

A study on health and occupational safety of female workforce in RMG industries of Bangladesh

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Abstract-Bangladesh is the second largest exporter of readymade garment (RMG) products trailing China. 82% of the country's total export is contributed by RMG sector which is 13% of the total GDP. At present, about 5100 garment factories are operating in Bangladesh and 3.6 million workers are working there in which more than 80% of them are female. Poor occupational health and safety damages many lives and livelihoods which impedes economic growth, since it decreases the labor productivity to a great extent. This paper discusses in brief the problem of health and safety issues of female workforce of garment industries in Bangladesh based upon the industrial environment and working conditions. This study tried to find out possible threats that directly effect on a company's overall productivity. This descriptive study was undertaken of the employees of three selective industries. Total sample were 60 and purposive sampling technique was followed for data collection, which was done by face to face interview by interviewer. The data was collected on a structured questionnaire. Data was analyzed by computer following SPSS version 20.0. After a deep analysis for three months, the major health and safety problems faced by the female workers in selected industries were indicated for which there have been noticed a massive fall down of workers efficiency as well as company's productivity. Indicating those problems, improvement proposals were given to those industries and were implemented over the course of few days. From the proposed improvement proposal, the result has been found that the rate of productivity of the workers is gradually increased after implementation than before and it was satisfactory as per as expected level.

Keywords: Female Workers, Working Environment, Health Hazard, Safety Measures, Productivity.

1. INTRODUCTION

Readymade Garment (RMG) sector is the main source of earning foreign currencies (81.32%) in the economy of Bangladesh [1]. The garment industry gained the highest focus and became the largest export sector in Bangladesh. Since Bangladesh is a labor-abundant country, government policies focused on the low-skilled labor intensive export goods sector. From the very beginning, RMG sector largely depended on low-skilled women workers because low skilled rural women are available at very low wages. Thus women became the main workforce in the garment sector.

It is common notion that, corporate sector organizations (CSOs) are ensuring better working environment with better office place, higher salary and staff amenities. But there are very few studies conducted to explore the real scenario of CSOs regarding the working environment in terms of women-friendly infrastructural facilities, discrimination, and sexual harassment and policy initiatives. The issue of working environment is more important for woman employees as they need some sort

of extra care, facilities and protection in and outside the office premises. As new industries expand, the labor force grew with the economy of the country, at the same time health hazards for those workers present there in various occupational diseases and accidents highly prevailed among the workers.

Time has come to consider the occupational health and safety of the female worker in its true spirit in a holistic way. The policy makers, legislators, employers and all other members of the society require understanding the relationship of true social development with economic development through a system of good practices of occupational safety and health in work places. In this connection, a study is conducted on 60 (sixty) female garments workers from 3 (three) different industries such as Comfit Composite Knit Limited, South East limited and Misami Apparel Limited. Careful thought was given to select an area where a particular set of objectives can be fulfilled. The objective were to identify occupational health hazard and safety among female workers in the industries. To explore the changing effect of the propose suggestions regarding the

study to improve the workplace environment and productivity were the main factor.

2. METHODOLOGY

In this study, both qualitative and quantitative methods are used. Quantitative method like survey method was chosen thought to be more advantageous. For in depth knowledge, qualitative method like case studies were applied. Workers from different section were called upon to deliver information regarding their health and safety issues. Sequences regarding the study are as follows:

Conducting primary survey: This research is based on output from primary data from the respondents through a sample survey with the help of interview schedule. The data collection included questionnaire survey and focus group discussion.

Sampling procedure: Questionnaire survey was conducted on 60 (sixty) female garments workers. 20 workers from each factory were chosen randomly in order to meet the objectives.

Data collection: From the month of December to January 2017 the data were collected. The questionnaires were asked systematically and recorded directly on the schedule.

Analytical procedure: After collecting data, it was cross checked through computer. The analyzing procedure was done through Excel software following Statistical Programme for Social Science (SPSS) to work out the cross tabulation and frequency distribution between related fields.

