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Monitoring The Behavioural Based Safety Aspects in a Chemical Industry – During The Normal and The Covid – 19 Circumstances

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ABSTRACT

The behavioural aspects prevailing in a chemical organisation has been studied. It mainly focuses on the positive changes in the behavioural aspects, which are resulted due to the Behavioural based safety training. The safety officer has identified the type of behavioural during the normal and COVID – 19 circumstances. After identifying the existing behaviour of the employees and contractor, in case of abnormality, the Safety officer has trained the employees and contractor for the suitable behaviour in the normal circumstances. Further people have been trained for following the golden rules by applying the appropriate behavioural practices to be followed to restrict the spread of the COVID -19 in the organisation has been presented. The percentage of variation among the nine different departments with five different kinds of behaviour has been discussed in this paper. The Mean, standard deviation, correlation and ANNOVA has been applied for the different variables. By Identifying the various type of behaviour in the total population (n = 286) by the safety officer, where the average highest population were following independent safety (9.8 + 12.2) behaviour in the normal circumstances in the chemical industry. After correcting the abnormal behaviour, people were following interdependent safety (19.3 + 22.6) in the organisation. Secondly after giving training for following the golden rules to avoid the COVID-19 circumstances, it has been observed that the highest population were following the independent safety (24.6 + 33.4) in the organization. There are Two different kinds of behaviour prevailed in the chemical industry.

1. Introduction

Behavioural based safety (BBS) is a study of science, which deals with the studying of the behavioural aspects of the people working in the organisation. Individual appropriate behaviour of the employees and the contractors play a vital role in practising a good safety culture in the

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organisation. BBS technique helps in following the safety rules and regulations in an organisation. In the modern world, practising of the BBS will have special bondage relationship among the employees, contractor, and with the management (Skowron-Grabowska & Sobociński, 2018), which will result in the safe operations as well as good behaviours practices among the individuals in the organisation (Murali et al., 2015). These positive behaviour aspects, which are strongly penetrated into the inherent minds of the individuals by providing training by the safety officer. Initially the behavioural aspects have been assessed during the normal circumstances. These are broadly classified in to five different kinds of behaviours, which are as follows.

1. **Emotional behaviour** – It is a kind of behaviour, where the employee or the contractor reacts to a situation in a strong body language, which leads to physiological changes of the individuals. It influences the auto nervous system, and which has direct impact on the opponent who is listening to the conversation. The behaviour can be positive / negative, as it may vary based on the situation / circumstances.
2. **Rash behaviour** – It is a kind of behaviour, where the people react quickly towards the situation, where there is no proper planning and they do not care about the situation / circumstances, they react in an abnormal way. The unnecessary behaviour, which happens without thinking, which leads to foolishness and mistakes.
3. **Dependent behaviour** – The activity, which are performed by the individuals are not confident and they dependent on others while performing the activity in the organisation. As the people are not trained for handling the activity.
4. **Independent behaviour** – People who have not influenced by other words / conversation. They take their own decisions while performing the activity in an industry. The correctness of the behaviour is situational dependent. For example, person wearing a Personal protective equipment (PPE) is mandatory, which is an independent behaviour.
5. **Interdependent behaviour** – It is a behaviour, where the each of the individuals will discuss with each other for understanding the present scenario with respect to the safe operations and adherence to regulations, which are laid by the safety and the concern departments.

The study has been conducted among the two hundred and eighty-six people in the various nine departments. Applying the suitable behavioural practices, which leads to the reduction of the accidents, avoiding injury. The new strain B.1.617 strain was submitted in the autumn 2020 season to the global initiative on sharing all influenza data (GISAID), which has emerged from Wuhan city in China, which is included in the first report (WHO, 2020), the new strain is called as delta variant. Based on the genome information, India has submitted similar sequence of B.1.617 has been first identified in India in Jan 2020 in Thrissur, Kerala. By following the golden rules and applying correct behaviour technique will result in avoiding the spread of the delta variant among the people in the organization. The golden rules, which includes six points. These golden words are recommended by the World Health Organisation (WHO). To boost the immunity power for tackling the delta variant strain, it is recommended to have two doses of vaccination have been made compulsory for the employees and contractors working in the factory premises.

