b>	Yes	<b>374</b>	<b>97.21</b>
	No	38	2.09
<b>Used pad during menstruation</b>	Yes	<b>245</b>	<b>64.14</b>
	No	137	35.86

**4.3.6 Washing hand with soap before eating:** **Table 4.3**shows that97.21 % (374) were washed hand with soap before eating, 2.09 % (38) were not washed among participants.

**4.3.7 Used pad during menstruation:**The study revealed that 64.14% (245) were used pad and 35.86% (137) were used at the time of menstruation.**Table 4.3** tabulated these frequencies and percentages.

#### 4.4 Associated factors of nutritional status

This study that showed that among 382 respondents 46.34 % were normal weight, 3.14% underweight, 38.74% were preobese and 11.78% were obese which was associated with sociodemographic characteristics and Biochemical factors.

##### 4.4.1 Association of nutritional status with Socio-demographic Factors

The result showed that age, marital status had statistically significant ( $p < 0.001$ ) with body mass index. It also found that level of education, Father's occupation, Mother's occupation, Types of family, Marital status, Husband's occupation, Monthly family income (taka), Monthly own income (taka) and Monthly expenditure for family (taka) were not statistically significant ( $p > 0.05$ ) among them. **Table 4.4** illustrated these associations.

**Table 4.4 : Association of sociodemographic characteristics with Body Mass Index**

Variables		Underweight n (%)	Normal n (%)	Preobese n (%)	Obese n (%)	p- value
<b>Age</b>	15-25	10 (6.02 )	99 (59.64)	46 (27.71)	11 (6.63)	<b>&lt;0.001</b>
	26-35	2(1.14)	63 (35.80)	85 (48.30)	26(14.77)	
	36-45	0(0.00)	11(33.33)	14(42.42)	8 (24.24)	
	Above 45	0(0.00)	4 (57.14)	3(42.86)	0 (0.00)	
<b>Level of education</b>	Primary	7 (2.52)	121 (43.53)	119 (42.81)	31 (11.15)	0.258
	Secondary	3 (4.35)	38 (55.07)	21 (30.43)	7 (10.14)	
	Higher secondary	2 (5.71)	18 (51.43)	8 (22.86)	7 (20.00)	
<b>Father's</b>	Garments worker	4 (8.51)	19 (40.43)	21 (44.68)	3 (6.38)	0.668
	Rickshaw puller	2 (1.30)	73 (47.40)	59 (38.31)	20 (12.99)	

<b>occupation</b>	Labor	5 (3.57)	62 (44.29)	55 (39.29)	18 (12.86)	
	Business	1 (2.94)	20 (58.82)	9 (26.47)	4 (11.76)	
	Other	0 (0.00)	3 (42.86)	4 (57.14)	0 (0.00)	
<b>Mother's occupation</b>	Housewife	11 (3.25)	157 (46.45)	131 (38.76)	39 (11.54)	0.623
	Garments worker	0 (0.00)	1 (100.00)	0 (0.00)	0 (0.00)	
	Others	1 (2.33)	19 (44.19)	17 (39.53)	6 (13.95)	
<b>Types of family</b>	Nuclear	5 (2.60)	90 (46.88)	73 (38.02)	24 (12.50)	0.738
	Joint	7 (3.68)	87 (45.79)	75 (39.47)	21 (11.05)	
<b>Marital status</b>	Married	6 (1.79)	149 (44.35)	139 (41.37)	42 (12.50)	<0.001
	Unmarried	6 (13.04)	28 (60.87)	9 (19.57)	3 (6.52)	
<b>Husband's occupation</b>	Driver	3 (2.94)	42 (41.18)	42 (41.18)	15 (14.71)	0.315
	Garments worker	3 (2.94)	48 (47.06)	43 (42.16)	8 (7.84)	
	Business	0 (0.00)	15 (36.59)	17 (41.46)	9 (21.95)	
	Rickshaw puller	0 (0.00)	17 (44.74)	17 (44.74)	4 (10.53)	
	Labor	0 (0.00)	15 (50.00)	12 (40.00)	3 (10.00)	
	Job	0 (0.00)	7 (43.75)	6 (37.50)	3 (18.75)	
	Immigrant	0 (0.00)	4 (66.67)	2 (33.33)	0 (0.00)	
<b>Monthly family income (taka)</b>	<10,000	2 (4.55)	24 (54.55)	16 (36.36)	2 (4.55)	0.128
	10, 000- 19, 000	7 (4.05)	82 (47.40)	63 (36.42)	21 (12.14)	
	20,000-29, 000	2 (1.55)	57 (44.19)	56 (43.41)	14 (10.85)	
	>30000	1 (2.78)	14 (38.89)	13 (36.11)	8 (22.22)	
<b>Monthly</b>	<10000	6 (4.44)	70	46 (34.07)	13 (9.63)	0.115