3. DATA ANALYSIS AND FINDINGS

Total 60 female garment workers were randomly selected from the garments situated in the area of Tangail and Dhaka where more than 2000 workers are working. Since Tangail and Dhaka are well known for garments area and lots of female garments workers are working there too, it was decided to make study in those area the data were collected using the prescribed format. The analysis of data with discussion are given below:

3.1 Respondent according to their salary range

Fig.1 shows the salary structure of the industries. It is observed that the garments workers are still ill paid which is unsatisfactory. Since their education level is very low too and most of them are not trained beforehand, they do manual work which is very hard labor and time consuming. Though they work hard, their wage never goes up.

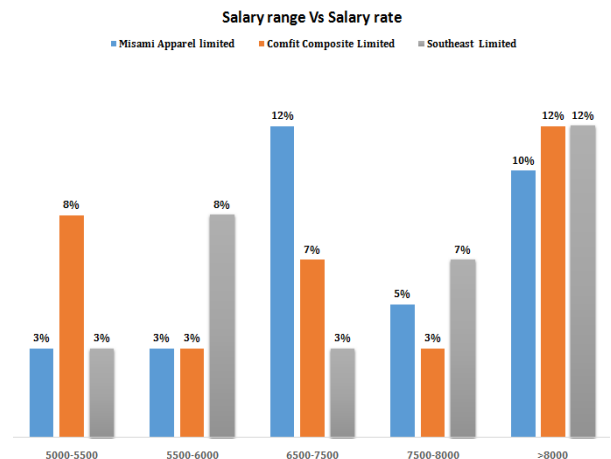


Fig.1 Respondent according to their salary range

The position of Bangladesh compared to the rest of the world on minimum wage within the garment industry which demonstrate that the Bangladeshi workers are still the lowest paid workers in the world. In that regard, Bangladesh has little backlash, as productivity in the RMG sector is comparatively low. From fig.2 it is seen that accordance with the other countries, productivity of the Bangladesh is consistently less than the others.

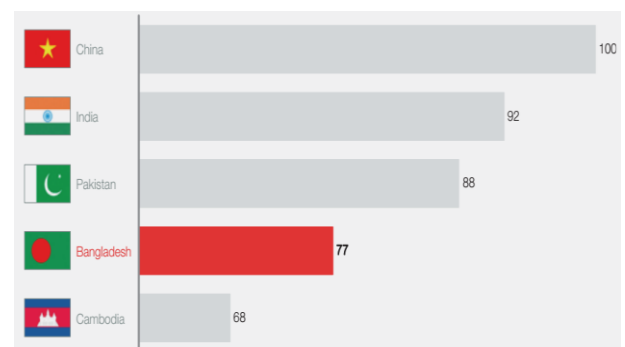


Fig.2. Comparison of productivity of Bangladesh compared with others countries (BGMEA, 2014)

Recommendations: A satisfied employee can provide 10 times effort than an unsatisfied workers in the same period, worker should be paid regularly which is recommended by BGMEA [2]. So that their motivation for work will increase, job switch rate will decrease. So, if we afford them higher wages, productivity may increase as per above statistics.

3.2 Nature & Dimension of Occupational Health Hazard

From the fig. 3, it is noticed that workers in all the industries (Misami, Comfit and Southeast) are suffering from musculoskeletal pain (26.9%, 38.5%, 34.6% respectively), back pain (32.5%, 40%, 27.5%), neck pain (32.6%, 34.9%, 32.6%), eye strain (37.5%, 33.3%, 29.2%), hypertension (40.9%, 34.1%, 25.0%), fainting (33.3%, 37.5%, 29.2%), chest pain (30.4%, 26.19%, 43.5%), frustration and others diseases as they have to work for long time without any interval. The nature of

the work are responsible for the below mentioned diseases of the female workers in Bangladesh.

