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Response to coronavirus disease 2019: Case study of one baking industry in Dhaka, Bangladesh

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ARTICLE INFO
Keywords:
Bangladesh
COVID-19
Food industry
Hygiene
Workers health

ABSTRACT
The coronavirus disease 2019 (COVID-19) poses significant risks to health in the workplace for employees in the manufacturing sector of Bangladesh. A variety of preventive steps are being taken by many food industries to sustain their production during this period by ensuring food safety. In response to the current outbreak, early identification, preparedness for the growing threat, and employee well-being are of utmost importance. Food health is also a concern in this regard, as workers in the food industry remain close to food and packages. The risk of spreading the virus within the industry can be held to a minimum with timely action and concerted efforts. A study was carried out in one baking industry of Bangladesh to investigate their regular activities during the pandemic period. Until the writing of this report, there were no cases of COVID-19 among employees. Thus this case study shows how one baking industry in Bangladesh prepares and responds to the COVID 19 outbreak.

Coronavirus disease 2019 (COVID-19) is one of the widespread and highly transmissible pandemics since long. Once identified in Wuhan, China, it has been declared a health emergency worldwide by the world health organization (WHO). Bangladesh is still in a severe state with almost 300K confirmed cases till August 21, 2020 [1]. While online classes and lectures continue, all educational institutions remain closed. Government agencies are still in service and all safety measures are upheld. The economy of this country relies largely on manufacturing and processing industries, and most people live on a daily basis. However, ‘working from home’ is still not a viable choice for food production or any other manufacturing sector [2]. This is why staff ought to be guaranteed good health and safety with proper safety measures [3]. In compliance with the United States Homeland Security Department, the food processing industry is a vital infrastructure in which workers need to operate in an improved and secure environment [4]. The manufacturers now will need to provide, in addition to food protection, steps to prevent and monitor COVID-19 in their plant [5]. Taking these facts into account, the purpose of this study is to explore the steps taken by one food industry in Bangladesh.

In the current study, the food industry was baking industry. It was located in the Dhaka division of Bangladesh. In total, 248 people were working in the industry during the study period. Till the beginning of this study, products of the baking industry were muffins, pound cakes, layer cakes, Swiss rolls, brownie, macaroons, and puff pastries. The company has HACCP, HALAL, and ISO 22000:2005 implemented in the plant. The average monthly production was approximately 550 tons. The layout and location of the entire factory is shown in Fig. 1 and Fig. 2. The industry was used to run for 24 h for six days a week before the outbreak of COVID-19. The length of the operation was shortened to 8 h and 6 days a week after the pandemic outbreak. Plant operation time was 9.00 a.m. to 5.00 p.m. with a 1-h lunch break. Every employee was instructed to have lunch at the factory canteen. No one was allowed to bring lunches from home or outside.

In Bangladesh, most industrial workers’ socio-economic state makes them work even if they become ill. During the countrywide lockdown, many businesses remained closed, and a lot of people were sacked from their jobs. Those who keep production ongoing often cut wages and are unable to pay incentives before the Eid [6,7]. Taking these facts into...
account, the baking industry’s human resource (HR) policies had been modified, and some new actions were undertaken as follows for this pandemic period.

- The staffs affected by COVID-19 were declared full-pay vacations with all medical and financial assistance before full recovery.

- In order to maintain social distance and help stop workers from entering the market, the HR team created a ‘simple inter-factory marketing’ theme for these 248 employees. Everyone was to provide the HR department with a list of their required things, and the next day they would receive their products properly packed in the factory premises.

- For those living outside the area where the industry was located, transport facilities with adequate safety measures were arranged.

- A registry was planned for employees suffering from diabetes, cardiovascular diseases (CVDs), asthma, and high blood pressure, and they were instructed to visit the factory doctor twice a week as mandatory practice. Three categories were defined as following.

  Category A: Below 40 years and free from diabetes, CVD, asthma, and high blood pressure.

  Category B: Above 40 years and free from diabetes, CVD, asthma, and high blood pressure.

  Category C: Of any age and suffering from diabetes, CVD, asthma, and high blood pressure.

  An additional healthcare section was set up in the factory premises. A doctor and a nutritionist were therefore appointed immediately. A helpline facility for the employees had been established through which they could contact the physician and the dietician 24/7 via mobile phones. In the event of an emergency, an ambulance was also arranged at the station.

  While entering the factory, every worker was needed to pass through a series of checks and formalities. Firstly, they needed to stand for the body temperature check. After that, hand swabs were taken for the adenosine triphosphate (ATP) check. UltraSnap ATP detection device and SystemSURE Plus Luminometer were used to perform the tests. It is usually used to measure the biological contamination in surface within 15 s [8]. Several studies demonstrated its efficiency during cleaning practices in hospitals [9] and schools [10]. Finally, the workers undergo a brief, face to face interview-based questionnaire accompanied by the actions referred to below (Table 1). When these steps were completed, the worker was permitted to access the changing rooms.

  Office spaces, such as conference rooms, used to be swept every evening after working hours, and early in the morning before the rooms had been occupied. In case of any visible dirt, the contact surface was washed with soapy water prior to disinfection. The respective cleaner was instructed to wear disposable rubber boots, gloves (heavy duty), and a triple-layer mask during work. For successful cleaning, following standard operating procedures (SOPs) were established and implemented by the quality assurance (QA) department.