2. Literature review

Many of the different authors have expressed their view on the various behavioural aspects and its impact over the inappropriate behaviour practices in the organisation but very less information is available on the appropriate behavioural practices, which are followed in the organisation in the normal and COVID – 19 circumstances with respect to the chemical industry. As inappropriate behavioural practices, which will lead to the incidents / accidents in the organisation. Shemin joy (2020) reported that India has witnessed 32 accidents in the chemical industry sector around May 2020, which has resulted in killing of the employees and the contractors of around 75 numbers and injuring 194 people who are working in the organization due to unsafe behavioural practices. The awareness, education, and the competence of the BBS training among the employees and contractor will result in the behavioural changes, which increases the success rate for following the suitable behavioural technique in a chemical organisation. By not following the correct appropriate behavioural technique will result in the spread of the delta variant as well as decrease the motto among the employees and the contractors in the organization. Further it will lead to the causation of the injury, accidents, and less productivity in the normal circumstances. Terry McSween et al. (2003) have reported that reducing injury by applying behavioural technique will have many advantages to the employees, contractor, and to the management. The BBS can be applied in the different areas such as occupational safety, ergonomics, human error prevention, incident analysis, hazard identification for preventive and corrective action (Geller Scott & Perdue sherry, 2004). Now a days BBS has led to more refocusing among the employees and contractors in the organization for avoiding the accidents and injuries in the organization (peters et al., 1997., Jonas et al., 2011 & Galvin, 2005). The union labour ministry of India informed to the parliament that in the March 2021 that around 6300 workers lost their life, while working in various sectors such as factory, ports and construction sites in the past five years due to the abnormal behaviour towards the various different circumstances in the working environment. In this regard Indian ministry has set an expert panel for the recommendations and suggestions for prevention of accidents (Nagaraj, 2021).

During the lock down, in the pharmaceutical industry, which comes under the chemical industry is exempted in closing the unit, as it comes under the essential goods and services in India. Many of the anti - COVID 19 infection fighting drugs, which are manufactured in India. They have been supplied globally through a central government network. Many of the employees and the contractors working in the chemical industry have attended the duties even in difficult circumstances, where many of the people in the states in the India have been infected by delta variant. Although there is a drastic decrease in the infection of the delta variant considering the present circumstances have been achieved by following the COVID-19 golden rules. All the safety precautions must be followed, while working in the working environment. Identifying the risk prevailing in the working environment, various corrective, and preventive measures to be taken to mitigate the risk by applying the appropriate BBS techniques have been reported by different authors (Niciejewska & Kirilium, 2017 and Skowron-Grabowska & Sobociński, 2018). Further they have reported that the appropriate behavioural changes will result in the safe working circumstances (Guo et al., 2018). Marta Niciejewska and Matevž Obrecht (2020) reported that in the Poland accidents decreased to 4.6 % in the year of 2018 when compared to the previous year by applying the suitable behavioural techniques. Safe behavioural practices will have a positive impact on organisation.

3. Methodology

3.1. There are six sections the study that has been conducted

3.1.1. Training given to the safety officer for monitoring the behaviour of the employees and contractors

External training has been provided to the safety officers to fill the check list by visualizing and conducting the interview among the employees and contractors for identifying the behaviour of the individuals in the organization. The external training provided to the safety officer will lead to become competent enough to identify the five different kinds of behaviour in the various departmental people in a chemical industry.

3.1.2. The various kind of behaviour has been identified among the individuals in the factory during the normal circumstances by the safety officer:

After receiving the external training, the safety officer observes the individual behaviour of the employees and the contractors, which are listed in the Table.1 and concludes the type of behaviour for the employees and contractors. The results will conclude that the employee or the contractor behaviour is an emotional or rash or dependent or Independent or Interdependent among the various departments in the organization. All the results have been recorded.

Table. 1.
Safety officer identifies the behaviour of the employees and contractors based on the visualization activity and concludes the type of behaviour

Emotional behaviour	Rash behaviour	Dependent behaviour	Independent bhehaviour	Interdepednent behaviour
Employees / contractors may cry due to the various situations and decissions taken by the mangemnt in the factory	The employees / the contractors having a body langauge to fight with other if any situation arises	The employee or the contractor has not been trained for performing an activity in the factory	Employee or the contractor having over confident that they can achieve their targets by deviating the procedures laid in the department	Employees or the contractors are invovled in the team work to get the desired out put
Arguing emotionally for the activities, which has been performed in the factory	The employees / contractors are invovled in hurting other feelings. Having a tendency of forming groups	No preparation plan for the activities, which are performed in the department	Employees and contactors deviating the standard operating procedure in order to achieve the target	Employees and contractors sharing their experience and knowledge with other while working in the working environment
Emotionally the employee / the contractor do have patient to listen all words / entire discussion	The employees or the contractors will react to the situation in form an a cruel mind	The employee or the cotractor is new to the department	The employees and contractors who are working years together and having only substantial knowledge over the activities, which are performed	Mutual understanding between the employees, contactors and management staff
The employee or the contractors are not maintaining interpersonal relationalship with co-workers	Not listening to the other words, arguing and fighting to the situation	There is no supervisory control for looking after the activities, which are performed in the department	Employees and contractors hurrying to complete their task in the shift in order to achieve their target	All the employees and contactors aware of the advantages of following interdependent safety
The employees or the contractor are Feeling deepressed and they are in the emotional state	The employees or the cotnractors are narrow minded, which may lead to arguing or quarrelling	The employee or contractor is not having full knowledge on the activities, which are being performed	The people in the depatment are over confident that they can meet the dead lines laid in the department	All the employees and the contractors are involved in avoding accidnets / Incidents in the working environment