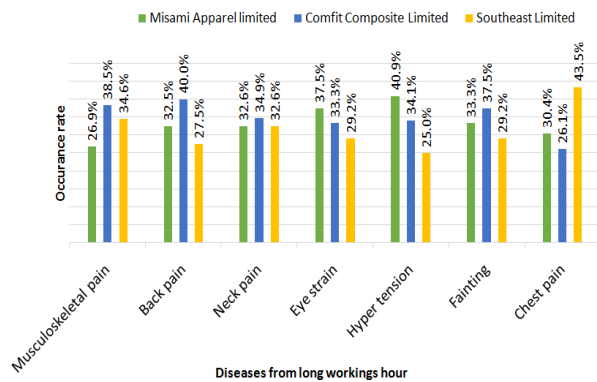


Fig.3 Health problem aroused from long working hours

(a) Scissors problem:

In sewing section large, heavy scissors are used for trimming. Operators cut through several layers of fabric with scissors that are too small and don't provide enough leverage. For that reasons scissor handles are narrow and create contact stresses. Scissors are dull and require excessive force to operate. Workers wrap cut bits around handle to reduce.

Recommendations: Ergonomically designed scissors and cutting equipment's help reduce contract stresses. They also offer comfortable cutting posture and lesser force.

(b) Sewing tables:

Tables that are too high create elevated shoulder postures and non-neutral elbow and wrist postures. Tables too low cause the operator to lean forward and flex her neck. Workers maintain awkward shoulder, elbow, and wrist postures because of improper table height. Employees resting for arms or wrists on sharp edges may cut off blood circulation, pinch nerves, and cause injury to the arms or hand.

Recommendations: Employees should be able to work with the elbows down, close to the body. Table height should be adjusted between 10cm to 15cm above elbow height. It should also have tilted 10° to 15° towards the operator. Knee angle should have inclined 90° to 110° with the table. Employees should not have to twist or bend to pick up or put down objects.

(c) Sewing Chair: Workers often maintain awkward shoulder, elbow and wrist postures while sewing because of improper chair height or position. Operators are provided with very poor chairs such as stacking chairs. They provide no cushioning or back support and the edge of the seat constricts blood flow at the back of the legs because of square edge. The high risk of musculoskeletal disorders related to working in a sitting

position bending the neck more than 30° for more than 10 hours. Additionally, sitting in a forward flexed posture causes the lumbar spine to flatten that leads to a static contraction of the extensor muscles of the back. Due to awkward postures for prolonged period, back pain, neck pain, musculoskeletal pain becomes possible threat for them.

Recommendations: Chair should adjust between 51cm and 61cm; the backrest distance and height should adjust horizontally by 5cm and 25cm. Chair height is correct when the work surface is at elbow height. Ideally, the entire sole of the foot should rest on the floor, and the back of the knee should be slightly higher than the seat. The seat may be slightly lower when the worker uses a treadle or pedal.

Fig.4 shows that workers of the industries (Misami, Comfit and Southeast) are suffering from pruritus (45.0%, 40.0%, 15.0% respectively), hearing problem (30.0%, 40.0%, 30.0%), diarrhea (26.9%, 30.0%, 42.3%), cut injuries (30.8%, 30.8%, 36.5%), asthma (35.7%, 28.0%, 35.7% respectively), respiratory problem (28.0%, 44.0%, 28.0%) diseases because of unhealthy and unsafe environment in the industry.

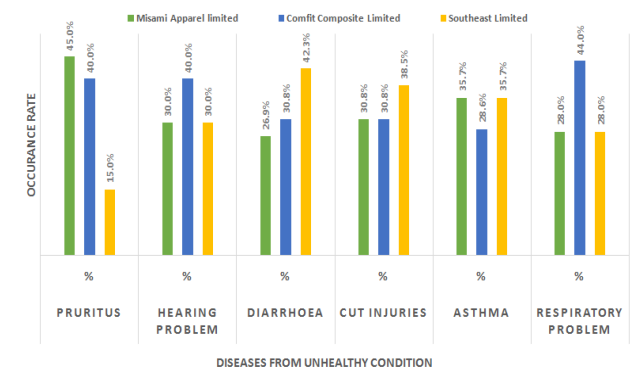


Fig.4 Health problem aroused from unhealthy and unsafe environment

3.3 Possible threats

- (a) Due to excessive noise in sewing, finishing section hearing problem becomes a common phenomenon for the workers of RMG sector. Chronic exposure to high decibels lead workers by damaging sensory hair cells in the inner ears. Garment workers in Bangladesh face noise levels of 96 to 100 dB adjusted, which is a significant contributor to NIHL (Noise-induced hearing loss) among women garments workers in Bangladesh [3].
- (b) Workers engaged with the fabrics stitching in the factory and they continuously inhale the fabric dust, loose fibers causing respiratory health problem like allergies etc. because of not using protective mask
- (c) In sewing section, piercing of wound is the most common type of injury. Workers injure their eyes

while stitching as the broken needle flying into the eyes.