<b>own income (taka)</b>			(51.85)			
	10,000- 19,000	6 (2.49)	103 (42.74)	101(41.91)	31(12.86)	
	>30000	0 (0.00)	4 (66.67)	1 (16.67)	1 (16.67)	
<b>Monthly expenditure for family(taka)</b>	<10000	6 (2.74)	107 (48.86)	85 (38.81)	21 (9.59)	0.484
	10,000- 19,000	6 (3.75)	68 (42.50)	63 (39.38)	23 (14.37)	
	>30000	0 (0.00)	2 (66.67)	0 (0.00)	1 (33.33)	

#### 4.4.2 Association of nutritional status with Biochemical parameters

The result revealed that body mass index was statistically significant ( $p < 0.028$ ) with blood pressure of respondents. Another variable such as hemoglobin level, were not significantly ( $p > 0.05$ ) associated with body mass index. **Table 4.5** illustrated this association.

**Table 4.5 : Association of Biochemical parameters with Body Mass Index**

<b>Variables</b>		<b>Underweig ht n (%)</b>	<b>Normal n (%)</b>	<b>Preobese n (%)</b>	<b>Obese n (%)</b>	<b>p- value</b>
<b>Hemoglob in level (g/dl)</b>	Moderate (7.0 to 9.0)	0 (0.00)	1 (25.00)	2 (50.00)	1 (25.00)	0.155
	Mild (9.0 to 12.0)	5 (3.09)	87 (53.70)	51 (31.48)	19 (11.73)	
	Normal (12.0 to 16.0)	7 (3.24)	89 (41.20)	95 (43.98)	25 (11.57)	
<b>Blood pressure( mm Hg)</b>	Low blood Pressure	3 (4.55)	38 (57.58)	21 (31.82)	4 (6.06)	<b>&lt;0.02 8</b>
	Normal blood Pressure	8 (2.78)	131 (45.49)	112 (38.89)	37 (12.85)	
	High blood Pressure	1 (3.57)	8 (28.57)	15 (53.57)	4 (14.29)	

## 4.5 Association of sociodemographic characteristics with personal hygiene

### 4.5.1 Association of sociodemographic characteristics with sources of drinking water:

The result showed that sources of drinking were statistically significant ( $p < 0.05$ ) with level of education, mother's occupation, marital status, monthly expenditure for family. Another factors such as father's occupation, husband's occupation, monthly family income were not significant ( $p > 0.05$ ) with sources of drinking water. **Table 4.6** illustrated this significant association

**Table 4.6: Association of sources of drinking water with sociodemographic characteristics**

Variables		Major sources (Tubewell) n (%)	Minor sources (Washa, river, others) n (%)	p-value ( $\chi^2$ )
<b>Level of education</b>	Primary	217 (78.06)	61 (21.94)	<b>&lt;0.001</b>
	Secondary	27 (39.13)	42 (60.87)	
	Higher secondary	16 (45.71)	19 (54.29)	
	Garments worker	27 (57.45)	20 (42.55)	
<b>Father's occupation</b>	Rickshaw puller	111 (72.08)	43 (27.92)	0.410
	Labor	95 (67.86)	45 (32.14)	
	Business	23 (67.65)	11 (32.35)	
	Other	4 (57.14)	3 (42.86)	
<b>Mother's occupation</b>	Housewife	239 (70.71)	99 (29.29)	<b>&lt;0.005</b>
	Garments worker	21 (48.84)	22 (51.16)	
	Others	0 (0.00)	1 (100.00)	
<b>Husband's occupation</b>	Driver	76 (74.51)	26 (25.49)	0.075
	Garments worker	75 (73.53)	27 (26.47)	
	Business	31 (75.61)	10 (24.39)	
	Rickshaw puller	28 (73.68)	10 (26.32)	
	Labor	17 (56.67)	13 (43.33)	
	Job	7 (43.75)	9 (56.25)	
	Immigrant	3 (50.00)	3 (50.00)	

