VISUAL-BASED TRAINING METHOD AND SAFE PRODUCTION PRACTICES IN THE BREWING INDUSTRY IN SOUTHWESTERN NIGERIA

BY

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ABSTRACT

Managements of breweries in Nigeria always ensure protective and safety measures and standards owing to the unsafe working environment which makes the workers prone to accidents and injuries. Nevertheless, most workers still exhibit work behaviours that expose them to fatalities and accidents. Most of these accidents are avoidable, if the workers are well trained to promote safety and ensure compliance with safety measures using activity-based training methods. Previous studies have focused more on other activity-based methods, such as syndicate training, guided practice, blended learning and role playing, than the visual-based training method. This study, therefore, was designed to determine the effects of visual-based training method on safe production practices (SPP) in the brewing industry in southwestern Nigeria. Moderating effects of job tenure and education level were also examined.

Dual-coding and cognitive theories of multimedia learning provided the framework. The mixed method of survey and pretest-posttest control group quasi experimental design of 2x3x3 factorial matrix was adopted. International Breweries PLC, Ilesa (treatment) and Nigerian Breweries PLC, Ibadan (control) were used. Seventy-eight production workers with records of safety negligence were purposively selected and randomly assigned to treatment (46) and control (32) groups. The instruments used were Visual-based Training Guides, SPP Questionnaire (r=0.78) and Knowledge (r=0.74) Attitude (r=0.78) and Management (r=0.77) of Brewing Safe Practices Questionnaire. Four sessions each of key informant and in-depth interviews were held with the human resource/safety managers and safety committees' representatives/ unit supervisors. Quantitative data were analysed using percentages and Analysis of Covariance at 0.05 level of significance, while qualitative data were content-analysed.

The participants were mostly males (74.0%), with 35.6 ±5.13 years of age; and from the brew house (36.3%), engineering (28.8%), packaging (28.2%) and other units (6.7%) on monthly salary of ₦51,000.00 (64.0%). The majority were permanent workers (92.2%), married (72.9%), first degree (42.4%) and Higher National Diploma holders (46.3%) with long job tenures (73.5%). Treatment had a significant main effect on SPP ($F_{(1;175)}$=10.22; partial η^2=.03). The participants in the treatment group had a higher postmean score (50.63) than those in the control (44.83) group. Job tenure had a significant main effect on SPP ($F_{(2;174)}$=3.00; partial η^2=.03). The participants with long job tenure had the highest postmean score (49.82), compared with those with medium (47.70) and short (47.73) length of service. Education level had a significant main effect on SPP ($F_{(2;174)}$=3.27; partial η^2=.04). The participants that were highly educated had the highest postmean score (49.36) compared with those who were moderately educated (47.97) and less educated (42.86). While the two-way interaction effects were not significant, the three-way interaction effect was significant ($F_{(2;164)}$=3.32; partial η^2= .04). Owing to the nonchallant attitude and use of mobile telephones, most workers did not comply with standard operation procedures, especially when on night shifts.

Visual-based training method was effective in promoting safe production practices in the brewing organisations in southwestern Nigeria. Therefore, this training method should be used regularly in inculcating safety measures and compliance in brew staff, particularly those with short job tenures and low education.

Keywords: Nigeria's brew industry, Safe production practices, Activity-based method, Visual-

based training method

CERTIFICATION

I certify that this study was carried out by Haolat Folake ADEPOJU (Matric. No.: 125254) in the Department of Adult Education, University of Ibadan, Ibadan, under my supervision.

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DEDICATION

This research is dedicated to ALMIGHTY ALLAH, the Most Gracious, the Most Merciful; my husband; and my children.

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Haolat Folake Adepoju

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INTRODUCTION

1.1 Background to the Study

The protection of health, safety and welfare of the people in the world of work, otherwise known as occupational health and safety, is an issue of major concern to all stakeholders. Occupational health and safety involve protecting the health, safety and welfare of people and others that may be directly or indirectly affected by the activities in the workplace. They dwell mainly on putting in place certain measures and regulations towards prevention of accidents, injuries and sicknesses as well as preserving a harmless and healthy work environment. Towards the actualisation of these lofty ideas, there are set rules, regulations, legal instruments and provisions, all of which are denoted as occupational safety and health regulations. Job-related accidents, diseases and injuries and other associated leading industrial mishaps have continued to raise a lot of anxiety at all levels, from the individual, organisation or workplace to national as well as international levels.