- (d) Working in humid conditions because of steam ironing and pressing the worker suffer from respiratory problem. Used to make fabric permanent press and color-fast, formaldehyde is released into the air from fabric in the form of a gas. Workers may also have skin exposure to formaldehyde as they handle the fabric. As some processes in this industry involve exposure to heated plastic fumes, metal dust and fumes (especially lead), leather dust, wool dust and hazardous solvents, the illnesses like pruritus, diarrhea, asthma, various respiratory problem etc. Becomes common phenomena for the worker.

Recommendations:

- (a) Decreasing noise and creating noise barriers, the use of personal protective equipment, such as “Ear muffs”, as well as the establishing maximum daily exposures, can go a long way to mitigate worker exposures to chronic noise.
- (b) Provision of local exhaust ventilation that uses suction, based on the principle of a vacuum cleaner, is to be encouraged stitching sections to remove dust from the air. The dust particles can be sucked through the ventilation duct provided.
- (c) Safety metal guard attached to the presser foot bar can prevent any unintentional touching of the needle during sewing. Workers should provide “eye protection glass” to protect eye from splashing liquid chemical materials. Beside factory should install a separate industrial eye wash section to rapidly relief eye injured by chemicals or particulates.
- (d) Exposure to formaldehyde can be prevented by allowing the fabric to off-gas in a well-ventilated area before it is handled and by providing good ventilation in the work areas, particularly where fabric is exposed to high heat and humidity. Workers who experience skin problem can wear gloves or protective cream.

3.4 Dimension of occupational safety issues regarding the female worker

From the fig. 5, it is noticed that, the ventilation condition of the three industries ((Misami, Comfit and Southeast) are (34.8%, 21.7%, 43.5%) respectively whereas the humidity rating is (37.2%, 27.9%, 34.9%) and sanitation facility rating is (40.0%, 24.4%, 35.6%) respectively which is below standard as per as the workers opinion. The lightening condition rating of those garments are (43.9%, 24.4%, 31.7%) respectively; drinking water hygiene percentage are (35.0%, 25.0%, 40.0%) and working space adequacy rating are (41.7%, 16.7%, 41.7%) which is not as per satisfactory label.

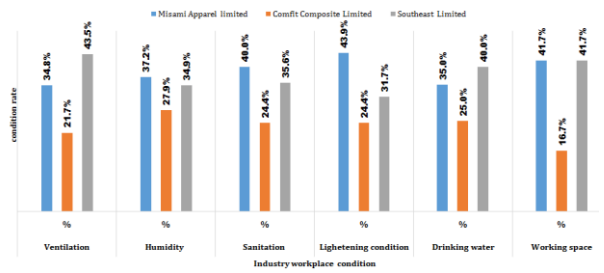


Fig 5. Dimension of occupational safety issues regarding the female worker

(a) Poor lightening condition:

In most of the factory, the lightening facilities and level too inadequate for worker. It creates eye strain on workers eye. Due to improper selection of lightening fixtures and their placements, the effort made to improve the level of illuminations failed to give the desired production. Lighting creates shadows and glare on some pressing surfaces increasing the visual demand on the operator.

Recommendations: The illumination level at the work-plane should be within 600-800 lux who work for 9-10 hours per day [4]. LED light and Additional task light should be provided in such a way that the visibility of the needlepoint will be optimum. Daylight provisions along with designing glare controlling devises should make to add more diffused daylight in indoors.