<b>Marital status</b>	Married	238 (70.83)	98 (29.17)	<b>&lt;0.002</b>
	Unmarried	22 (47.83)	24 (52.17)	
<b>Monthly family income (taka)</b>	<10,000	29 (65.91)	15 (34.09)	0.851
	10, 000-19, 000	120 (69.36)	53 (30.64)	
	20,000-29, 000	85 (65.89)	44 (34.11)	
	>30000	26 (72.22)	10 (27.78)	
<b>Monthly expenditure for family(taka)</b>	<10000	132 (60.27)	87 (39.73)	<b>&lt;0.001</b>
	10,000-19,000	126 (78.75)	34 (21.25)	
	>30000	2 (66.67)	1 (33.33)	

**4.5.2 Association of purifies water before consumptions with sociodemographic characteristics:** The result exposed that water purification was significantly associated ( $p < 0.05$ ) with level of education, mother's occupation, marital status. **Table 4.7** presented these associations.

**Table 4.7: Association of purify water before consumptions with sociodemographic characteristics**

<b>Variables</b>		<b>Yes</b>	<b>No</b>	<b>p- value</b>
		<b>n (%)</b>	<b>n (%)</b>	<b>(<math>\chi^2</math>)</b>
<b>Level of education</b>	Primary	263 (94.60)	15 (5.40)	<b>&lt;0.001</b>
	Secondary	49 (71.01)	20 (28.99)	
	Higher secondary	30 (85.71)	5 (14.29)	
<b>Father's occupation</b>	Garments worker	41 (87.23)	6 (12.77)	0.811
	Rickshaw puller	136 (88.31)	18 (11.69)	
	Labor	127 (90.71)	13 (9.29)	
	Business	32 (94.12)	2 (5.88)	
	Other	6 (85.71)	1 (14.29)	
<b>Mother's occupation</b>	Housewife	307 (90.83)	31 (9.17)	<b>&lt;0.002</b>
	Garments worker	35 (81.40)	8 (18.60)	

	Others	0 (0.00)	1 (100.00)	
<b>Marital status</b>	Married	307 (91.37)	29 (8.63)	<b>&lt;0.001</b>
	Unmarried	35 (76.09)	11 (23.91)	
<b>Husband's occupation</b>	Driver	92 (90.20)	10 (9.80)	0.135
	Garments worker	91 (89.22)	11 (10.78)	
	Business	37 (90.24)	4 (9.76)	
	Rickshaw puller	37 (97.37)	1 (2.63)	
	Labor	29 (96.67)	1 (3.33)	
	Job	16 (100.00)	0 (0.00)	
	Immigrant	4 (66.67)	2 (33.33)	
<b>Monthly family income (taka)</b>	<10,000	42 (95.45)	2 (4.55)	0.158
	10, 000-19, 000	157 (90.75)	16 (9.25)	
	20,000-29, 000	114 (88.37)	15 (11.63)	
	>30000	29 (80.56)	7 (19.44)	
<b>Monthly expenditure for family(taka)</b>	<10000	192 (87.67)	27 (12.33)	0.136
	10,000-19,000	148 (92.50)	12 (7.50)	
	>30000	2 (66.67)	1 (33.33)	

#### 4.5.3 Association of types of latrine with sociodemographic characteristics:

The result showed that types of latrine were not statistically significant ( $p>0.05$ ) with level of education, father's occupation, mother's occupation, husband's occupation, monthly family income etc. The result of  $\chi^2$  test illustrated in **Table 4.8**.