3.1.3. Training has been provided to correct the abnormal behaviour among the employees and contractors in the normal circumstances

After identifying the various negative and abnormal behaviour among the employees and the contractor. Training has been provided to enhance and practice of following the appropriate behaviour for the employees and contractor in the organisation. The main advantages of such type of behaviour benefits have been explained to the people in the factory by conducting BBS training by the safety officer.

3.1.4. Monitoring the behavioural change after correcting the abnormal behaviour among the employees and contractors in the normal circumstances

The effect of the BBS training is to avoid the abnormal behavioural aspects among the employees and the contractors in the organization. It is very much necessary that the safety officer thoroughly identifies the behaviour among the employees and contractors after giving the BBS training, also he should see that there is good change in the behavioural practices by following the correct behaviour practices among the employees and contractors.

3.1.5. Training has been provided for following the COVID – 19 guidelines during April 2021 at the time of starting of the second wave of delta virus in India

The safety officer has been trained for gaining the knowledge on COVID – 19 guidelines. The trained safety officer has provided the training to the employees and contractors regarding the following of the COVID – 19 golden rules. Safety officer ensures that strict policy of the adherence of the COVID – 19 guidelines has been followed when an employee and the contractor enter the factory premises. All the employees and contractors have been trained for following the golden rules thus resisting the spread of the COVID -19.

3.1.6. Monitoring the effects of the behaviour of the employees and contractors after receiving the training for following the COVID -19 safety guidelines in the factory

Safety officer playing a vital role in monitoring the effects of the training for following the COVID -19 guidelines in the organization. Any of the people who is not following the COVID – 19 guidelines, he will be restricted in entering in the factory premises. The restricted employees and contractors will be trained, and he will be adhered for following the COVID – 19 guidelines, which is in the form of golden rules. In the COVID-19 circumstances, it recommended to follow the Independent behavioural practices to avoid the spread of delta variant.

The BBS monitoring and the study pattern, which are given in the Figure 1.