Several measures and strategies have been continuously adopted over the years to prevent, control, lessen or eliminate completely occupational hazards and risks so as to keep pace with economic and technological changes. For example, the Inspectorate Division of the Nigerian Federal Ministry of Labour and Employment has laid down certain criteria, such as equipping the workers with adequate safety equipment, involving them in safety programmes and providing good and safe working conditions. However, these measures have not yielded the desired results (Umeokafor, Isaac, Jones and Umeadi, 2014), as occupational accidents and diseases still remain very frequent, and the consequences in terms of costs on the organisations, workers and the economy continue to be very significant. To buttress this, the Nigerian country profile on occupational safety and health revealed that between year 2014-2016, 238 fatalities and 3461 occupational accidents and diseases were recorded across different sectors of the economy. ILO (2016).

The major and constant objective of the International Labour Organisation (ILO) since its formation in 1919 has been towards promoting a decent, safe and healthy working environment (Alli 2001). To date, the organisation's stance on safe work practices has continued to be of high

priority, with emphasis on the protection of employees against job-related sicknesses, infections and injuries. In the ILO report (2016), it was estimated that over three hundred million fatal occupational injuries and, at least, 320,000 fatal occupational injuries occur each year. Furthermore, two million cases of fatal work-related diseases occur across the world every year. The highest proportion of deaths result from work-related cancers, circulatory and cerebrovascular diseases and some other communicable diseases. The global work-related deaths estimated, including occupational injuries and work-related diseases, if put together, amount to two to three million annually (ILO 2016). One of the reports of the Nigerian Institute of Safety Professionals (NISP), cited in Oyawale, Odior and Bolanle (2011) claimed that over 11,000 people die from on-the-job accidents each year and a worker gets injured every 18 seconds, particularly in industries where the use of chemicals is prevalent in Nigeria.

Adebiyi (2006), asserts that there is higher incidence of fatal work-related injuries in developing countries than in the developed ones. For instance, the mortality rate per 100,000 workers in the sub-Saharan Africa is 21, while the accident rate is reported to be 16,000. This means that in a year, 54,000 employees lose their lives, while 42,000 million job-related accidents occur, causing not less than three days absenteeism from work (Alli, 2008). In the case of Nigeria, though reliable accident data are not readily available (Idoro, 2008; Okoli and Okoye, 2012), a study conducted by Ezenwa in 2001, revealed that, within a period of ten years (1987-96), workplace injuries that were reported to the Federal Ministry of Labour and Employment were estimated at 3138, out of which 71 workers lost their lives. In another report by the National Occupational Safety and Health Information Centre in Nigeria, in 2006, the total figure of workplace accidents that were reported in the period 2001-2006 was put at 497.

In another study conducted by Umeokafor, Evaggelinos, Lundy, Isaac, Allan, Umeokafor, Igwegbe and Umeadi (2014), on the pattern of occupational accidents, injuries, accident causal factors and intervention in Nigerian factories, the findings revealed that in 2002-2012, a total of forty (40) accident cases were reported, ninety-three (93) injuries resulted from these cases, 46 (49.5%) out of these were fatal injuries, while four near misses were reported. This suggests massive underreporting of accidents for the 11 year period, as it differed from the report gathered by the National Occupational Safety and Health Information Centre, as stated above. In short, the

above figures were not true representations of what obtains in industries in Nigeria, as the regulatory system does not encourage mandatory reports of accidents (Idoro, 2008).

The Nigerian Ministry of Labour and Employment has made commendable efforts in promoting the safety and health of workers. The Factories Act CAP 126 Laws of the Federation 1990 contains the legislation for enforcing safety and health values in Nigerian places of work. Some of the efforts include providing minimum standards of safety and health in Nigerian industries, enforcing the act by the inspectorate division of the Federal Ministry of Labour and Employment and carrying out regular and random checks of the workplace. Yet, accidents still happen in Nigerian workplaces.

The overall consequences of accidents and illnesses in workplaces are enormous at the individual, organizational, national and universal levels. At the individual level, injuries and accidents result in irregularity at work, absenteeism, low morale, job dissatisfaction, diseases, permanent disability and death (Burns 2006; Adebiyi and Owaba 2007). The impact of serious injuries is also compounded by the fact that they usually happen to workers who still have potential and a long working career in the future (Oyawale, Odior and Bolanle 2011). A worker that sustains injury that results into physical impairment becomes redundant and helpless. This shows that the end result of accidents might not only be death but also loss of working years. Added to these is the emotional trauma that such workers, including members of their families, have to contend with.