**Table 4.8: Association of types of latrine with sociodemographic characteristics**

Variables		Sanitary n (%)	Unsanitary n (%)	p- value( $\chi^2$ )
<b>Level of education</b>	Primary	271 (97.48)	7 (2.52)	0.854
	Secondary	68 (98.55)	1 (1.45)	
	Higher	34 (97.14)	1 (2.86)	

	secondary			
<b>Father's occupation</b>	Garments worker	44 (93.62)	3 (6.38)	0.132
	Rickshaw puller	151 (98.05)	3 (1.95)	
	Labor	139 (99.29)	1 (0.71)	
	Business	32 (94.12)	2 (5.88)	
	Other	7 (100.00)	0(0.00)	
<b>Mother's occupation</b>	Housewife	332 (98.22)	6 (1.78)	0.105
	Garments worker	1 (100.00)	0 (0.00)	
	Others	40 (93.02)	3 (6.98)	
<b>Husband's occupation</b>	Driver	98 (96.08)	4 (3.92)	0.751
	Garments worker	99 (97.06)	3 (2.94)	
	Business	41 (100.00)	0 (0.00)	
	Rickshaw puller	37 (97.37)	1 (2.63)	
	Labor	30 (100.00)	0 (0.00)	
	Job	16 (100.00)	0 (0.00)	
	Immigrant	6 (100.00)	0 (0.00)	
<b>Monthly family income (taka)</b>	< 10,000	42 (95.45)	2 (4.55)	0.496
	10, 000-19, 000	170 (98.27)	3 (1.73)	
	20,000-29, 000	125 (96.90)	4 (3.10)	
	>30000	36 (100.00)	0 (0.00)	
<b>Monthly own</b>	< 10000	132 (97.78)	3 (2.22)	0.971

<b>income (taka)</b>	10,000- 19,000	235 (97.51)	6 (2.49)	
	>30000	6 (100.00)	0 (0.00)	
<b>Monthly expenditure for family(taka)</b>	<10000	216 (98.63)	3 (1.37)	0.309
	10,000-19,000	154 (96.25)	6 (3.75)	
	>30000	3 (100.00)	0 (0.00)	

**4.5.4 Association of used pad in menstruation with sociodemographic characteristics:** The study revealed that used pad in menstruation was statistically significant ( $p < 0.030$ ) with types of family. This result was illustrated in **Table 4.8**.

**Table 4.9: Association of used pad in menstruation with sociodemographic characteristics**

<b>Variables</b>		<b>Yes n (%)</b>	<b>No n (%)</b>	<b>p- value (<math>\chi^2</math>)</b>
<b>Age</b>	15-25	113 (68.07)	53 (31.93)	0.565
	26-35	102 (61.36)	68 (38.64)	
	36-45	20 (60.61)	13 (39.39)	
	Above 45	4 (57.14)	3 (42.86)	
<b>Level of education</b>	Primary	178 (64.03)	100 (35.97)	0.568
	Secondary	42 (60.87)	27 (39.13)	
	Higher secondary	25 (71.43)	10 (28.57)	
<b>Types of family</b>	Nuclear	113 (58.85)	79 (41.15)	<b>&lt;0.030</b>
	Joint	132 (69.47)	58 (30.53)	
<b>Father's occupation</b>	Garments worker	25 (53.19)	22 (46.81)	0.152
	Rickshaw puller	98 (63.64)	56 (36.46)	
	Labor	93 (66.43)	47 (33.57)	
	Business	33 (64.71)	12 (35.29)	
	Other	7 (100.00)	0 (0.00)	
<b>Mother's occupation</b>	Housewife	214 (63.31)	124 (36.69)	0.215
	Garments worker	31 (72.09)	12 (27.91)	
	Others	0 (0.00)	1 (100.00)	
<b>Marital status</b>	Married	216 (64.29)	120 (35.71)	0.869
	Unmarried	29 (63.04)	17 (36.96)	

<b>Husband's occupation</b>	Driver	68 (66.67)	34 (33.33)	0.282
	Garments worker	72 (70.59)	30 (29.41)	
	Business	20 (48.78)	21 (51.22)	
	Rickshaw puller	23 (60.53)	15 (39.47)	
	Labor	18 (60.00)	12 (40.00)	
	Job	11 (68.75)	5 (31.25)	
	Immigrant	3 (50.00)	3 (50.00)	
<b>Monthly family income (taka)</b>	< 10,000	30 (68.78)	14 (31.82)	0.898
	10, 000-19, 000	112 (64.74)	61 (35.26)	
	20,000-29, 000	80 (62.02)	49 (37.98)	
	>30000	23 (63. 89)	13 (36.11)	
<b>Monthly own income (taka)</b>	< 10000	92 (68.15)	43 (31.85)	0.468
	10,000- 19,000	149 (61.83)	92 (38.17)	
	>30000	4 (66.67)	2(33.33)	
<b>Monthly expenditure for family(taka)</b>	<10000	141 (64.38)	78 (35.62)	0.536
	10,000-19,000	103 (64.38)	57 (35.63)	
	>30000	1 (33.33)	2 (66.67)	