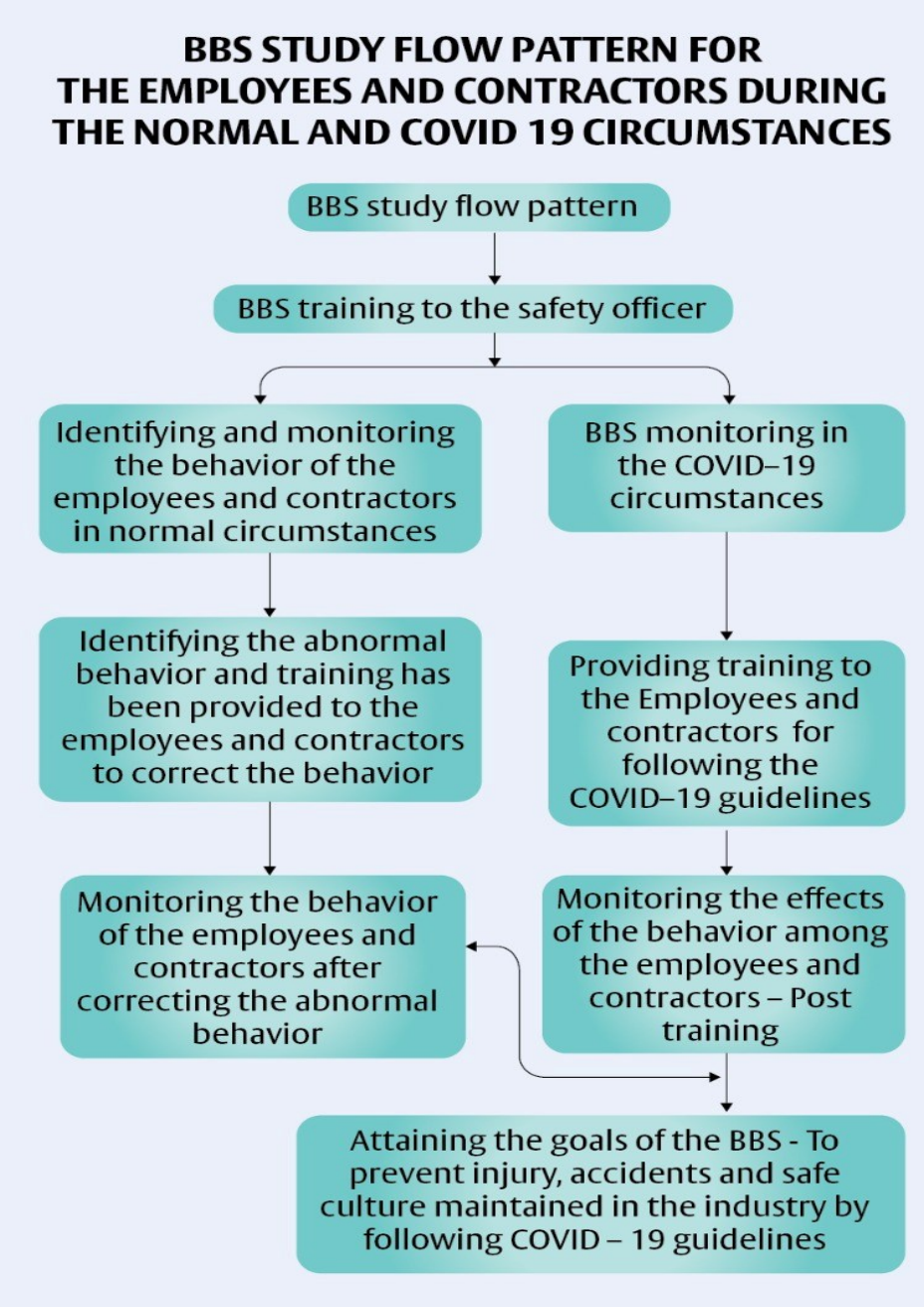

Figure 1. Flow chart for monitoring of the behavioural based safety aspects

Statistical analysis for the mean, standard deviation, linear regression and ANNOVA has been applied for the different variables during the study.

4. Results

There are total of 286 (n) people, which includes employees and the contractors in the organization in the different department, which are presented in Table. 2.

Tabel.2.
Different types of departments and their total number of employees and the contractors in the chemical organisation

Types of Departments	Number of employees and contractors
Production	120
Stores	43
Quality control	29
Quality assurance	19
Accounts	5
Maintenance department	37
Utility department	14
Security	16
HR/Admin	3
Total	286

In the production department there were 120 members, which were the highest number of people working in the department and lowest being accounts and HR/admin department and accounts, where there are five and three people only employed in the organization. The results for the monitoring of the percentage of behaviour before giving the BBS training in the normal circumstances among the various departments has been presented in the Figure 2, which shows that there is a variance in the behaviour among the various departments. Emotional safety behaviour was the lowest among the departmental people, which has not been observed.