At the industry level, the fiscal costs include loss of working time and production interruption, resulting in low production output, debts incurred from medical attention given to workers that are injured, compensation given to workers that are rendered helpless as a result of mishaps and, sometimes, payment of reparation fees to the family of a deceased worker whose death resulted from accident. All of these put together have negative impacts on the industry and the entire economy.

The brewing industry, particularly in less developed countries, is an industry in which occupational accidents frequently occur (Oyawale, Odior and Bolanle, 2011). The Hieneken's

Group's Corporate global accident report for 2006 to 2008 indicated that the rate of recurrence of accident and severity rates were too much greater than the company's production target (Hieneken International, 2012). The trend is not different in most breweries universally irrespective of the acclaimed good safety records. Brew workers lose their lives unnecessarily every year in terrible accidents that are completely avoidable. For instance, in 2013, two workers reportedly lost their lives in separate accidents in the same brewery in Germany, a country reputable for good safety standards for brewery workers (Wilson, 2014). The first case involved the owner of the brewery who was discovered dead with the head and upper body in a beer mixing container. According to Wilson (2014), it was believed that the victim must have been overwhelmed by carbon dioxide (CO_2), while leaning to check the container after bottling and cleaning. The second was a case of a member of staff who was also discovered dead in a pressure container normally used in recirculating wheat beer. Probably he wanted to fit in a yeast plug and leaned too closely to the tank that was already pressurised with CO_2, and in the process got himself poisoned within seconds owing to the great concentration of the CO_2. Both incidents demonstrated the extreme unsafe and dangerous nature of the brewing industry and how quickly the workers can be overwhelmed by its poisonous properties irrespective of safety measures provided (Wilson, 2014).

Several practices abound in the brewing industry which are practically unsafe for workers during production. Such practices include neglecting the standard procedures of working, working at unsafe speed and neglecting the use of protective equipment. Apart from the general hazardous environment of the industry, such as slippery and wet floors, dust, chemicals and humid temperature, most brewery workers are either unconscious of the risks related with their jobs, or they are aware of such risks but decide to violate provided safety procedures (Tounalum, Yingratana and Chantawong, 2012). So, the question is what could be responsible for most of the occupational hazards in the brewing industry? Is it the unsafe practices of the employees or the unsafe working conditions? Whatever it is, it is an undisputable fact that unsafe production practices have grievous consequences on the individual worker, the industry, and the whole economy.

Generally, the style of staffing and method of recruitment in the Nigerian brewing industry is subject to criticism. Most times, the status of employment is temporary which gives room for

employing a large number of unskilled workers. The industry required skilled workers, for instance in manufacturing, packaging, distribution and sale (Wilson, 2014). It is expected that workers should qualify in various areas, such as storage, milling and mashing, packaging and distribution which will eventually reflect their compliance roles towards health and safety (Wilson, 2014).

Employment in the brewing industry, which centres most times on the use of contract and temporary personnel, has a great impact on safety and health (Ward, 2011). There is the tendency that workers employed periodically are much more likely to be confronted with poor working conditions, and environmental hazards, and might not be given the same amount of safety-related training as the permanent employees. In some cases, the accident rates of contract workers is on average twice that of the permanent workers and the subsequent costs related with the injuries sustained by temporary personnel are not, in some cases, the responsibility of the management but that of the agency supplying the workers (Ward, 2011). Many employers believe that by subcontracting certain tasks, the safety responsibilities have been subcontracted as well. This has created an apparent "win-win" situation for the employer and the contradictory effect on the workers employed in such positions (Ward, 2011), owing to low competences and skills of these temporary workers, who, out of ignorance, sheer negligence or carefree attitude, may decide to disregard safety precautionary measures like using personal protective equipment, such as gloves, boots, eye glasses, and respirator when they are at work, especially in the production areas.

Encouraging healthy, safe, good working conditions and promoting occupational safety and health are the obligation of all stakeholders in the beer-making industry in Nigeria and other areas of the economy. These involve educating the employers and the employees about employment standards, enforcing obedience with safety measures, regular check of the workplace and promoting positive approaches towards safety measures. In the course of promoting safety at work, workers must be adequately informed about what constitutes hazards in their work environment and become familiar with all activities with regard to known hazards. They must also be well equipped with personal protective equipment and encouraged to use available methods of protection, while employing additional safety intervention activities, such as regular checks and safety meetings to avert or lessen the rate of accidents on the job. Safe

production practices of workers require that workers should be constantly reminded that safety is essential at all times.