## **Chapter-5: Discussions**

### **5.1 Socio-demographic Characteristics of female garments workers**

This study indicates that female garment workers were young, unmarried, less education, of rural origin and very poor families. Major socio-economic characteristics of women garment workers are as follows.

This observation revealed that female garment workers were 15 to 45 years but most of them were 26-35 years in age and majority of them were Muslims. Although peoples from all blood groups were engaged with the working in garments factory, it was found that highest number of female workers (47.91%) were O+ blood group which number was 183. In case of education, 72.77% were in primary level and only few workers 9.16% had been completed higher secondary level. Because of their lower economic support, they had deprived of education. Most of the female garment workers fathers were rickshaw puller almost 40.31%. Among others some were labor almost 36.65% and other profession was negligible etc. and mothers were housewife, labor etc. 50.26% female workers were comes from nuclear family and 49.74% of them were joint family. there are about 87.96 % of women workers are married and rest of them are unmarried, divorced, widowed or abandoned by their husbands. The Husband's occupation of married female garments worker were driver, garments worker, businessmen and immigrant etc. The monthly family incomes (taka) of workers monthly family income were varied within 10, 000 taka to 30,000 taka. 63.09% female workers monthly own incomes were in below 20,000 taka and only 1.57% was below 30,000 taka. 57.33 % were expending below 10,000 taka for their family purpose and 0.79% was below 30,000 taka for their family.

### **5.2 Nutritional and Biochemical Characteristics of female garments workers**

According this observation, normal weight, underweight, preobese and obese were 46.34%, 3.14%, 38.74%, 11.78 % respectively. Among 382 respondents, normal, mild and moderate hemoglobin levels of workers were 56.54 %, 42.41 %, 1.05 % respectively. Most of the respondents including 75.39% were normal blood pressure level, 17.28% were low blood pressure and 7.33% were high blood pressure.

According to the World Health Organization (WHO), a low weight prevalence of 20% to 39% in a given population is considered a critical situation (WHO, 1995). NGOs



reported a similar prevalence of low weight (36%) among garment workers in Cambodia in 2013, according to a small cross-sectional survey (McMullen, 2016). In contrast, a recent study by the International Labor Organization (ILO) conducted in several Cambodian factories found a significantly lower prevalence of 14.3% of reduced weight among female workers, who were mainly married and whose age was therefore greater (ILO, 2016). Many young workers are likely to start working when they are already underweight, as demonstrated by teenage workers in Bangladesh (Khan and Ahmed, 2005). It is known that amenorrhea (absence of menstruation) is related to low weight (Mitan, 2004). In contrast, a cross-sectional study of 1530 Vietnamese women of reproductive age reported positive associations between BMI and Hb level (Lailou, 2014).

### **5.3 Personal hygiene practices of female garments workers**

Hygiene practice among them was almost same. The results of this study showed that the percentage of drinking tube well water was 68.06 %, purifying water was 89.53 %, using sanitary latrine in garment workers was 97.64%, using footwear in toilet was 99.21%, Washing hand with soap after visiting toilet was 99.21% , Washing hand with soap before eating was 97.21 %, Using pad during menstruation was 64.14%. Although garment workers have lower level of economic status but they have good hygiene practice.

### **5.4 Associated factors of nutritional status**

Though hygiene practice of both groups was same and we found both groups was in normal and underweight. But most of them were normal in weight.

If we associate age with BMI we found that 6.02 % of 10-15 yearswomen were under weighted, 59.64% were normal weighted, 27.71% were pre-obese and only 6.63% were over weighted. 1.14% of 26-35 years women were under weighted, 35.80% were normal weighted, 48.30% were pre-obese and only 14.77% were over weighted. 33.33% of 36-45 years women were normal weighted, 42.42% were pre-obese and only 24.24% were over weighted. 57.14% of Above 45 years women were normal weighted, 42.86% were pre-obese. Thus we can conclude that most of the women were normal weighted.