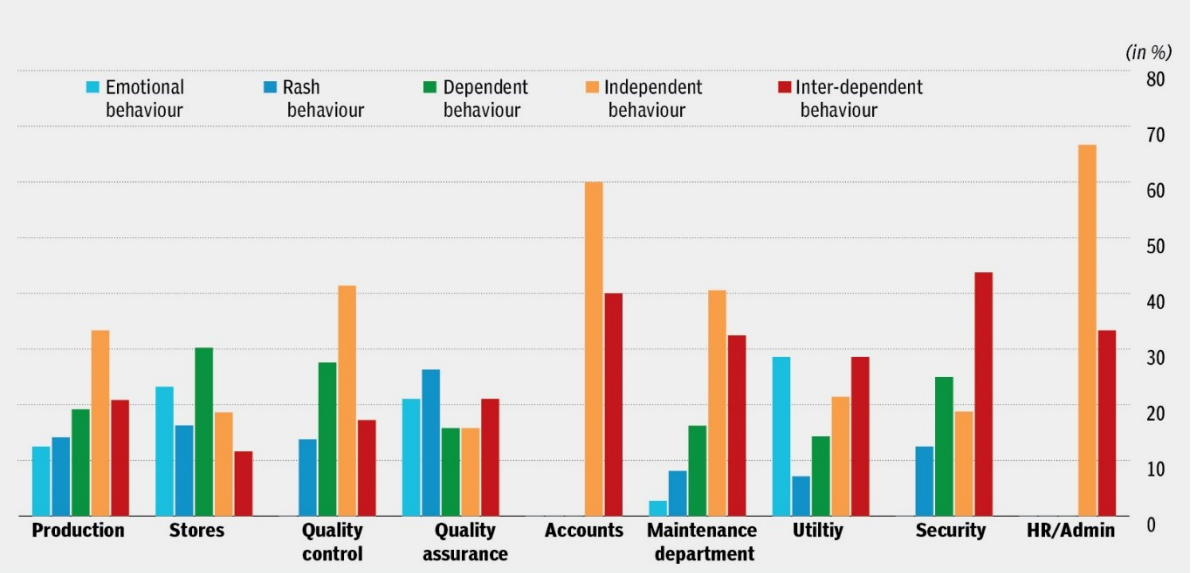

Figure 2. Monitoring the behaviour of the people in the organisation before giving the BBS training in the normal circumstances

in the four departments. Rash behaviour was highest in the quality assure department (26 %), Dependent safety behaviour (30 %) was highest among the stores departmental people. The independent safety behaviour was highest in the QC and Maintenance department (41%), these both departments work independently, similarly to that of the accounts (60 %) and Hr/admin (68 %) department, where less people are employed. The interdependent behaviour (44 %) was highest among the security departmental people. The mean and the standard deviation before giving the BBS training among the various behaviour (n=286) are as follows, independent behaviour (9.8 $\pm$ 12.2) > Inter Dependent behaviour (7.2 $\pm$ 7.3) > dependent behaviour (6.5 $\pm$ 7.4) > Rash behaviour (4.3 $\pm$ 5.2) > Emotion behaviour (3.7 $\pm$ 5.3) (Figure 2). The relationship

between X and Y variables have showed the significant difference among the different behaviours (R^2 = 0.95, F = 3.611178, P< 0.05, n = 286). Similarly, among the different departments (R^2 = 0.73, F = 17.07511, P< 0.05, n = 286). To narrow the gap among the employees and contractors, to bring a change in the behavioural culture, which will result in the reduction of the unpredictable injury, easily identification of unsafe act and unsafe circumstances in the chemical organisation.

Training has been conducted for following the appropriate behaviour by the safety officer and he has explained the advantages of following the BBS. There was a huge change in the appropriate behaviour of the employees and contractors after attending the safety training. After the BBS training, the emotional behaviour varied from 4 to 16 % among the various people in the department. It was observed that four departments showed no emotional behaviour. The Rash behaviour varied from 5 to 14 %. The accounts and HR & admin are the two departments were not involved in any rash behaviour. The dependent safety behaviour varied from 6.8 to 26.3 %. The highest percentage of dependent behaviour has been found in the quality assurance department. The independent behaviour varied from 6 to 60 %, the highest percentage of the independent behaviour has been found in the accounts department. The interdependent behaviour percentage of HR/Admin > security > maintenance department > Quality control > production > stores > utility > accounts > Quality assurance which were 100 > 75 > 68 > 66 > 63 > 58 >50 > 40 > 32 % (Figure 3), which are the highest percentage