(b) Pregnancy and Maternity leave problem:

Workplace risk assessments during pregnancy are especially important. For any workers, sitting 8 to 10 hours a day behind a sewing table can lead to back and neck injuries, stiff muscles and joints, poor circulation, worker’s fatigue and more. In most of the company women don’t get enough maternity leave and if they get they don’t have properly paid. Some companies pay half of the full salaries which is insufficient for workers and for that reason worker have tendency to switch the job.

Recommendations: During pregnancy, company must provide ergonomic chair so that they feel good to do work. It is a well-established fact that maternity leave benefits increase the chances of women to get back to their work and plays a significant role to increase organizational loyalty, efficiency and job satisfaction.

(c) Fire Safety Management:

Emergency signage: To escape within a building should have adequate lighting for identification of the locations of exits and paths of travel to an exit in case of fire. At our survey time, we found some of the exit doors are not in standard way. Like, it is blocked or locked and inadequate lighting systems.

Electrical faults: Most of the time, faulty earthling system, improper electrical wiring and overloaded electricity lead to fires. In cutting section, during cutting

static electricity being produced because of friction between cutting blade and fabric.

Recommendations: The wooden platform help in preventing electrical shocks while operating electrical instruments. Before cutting, fabric must be needed special treatment to neutralize static electricity

4. RESULTS AND DISCUSSION

Some recommendations were given to the sample industries worked for 5 days (20 Feb. 2017 to 25 Feb. 2017). It was observed that, the change in percentage for different cases improved which is directly related to the female workers comfort ability and thus leads to increase in productivity.

4.1 Ergonomic chair and table for sewing different parts of the garment

In Comfit Composite Ltd, observations was carried out on 10 female workers on sewing section for the operation of both sleeve joint and 92 target were given to them in each day.

Before implementation (20 Feb-25 Feb, 2017) the productivity level of those workers were collected, by monitoring the achievement of their target in relation to what they were required to achieve (Fig.6).

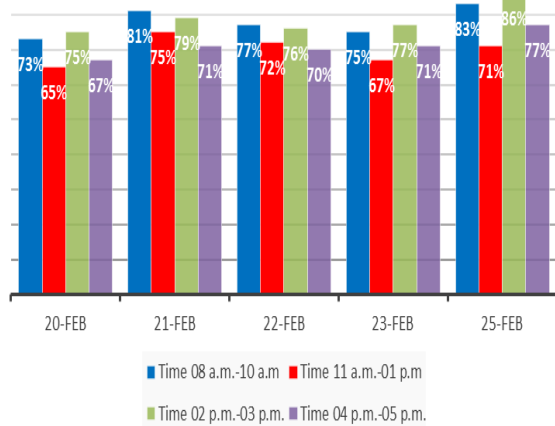


Fig.6. Worker efficiency with normal chair and table

After observation it wasfound that the productivity rate was (73%, 65%, 75%, 67%), (81%, 75%, 79%, 71%), (77%, 72%, 76%, 70%), (75%, 67%, 77%, 71%), (83%, 71%, 86%, 77%) for 5 days and several hours respectively.

After implementation (26 Feb – 02 March, 2017), for the same operation and the same target (Fig.7).

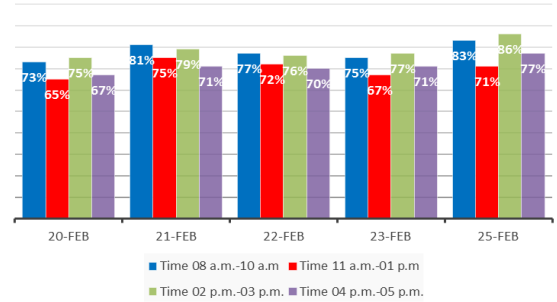


Fig. 7 Worker efficiency with ergonomic chair and table

It is found that the productivity rate becomes (75%, 72%, 70%, 67%), (82%, 79%, 80%, 79%), (74%, 70%, 75%, 71%), (78%, 76%, 76%, 75%), (82%, 78%, 79%, 77%) which is much better than before. As workers are to do work for prolonged period in the industry, they need comfort and industry needs more production. This diagram covers both. Workers feel better without any stretch and rate of some of the diseases which we have cited before like back pain, neck pain, chest pain, musculoskeletal pain are decreasing and on the other hand, the rate of productivity growing up.