Association of level of education with BMI, it was found that 2.52% of primary level educated women were under weighted, 43.53% were normal weighted, 42.81% were pre-obese and only 11.15% were over weighted. 4.35% of secondary level educated women were under weighted, 55.07% were normal weighted, 30.43% were pre-obese and only 10.14% were over weighted. On the other hand 20.00% of higher secondary level educated women were overweighed. Thus we can conclude that most of the women were normal weighted.

After association of father's occupation, mother's occupation, types of family, marital status, husband's occupation, monthly family income (taka), monthly own income (taka) and monthly expenditure for family (taka) were not statistically significant ( $p>0.05$ ) among them and most of them were normal weighed.

Association of biochemical and with body mass index revealed that only blood pressure is statistically significant.

### **5.5 Associated factors of sociodemographic characteristics with personal hygiene**

The level of education, mother's occupation, marital status, monthly expenditure for family were statistically significant ( $p<0.05$ ) with sources of drinking water, way of water purification and using pad during menstruation. This result corroborates with Haque (2017) where religion, level of education, mother's occupation, marital status, monthly expenditure for family is responsible for hygiene practice. Although there are several factors that cause malnutrition in the female population of our country, personal hygiene related to socio-demographic characteristics is the main factor. Illiteracy is also one of the factors because it is not true that only expensive foods can provide better nutrition. The high prevalence of the disease adversely affects the working capacity of female workers which can be avoided by maintaining an adequate standard of personal hygiene. But the result is that almost half of the subjects are malnourished, since they belong to a low socio-economic class of society.

## **Chapter-6: Conclusions**

The information collected and discussed in the needs assessment report provides a clear indication of the need and the utmost importance of this problem to be developed to address the nutritional status of female garment workers. The garment industries in Bangladesh are having an impact position on women's economic growth. It can be hoped, that this economic growth will have a positive impact on women's nutritional awareness. The socialization process will not become a major obstacle. The garment factories involve about 13 lack people who 20,000 women and only 2 to 80,000 male workers. Insufficient nutrition and sleep and an unhealthy working environment, inadequate healthcare facilities in the workplace and long working hours, all of which jointly affect the health and working capacity of workers. The result of this study confirms the existence of a negative energy balance among garment workers. In this study, it revealed that women face many problems, such as poor nutritional status, lack of knowledge of nutritional foods and bad eating habits, resulting in a lack of BMI standards. As a result, they suffer from malnutrition. So they face different types of physical problems, but are not aware of these problems. Although the results showed that female garment workers have normal weight, they filled it up by eating carbohydrates. They eat very few foods like proteins, fats, vitamins and minerals. Since their hygiene practice is better, they should also know nutritious foods to enrich their nutritional status in this way, we can expect good health from women. As garment workers, women have a lower income in their food bills and the situation in the home is of a lower quality. Finally, it can be concluded, collaboration between them is needed to improve coverage within limited resources. Essential policies already exist that support the achievement of better education and women's rights, but their implementation needs to be strengthened. Continuous promotion is needed to promote women's education.

## **Chapter-7: Recommendations and Future Perspectives**

In recent years, the garment industries in Bangladesh have contributed positively to economic growth. At present, 76.1% of the total national currency incomes made by garment workers are women who are neglected in every part of life. More intense and in-depth research is needed to understand and eliminate their problems.

### **National Policy for Women**

On March 8, 1997, May 2004, February 2008 and March 2011 the government of the People's Republic of Bangladesh declared national women's development policy to improve conditions for women as a whole. The objective of the current women's development policy is to improve the socio-economic conditions of the poor-quality women's community in Bangladesh. To achieve the goal, the government requires some strategies. The government adopts research strategies in the field of working women, empowering working women through participation, economic support, poverty reduction, reduction of women's violations, increased health and nutrition services, family planning and social care services, improvement of working environments, etc. The supply of health and nutrition includes:

- ✓ Women should receive adequate nutrition.
- ✓ Women should receive adequate nutrition education and training.
- ✓ Women must participate in all areas of medical care, including planning, distribution and conservation. If national women's development policy achieves its goal, the current conditions of working women, including garment workers in Bangladesh, will improve significantly. (National Women's Policy, 2011).