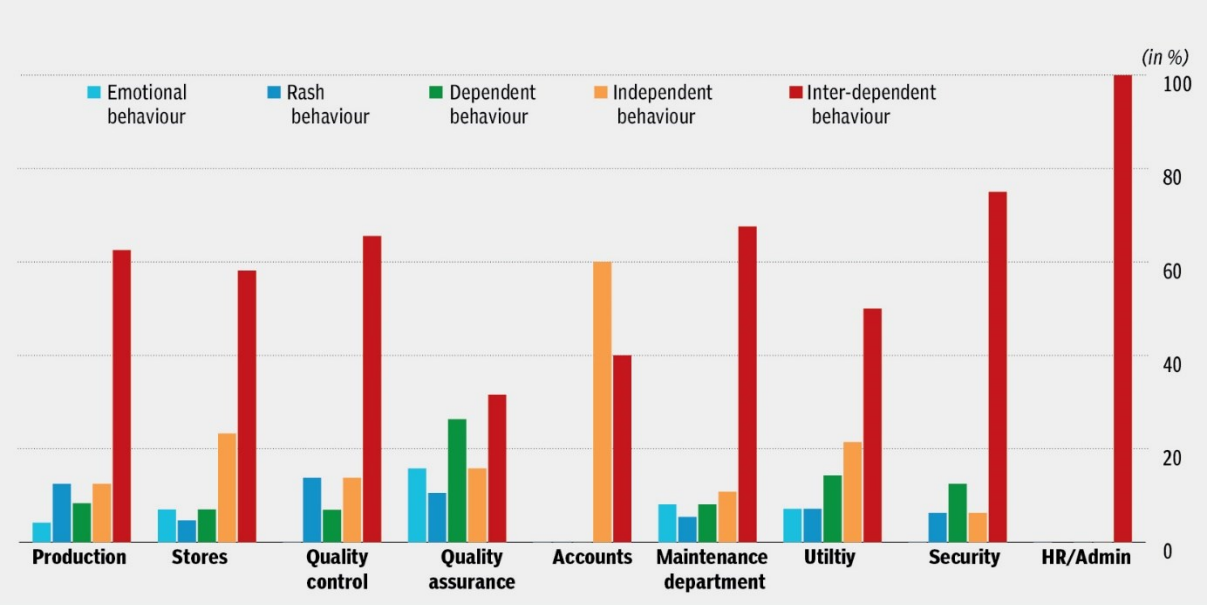

Figure 3. Monitoring the behaviour of the people in the organisation after giving the BBS training in the normal circumstances

of the behavioural change among the employees and the contactors compared to the other safety behaviours observed in the chemical factory. The mean and the standard deviation after giving the BBS training among the different behaviour variables (n = 286), where Inter dependent behaviour (19.3 $\pm$ 22.6) > Independent behaviour (4.7 $\pm$ 4.7) > Rash behaviour (3 $\pm$ 4.6) = Dependent behaviour (3 $\pm$ 3.0) > Emotional behaviour (1.6 $\pm$ 1.8). The relationship between X and Y have showed the significant difference among the different behaviours (R^2 = 0.84, F = 3.235907, P< 0.05, n = 286). Similarly, among the different departments (R^2 = 0.70, F = 6.140052, P< 0.05, n = 286).

More than 4,50,000 people died due to the spread of the Covid-19 (B. 1. 617. 2 strain) in India as of now. During the first week of April 2021, among the 286 people in the organization, 12 people has been tested positively initially during the starting of the second wave of COVID -

19. Considering the emergency pandemic situation, we have trained the people in the second week of the April 2021 in the organizations for the following the COVID -19 guidelines, so that we can restrict the spread of COVID -19 virus. These are below very important golden rules, where the employee and the contractors must follow in the COVID -19 circumstances, the people in the industry have been trained during the pandemic circumstances to follow independently safety by adopting the golden rules inside the factory premises.

1. Facial recognition should only be used in biometric by the employees and the contractors and fingerprint should not be used.
2. Safe distance must be maintained while working in the working environment for all the employees and the contractors
3. All the employees and the contractors must check the temperature of the body and same to be recorded by the security department before entering the factory premises through the entrance gate
4. It is very much important to wash the hands with the soap and wipe it with the towel and then Sanitize the hands and enter the factory premises.
5. It is recommended to use N95 mask for all the employees and the contractors while they are inside the factory. See that they always cover the N95 mask entirely to their nose and the mouth.
6. It is always essential to stay away from the people who are sneezing and coughing inside or outside the factory premises.

Post training of the behavioural safety changes has been monitored and it was found that the percentage of Independent behaviour of HR & admin > production department > accounts > stores = Maintenance department > Quality control > Quality assurance = utility > security department, which were 100 > 92 > 80 > 72 > 66 > 57 > 56 %, which were the highest when compared to the other kinds of behaviour in various department (Figure 4). The mean and the standard deviation after giving the BBS training for following the COVID – 19 guidelines among the various behaviour variables (n = 286), which are as follows - independent behaviour (24.6 $\pm$ 33.4) > Dependent behaviour (2.2 $\pm$ 1.4) = Interdependent behaviour (2.2 + 1.3) > Rash behaviour (1.4 $\pm$ 1.2) > Emotional