The involvement of workers in developing a positive attitude in the direction of safety, the risks involved in the beer-making industry as well as the importance of ensuring safe production practices necessitated constant safety training. The problem of unsafe production practices in the industry can be curtailed or wiped out if the workers, both old and new, as well as temporary and permanent, are given properly planned safety training programmes. To regulate or manage the manifestation of hazards in the brewing companies in Nigeria, workers have to be trained in sound lifting techniques, mechanical handling of pallets, behaviour-based management, general safety practices and performance expertise and their responsibilities towards safe production. It is expected that well-trained employees will eventually manage well-planned brewery jobs and ultimately guarantee a harmless and productive working environment.

Despite the fact that there is a degree of awareness on the significance of safety at the workplace and the encouragement given to workers to do their job safely, coupled with the safety training and sensitisation programmes workers are given, accidents, injuries and illnesses are still very high in the brewing companies. For instance, in one of the brewery under study, in the year 2015 alone, available records revealed 190 workplace accident cases and 1,250 illnesses, ranging from ergonomics problem, respiratory tract infections, skin problems, ear, nose and throat infections and others (International Breweries PLC, 2017). Not only that, the Heineken Group's Sustainability report revealed that accident severity and average lost days in 2013 was 25%, 28% in 2014 and 32% in 2015 (Heinekens' Report 2016).

Several safety training methods are linked with the brewing and manufacturing industries, particularly in terms of providing safety competences and skills. The training and sensitization programmes usually given to workers involve using the traditional lecture method and, in some cases, the demonstration method of instruction. The efficacy of safety training, therefore, calls to question the efficiency of the methods being used in disseminating information to the workers. The conventional or traditional lecture technique has been so much criticised by scholars, such as Miller (2013) and Meguid and Collins (2017), because it constitutes a one way-communication, violates the principle of learning by doing, and learners are passive throughout the period of lecture.

In the light of these limitations of the traditional lecture method, this study, therefore, looked at the visual-based method of training, which falls in the category of activity-based training method. The activity-based training method is a learning technique that focuses on learning by doing. It is a technique adopted by trainers, in which learners take part thoroughly and actively in the learning procedure; it brings about effective learning experiences. It includes active writing, active speaking, active listening, visual-based learning, brainstorming, collaborative learning, cooperative learning, peer-teaching, role- playing, drama and simulations, problem-based learning, case studies, discussion method and questioning sessions.

Visual- based training method is defined as the incorporation of information from visual formats. It implies when visual formats, such as images, flow charts, diagrams, simulations, graphics, cartoons, slide shows, powerpoint decks, flash cards, films, video tape demonstrations and even the television, are used to deliver instructions in the learning procedure. It has the advantage of being easy to deliver in a learning setting and is inherently interesting to the current generations of trainees.

Visual learning is the basic foundation in the thought process and constitutes a very vital ground for learning to read and write. Images, for example pictures and photos, are non-verbal representations that herald verbal cues and abstract symbols which promptly shape how human beings perceive reality. They also create subconscious memories that are located in the prefrontal parts of the brain, memories against which information is considered in the cognitive processes, which eventually enable multifaceted innovative problem solving. Visual-based training method can also be planned to be adaptive to individual learners in the sense that the training content and technique of presentation may be customised to satisfy the requirements and preferences of individual trainees, giving opportunity for the learner to exert influence or control over the style and content of the training. In the Visual-based training method, individuals have the capability to infer and understand all information through visual elements, such as pictures.

Research has constantly and reliably shown that people learn best when they are involved in uninterrupted and decisive experiences, applying multiple intelligences (Dimitrios, 2013). Several studies have been conducted on whether the use of visual materials has positive results in teaching and learning; and results have revealed that learning by visual materials is more

effective than learning without visual materials. Most studies have established that the use of visuals provide learners with an authentic context that reflects the way knowledge is used in actual life situations (Bush, 2007; Tonzar, Lotto and Job, 2009; Carpenter and Olson, 2011; Rokni and Karimi, 2013).

The visual-based training method has been effectively used in teaching elementary, middle and senior secondary schools. Facilitators have equally used it to train adult learners, however outside the brewing industry. In conclusion, the method, being learner-centred and interactive in nature, has been established as very effective in increasing knowledge and ensuring behavioural change among learners. The method is categorized as activity-based, which includes learning by doing, otherwise known as experiential learning and collaborative group work. The method also redefines traditional student-teacher interactions in the classroom and emphasizes more on engaging the mental capabilities of learners, thereby limiting the function of the facilitator to more of guidance in helping the learners to attain the desired results.