  All areas inside the factory such as lobbies, corridors, stairways, escalators, elevators, security booths, office, meeting rooms, and lunchrooms were used to clean with a disinfectant with 1% sodium hypochlorite. High contact surfaces such as elevator buttons, railings, call buttons, escalator handrails, intercom systems, telephones, printing and scanning machines, and other office equipment were cleaned three times every day with an absorbable piece of cloth soaked in 1% sodium hypochlorite solution.
Table 1
Checklist and questionnaire form to be completed at the entrance.

| Questions/points to be addressed | Answer | Actions |
|----------------------------------|--------|---------|
| 1. Is the employee body temperature below 98.4°F? | Yes | If no, send him/her back home after reporting to the duty doctor. |
| 2. Did he/she enter into the factory wearing a face mask? | Yes | If no, give him/her a warning. Make a fine of 100tk. |
| 3. Is the ATP hand swab result below 50RLU***? | Yes | If no, send him/her to the emergency clean room (Fig. 1) for a quick bath. |
| 4. Did you take a bath in the morning? | Yes | Then recheck for ATP⁴. |
| 5. Yesterday, after the office, did you go to the market? | Yes | Same as no 3. |
| 6. Do you have any feeling of sickness today? | Yes | Ask him/her about the safety measures taken during the visit. Report to the human resource department. |
| 7. Is any member of your family sick? | Yes | The doctor will either send the worker back home or allow him/her to work after a proper check-up. |
| 8. Are you from category B/ category C? | Yes | Send him/her to the duty doctor for a routine visit (only in Saturday and Wednesday). |

⁴ ATP = Adenosine triphosphate; **RLU = Relative light unit.

After each prayer, the floor of the prayer room was washed by mopping with disinfectant or 1% sodium hypochlorite.

70 percent of alcohol was used to scrub down surfaces where bleach is not suitable for metal surfaces.

Hand sanitizing stations were set up at the entrance point and beside the high contact surfaces.

In a conference room, whenever someone coughs or sneezes, without the use of respiratory etiquettes or masks, the areas around his/her seat were immediately vacated and cleaned with 1% sodium hypochlorite.

At the end of each cleaning cycle, the equipment used for cleaning was carefully washed.

Raw materials and finished goods carrying vehicles had frequently come and gone to the industry. All incoming vehicles were ordered to disinfect with 1% sodium hypochlorite before entering the facility.

There is no evidence for the transmission of the respiratory virus by food. However, it can be spread by the touch, cough, and sneeze of an infected person [11]. Therefore, throughout the production line, careful handling of raw and packaging materials and manufactured goods were ensured. On the other hand, the coronavirus can persist for up to a few days on metal, glass, plastics, and regular handling surface of the food industry [1,2]. For safety, all packaging materials, including foil and blister were asked to use after 72 h from dispatching from the QA dept.

The person receiving the raw materials and packaging materials used to wear the head cover, musk, and hand gloves. The unloading area was kept clean and disinfected after receiving of each shipment. Programmable logic controlled (PLC) sound module was used to instruct the online workers to change their hand gloves after every 30 min and change their mask every 2 h. With this sound module, it was also advised to maintain a safe distance with the coworkers with this sound module. It was highly advised that a brief conversation be conducted with colleagues if someone was mentally depressed or physically exhausted. It was so important for them to feel empowered. External Drivers and other staff delivering food to the premises were not allowed to leave their vehicles during delivery. Drivers were required to use hand sanitizer before handling over various documents to the factory staff. Drivers were also advised to be aware of physical distancing while picking up goods, giving deliveries to customers by maintaining a high standard of personal cleanliness, and wearing clean protective clothing.

The guidelines and measures, as mentioned above, were applied strictly by the industry management. The best thing was that there was no single cause of COVID-19 among the workers until the end of July 2020. However, 37 people reported that 58 of their family members and relatives (eleven from Dhaka city and 47 from outside Dhaka) were tested positive for coronavirus. We came to know that everyone got recovered. During this time, the workers were advised not to go to the home of their infected family members and relatives. During the first month after the outbreak, personal protective equipment (PPE) was scarce. The previous stock of masks, hand gloves, head, and shoe cover helped a lot at that time. Only the floor workers and QA persons were able to use the PPFs. After one month, supply was ample, and everyone got the facilities. On the other hand, the amount of monthly production was reduced to half.

To the best of the authors’ knowledge, this current attempt is the first to discover the preventive and precautionary measures taken by a food industry during COVID-19, especially in Bangladesh. However, a number of studies were conducted by different researchers considering the impact of COVID-19 on meat industries [13,14], fruits and vegetables sectors [15], seafood industries [16,17], and agricultural sectors [18]. Another research explores the job situation of employees in the U.S. food sectors during the COVID-19 [19]. It shows that COVID-19 influences the employment rate in the U.S. Some 20 million employees from small and medium-sized enterprises (SMEs), transport, manufacturing, textiles, leather goods, hospitality and tourism, engineering, migration, real estate and housing, and ceramics sectors have also become unemployed in Bangladesh [20]. Still, there is a shortage of information on the impact of COVID-19 on the food manufacturing industry of Bangladesh. Further researches are required to investigate the safety and hygiene conditions, as well as the employment status in various food industries in Bangladesh. Being the only field study during the outbreak of COVID-19, this present study will help stakeholders in this country to plan and enact substantial action in the field of health, safety, and employee benefits at work. As with the case of COVID-19 in daily diagnosis in Bangladesh [1], it is difficult to draw any conclusions from this study. The goal of zero occupational infection is being attained to date, but we have to wait for a couple of months to study after the beginning of 24 h of production. Besides, the economic losses encountered by the industry will also need to be taken under consideration for a better understanding of the situation and further recommendations.

Declaration of competing interest

The authors declare that there are no conflicts of interest.

Acknowledgement

The authors thank the management of the baking industry, especially the section managers for their cordial help.

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