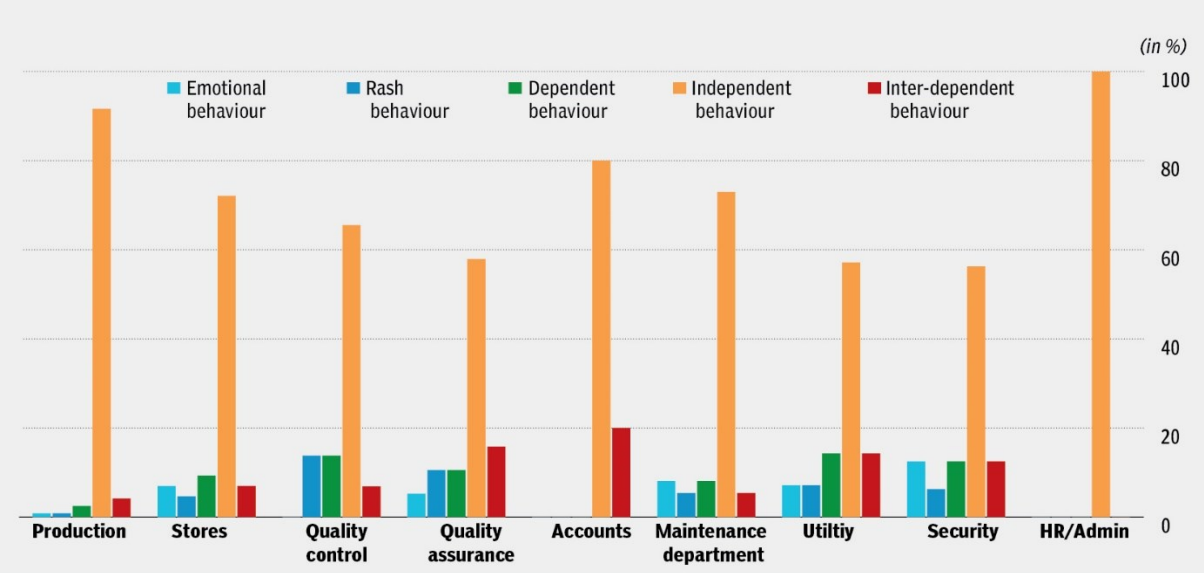

Figure 4. Monitoring the behaviour of the people in the organisation after giving the BBS training in the COVID -19 circumstances

behaviour (1.2 ± 1.2). The relationship between X and Y have showed the significant difference among the different behaviours (R^2 = 0.82, F = 4.3321, P< 0.05, n = 286). Similarly, among the different departments (R^2 = 0.83, F = 1.17112, P< 0.05, n = 286).

It was observed and concluded after the BBS safety training that highest percentage interdependent safety prevailed among the employees and the contractors during the normal working circumstances, simultaneously the highest percentage of independent safety technique were dominant among the various departmental people, which has helped to prevent and restrict the spread of COVID -19 virus in the organisation.

5. Discussion

It was observed that highest number of People in the organisation were following independent behavioural practices (9.8 ± 12.2) before giving the BBS training to the employees and contractors in the normal circumstances in the organisation. BBS training has played a vital role by changing the attitude of the employees and the contractors in the normal as well as the COVID- 19 circumstances in the organisation. Initially while monitoring the behaviour of the individuals in the organization in the normal circumstances, the majority of the people, where the mean difference was very less, and the BBS variables showed unscientific behavioural practices among the various departments in the chemical industry. Identifying the risk of the behaviour will result in the reduction of the injury rate (Goetsch, 2002). Identification of the abnormal behaviour, providing training for rectifying the behaviour, evaluate the behaviour using a check list (Alvero et al., 2008) and training feedback (Krause et al., 1999 and Wirth & Sigurdsson, 2008), which are considered as the powerful tools in the BBS. In this regard we have identified the behaviours of the individual who are exposed in the risk handling of hazardous chemicals in the working environment (Ian Glendon et al., 2006). The identified negative behaviour has been changed, so that it will result in safe handling of the chemicals (Smith-Jackson et al., 2010), which are achieved with the help of the appropriate BBS training to the individuals working in the organization. To narrow the gap among the behavioural practices in the normal circumstances, training for the BBS has been provided to the people in the five secessions, initially around 48 to 52 people attended each training session. Interdependent safety has been recommended to follow in the normal circumstances in the organization, its effects, and benefits of following such type of behaviour has been explained in each session of the BBS training. Each session, the safety office will get feedback from the trainee about the BBS training and inform the same to the departmental heads. Repeatedly to follow the appropriate behaviour, we have conducted another two session of BBS training, in each session around 143 people attended by the employees and contractors, had a discussion, and pledged to change the behaviour, which is beneficial to the employees, contractors and to the management. The average (19.3 ± 22.6) population, which followed interdependent safety after the BBS training, while its highest (100 %) of interdependent safety have been followed in the HR & admin department, while lowest (32 %) in the Quality assurance department. Several literatures showed that the perception of the risk can be identified with the help of the BBS training, so that we can avoid the exposure of the hazardous chemicals, reduce the accidents and severity rate (McCaughey et al., 2013). Implementing the BBS training for the employees and the contractors will result in increase in the commitment to follow the interdependent behavioural practices, which will result in the decrease in the rate of accidents and unsafe behaviour (Salvendy, 2001 and Mohammadfam et al., 2010). Various authors reported that the BBS training will help in reducing the unsafe acts by 10 % (Williams & Geller, 2000). and decrease the accidents by 62 % (Knipling et al., 2002). Although the risk perception mainly depends on the experience of the work and the knowledge, which are gained from the past (Marynissen et al., 2013). Mohammadfam et al., 2017 have studied the risk perception and