The entry of women into the normal labor market cannot be verified because of the country's progressive economic deterioration, but measures can be taken to improve their efficiency, productivity and quality of life. The following recommendations can be made in this regard.

- Burial of the wage rate is recommended according to the standards of the international labor organization. Adequate payment must be guaranteed for additional working hours.

- There should be a reduction in working time according to the labor legislation in our country.
- A half-day meal must be provided at zero cost or at a nominal rate for workers.
- Provide free medical facilities for garment workers.
- Improve the working environment by installing the central air conditioning or ventilation system, fire alarm; it exists easily during emergency in the garment factory.
- The wage rate must be established in accordance with the market price of the goods.
- Insurance benefits must be guaranteed to workers.
- Improvement of nutritional knowledge through the food education program among garment workers.
- Long-term sedentary work and reduced physical activity increase the percentage of body fat among them, although their nutritional status is moderate, which may cause a future risk of heart disease. Therefore, some physical exercises may be suggested to avoid risk.
- National women's policy must be properly implemented to improve women's nutritional status.

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## Annex 1: Pre-structured Questionnaire

### Perception Survey for Female Garment Workers (A Cross Sectional Study)

#### PART-A: Participant Consent Form

My name is Nilufa Yeasmin, and I am a student at Chattagram Veterinary and Animal Sciences University. I am conducting a qualitative research study on “Perception of Nutritional Status and Personal Hygiene Practices of Female Garments Worker in Chattagram City, Bangladesh.” The purposes of this study are to assess the nutritional status and the status of personal hygiene practices of female garment workers of Chattagram City. Your participation in the study will involve an interview with an estimated length of half an hour. This study poses little to no risk to its participants. I will do my best to ensure that confidentiality is maintained by not citing your actual name within the actual study. You may choose to leave the study at any time, and may also request that any data collected from you not be used in the study.

By signing below you agree that you have read and understood the above information, and would be interested in participating in this study.

Date: .....

Signature.....

#### Part B: Background Information

- 1.1 Survey place..... 1.2 Sample no.....
- 1.3 Name..... 1.4 Age (years).....
- 1.5 Religion..... 1.6 Blood group.....
- 1.7 Education: Under 6  Under10  11 +
- 1.8 Father’s occupation: Garments worker  Rickshawpuller  Others
- 1.9 Mother Occupation: Garments worker  Housewife  Others
- 1.10 Types of family.....
- 1.11 Marital status: Married  Unmarried
- 1.12 Husband’s occupation.....

1.13 Monthly family income: .....

1.14 Own Monthly income: .....

1.15 Monthly costing for family: .....

**Part C: Nutritional Status**

1.1 Height (m): .....

1.2 Weight (Kg): .....

1.3 BMI: .....

1.4 Hemoglobin level: .....

1.5 Blood pressure level: .....

**Part -D: Personal Hygiene Practices**

1.1 Source of drinking water: Tubewell  WASHA  River   
Others

1.2 Purifying the water before consumption: Yes  No   
Sanitary rine Unsanitary

1.4 Using Footwear in toilet: Yes  No

1.5 Washing hand with soap after toilet: Yes  No

1.6 Washing hand with soap before eating: Yes  No

1.7 Using sanitary pad during menstruation: Yes  No

## Annex 2: Photo gallery



**Data Collection**



**Weight measurement**



**Height measurement**



**Hemoglobin measurement**

## **Brief biography**

Nilufa Yeasmin daughter of Nur Islam and Anawara Begum passed the Secondary School Certificate Examination in 2006 and then Higher Secondary Certificate Examination in 2008. Nilufa Yeasmin obtained her B.Sc. (Hons.) in Food Science & Technology in 2013 from Chattogram Veterinary and Animal Sciences University (CVASU), Bangladesh. Now, she is a candidate for the degree of M.S in Applied Human Nutrition and Dietetics under the Department of Applied Food Science and Nutrition, Faculty of Food Science and Technology, Chattogram Veterinary and Animal Sciences University (CVASU).