4.2 Additional lightening system for sewing section especially in the evening time

In Misami Apparel Ltd, investigation was carried out on 15 female workers on sewing section for the critical operation like bar tack stitching and 250 target were given to them in each day.

Before implementation (20 Feb-25 Feb, 2017) the productivity level of those workers were collected, by monitoring the achievement of their target in relation to what they were required to achieve.

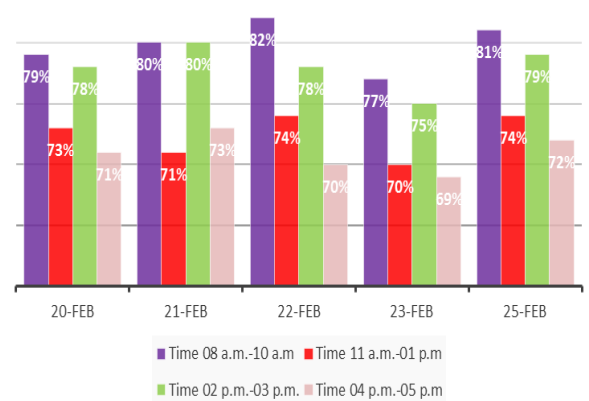


Fig. 8 Worker efficiency without additional light (Evening time 4pm-5pm)

With as usual light setting at Misami Apparel Limited to do some critical operation like bar tack at different time for 5 days the efficiency found (8am-10am, 79%, 80%, 82%, 77%, 81%), (11am-1pm, 73%, 71%, 74%, 70%, 74%), (2pm-3pm, 78%, 80%, 78%, 75%, 79%), (4pm-5pm, 71%, 73%, 70%, 69%, 72%) . In fig. 8, it is seen

that efficiency is in constant rate at day time but in the evening especially (4pm- 5pm) it is gradually decreasing and it also creates eye strain on workers eye.

After supplying additional lighting facilities for same operation and same target, at the evening hour, efficiency becomes (8am-10am, 82%, 84%, 87%, 80%, 86%), (11am-1pm, 80%, 81%, 84%, 79%, 83%), (2pm-3pm, 81%, 82%, 88%, 81%, 88%), (4pm-5pm, 80%, 80%, 81%, 80%, 86%).

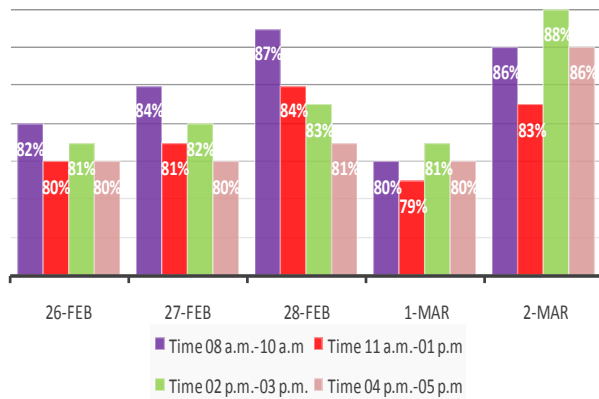


Fig. 9 Worker efficiency after supplying additional light (Evening time 4pm-5pm)

From fig. 9, it is seen that due to providing lighting system at the evening hour (4pm-5pm), efficiency is not decreasing with day time rather than keeping constant and also the visibility of needle point reduces workers eye strain by ensuring optimum light at the work site.

5. CONCLUSION

The growth and development of the garment sector largely depends on the female workers because female workers are the main contributor to this sector. The competitive strength of the garment sector in the world market is seriously affected by the health and safety problems of the workers, since it decreases the productivity of the workers to a great extent. The overall condition of the working women as revealed in the present research indicates that there are many deficits in

6. REFERENCES

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NOMENCLATURE

Symbol	Meaning	Unit
T	Temperature	(K)
P	Pressure	(Pa)
A	State transition matrix	Dimensionless