key safety behaviour practices in a chemical industry in Iran, in which it was observed that the woman safety behaviour was 1.786 times higher compared to men, which was statically significant, where $P < 0.05$. Although only one woman in the admin department and two women's were there in the stores department have been employed in our organisation. On that other hand we can say that the workers are not trained in the handling of hazardous chemical in occupational environment, which will lead to the unsafe behaviour practices while handling of the hazardous chemicals (Perlman et al., 2014). Care hast been taken, so that the BBS training goals are met. Considering the present results it has been concluded that the majority percentage of the people in the departments have changed the attitude and they have followed the interdependent safety behaviour in the organization, which helps not only to reduce the accidents and also prevents the happening of the injury, further it also leads for the easy identification of the unsafe conditions in occupational environment, which are easily rectified, so that safe working conditions are maintained in the working environment, The interdependent behaviour not only increases the mutual understanding on the safety aspects but also increases the coordination among the workers in the organization, which are resulted in getting the desired output in the production in the chemical industry in normal circumstances.

To restrict the spread of the COVID-19 virus in the organisation, we have provided training to the people in the organization for following independent safety behaviour by following the golden rules in the organization. The golden rules are taken from the WHO guidelines to restrict the spread of the COVID-19. It was observed that the highest average (24.6 ± 33.4) employees and contractors were following the independent safety during the COVID-19 circumstances. The percentage of the change of the independent behaviour varied between 56 % (Security department) to 100 % (HR &Admin) after providing safety training to restrict the spread of COVID-19. In this way we have restricted and avoided the spread of COVID-19. By adopting other kind of behaviours except independent behaviour, it may lead to the spread of infectious virus inside the chemical industry. There was a positive correlation between the various behavioural variable and between the various departments. Various researchers have found out that there is a positive correlation between the education level and the knowledge score regarding the following of the golden rules for restricting the spread of the COVID-19 virus (Hossain et al. 2020 & Zhong et al. 2020). In Iran research have observed positive correlation between the gender, higher age and higher education with knowledge, behavioural attitude and the practices in the COVID -19 circumstances (Erfani et al., 2020). Caycho-Rodriguez (2021) reported that they have found significant correlation between the concern of spreading of COVID -19 virus with anxiety, well-being, and perception of health in general in the population of young people and adults. Further research shows that the attitude among the age group less than 65 years of age showed positive behaviour than that of the people older than 65 years old (Czeisler et al., 2020). Additionally, research findings showed that 15 % increase of covering of the face by cloth when the people left their houses have been observed in the United States during the COVID – 19 circumstances (Fisher et al., 2020). By not following the COVID -19 guidelines, which results in the inappropriate behaviour, which effects mental health (Roy et al., 2020). On the contrary health care workers are highly trained and have the highest knowledge on the restriction and prevention of the covid-19 virus (Saqlain et al., 2020 and Bhagavathula et al., 2020). It has been seen that the golden rules along with the other safety guide lines are remembered in the subconscious minds of the individuals in the organization, so that the employees and contractors follow the golden rules independently in the working environment. In this way independent behaviour has been practiced for avoiding the spread of the COVID-19 virus. Similarly, considering the various risk factors and various practices, which were followed to restrict the spread of the COVID-19 virus has been reported by Afzal

el al., 2020. Let us all pledge to follow the safety rules to restrict the pandemic virus, considering the future perspective.

Over all two different kind of behaviours such as inter dependent behaviour and independent behaviour prevailed in the organisation

6. Conclusion

It has been concluded that the interdependent behavioural practices have been followed during the normal circumstances in the working environment, which have resulted in the change of the attitude of the people in the chemical organization, after providing the BBS training. Secondly independent behaviour has been followed for following COVID-19 circumstances. in this case independent behaviour helps to restrict and prevent the spread of virus, whereas the interdependent behaviour helps us to avoid injury and prevent accidents and identifying the unsafe circumstances prevailing in the working environment. These are the two different types of behaviour found dominant among the employees and contacts in the chemical organization in the different circumstances after giving effective training on the BBS aspects.

7. Limitation of the study

The present study focusses on the behavioural based safety aspects among the various departments in the organisation. Five different types of behaviours were considered during the study. It has been reported several injuries and unsafe conditions have been avoided in the normal circumstances after attending the BBS training. The detailed study for the accidents /incidents / unsafe conditions / unsafe acts to be explored.

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