In addition to the method that was used, job tenure and educational qualification of the brewery workers were considered as equally significant moderating variables. Job tenure or workers' level of experience has been recognised to have great impact on workers' safe practices in brewing organisations. The more the experience workers have on the job, the greater their constructive insights regarding safety practices at work. Apparently, the long-tenured workers would have benefitted substantially from their long stay in the industry, acquired the necessary skills needed to execute their jobs safely, which will assist them to comply more with safety guidelines than the short-tenured workers.

Education level has also been identified to have a major influence on training. Educational attainment is perceived to be an important contributor in improving an operative's consciousness and proficiency. Workers that have vital knowledge concerning safe work manners demonstrate better compliance with safety guidelines and practices. In the case of the brewing industry in Nigeria, many brewery workers do not possess the necessary knowledge and expertise required for the job given simply because most of them were employed on temporary or contract basis. Brewing work requires explicit skills and facts that will confirm their competence in brewing operatives and technical roles, enabling them to do their duties safely.

Several studies have been carried out on the effects of activity-based training methods. Particularly, such previous studies include effect of brainstorming technique on training outcomes of adult and non-formal education personnel (Kester and Ogidan, 2010), will they or will they not change? application of the games show method to attitudinal change among trade union leaders in Nigeria (Kester and Shadare, 2011), effects of small groups and role playing methods on knowledge and attitude to Social Studies among advanced level adult learners in Oyo State, Nigeria (Ayoola, 2016), and effects of team teaching and blended learning instructional methods on health promotion competence among student nurses and midwives (Kolade, 2016). However, these previous studies did not apply the strategies to solving safety problems in their usage. Where it is so applied (Ojo, 2016), its use was restricted to the effects of syndicate and guided-practice training methods on occupational health and safety competencies of workers in the Nigerian construction industry. Hence, the need for this study to see how effective the visual-based training method was in solving safety problems in the brewing industry. The study, therefore, examined the visual based training method and safe production practices in the brewing industry in Southwestern Nigeria.

1.2 Statement of the Problem

The brewing industry is a core industrial sector that is highly prone to industrial hazards and accidents. Most of these hazards and accidents are needless and completely avoidable if workers adhere to safe production practices, which remain the key to reducing the risk of illnesses and injuries in the industry. Safe production practices keep employees safe and reduce the frequency of accidents and its severity rates. It also saves money and increases productivity, thereby enabling the industry to meet its target. Irrespective of the safety measures provided to safeguard general safety and the sensitization and training programmes workers are exposed to, with the use of the traditional lecture method and occasional use of the demonstration method, the workers have been known to have little consciousness for dangers connected with their task performance, besides cases of outright violation of safety precautions provided.

Thus, the industry has been labelled as a haven for unsafe production practices with grave consequences on the workers, the industry and the entire economy. Occurrence of job-related

accidents resulting in serious injuries and illnesses are common among the workers of Nigerian brewing organisations, leading to deaths, physical impairments (such as loss of eye, fingers, arm or legs), constant cases of absenteeism, irregularity at work for health reasons, low morale and labour turnover. Besides, there is the emotional trauma that injured or disabled workers have to put up with coupled with the fact that homes and relationships might have been destabilized owing to one form of disability or the other arising from accidents. The brewery also suffers low output and inability to meet up with the production margin, without mentioning the debts incurred from the medical attention given to injured workers. From the preliminary survey conducted by the researcher at International Breweries, Ilesa, it was gathered that the production target has been 2m hectolitre in the most recent years. However, the industry recorded 1.69m hectolitre in 2014 and 1.4m hectolitre in 2015, an indication that the target was not achieved. Reasons for this have been attributed partially to cases of absenteeism and irregularity at work owing to accidents and other health matters related to work.

This therefore raises the concern of how these problems could be minimised or completely eliminated to ensure safe production practices in the brewing industry using very effective training methods for safety training programmes. Activity-based training methods have been prominently advocated in the literature, with restricted focus on role-playing and small groups, brainstorming technique, games show, team teaching and blended learning, syndicate training and guided-practice, and little attention to application of these methods to solving safety problems. Obviously, there is a gap in the literature concerning the use of the visual-based method in the realm of work, particularly the brewing industry. The study, therefore, investigated the visual-based training method and safe production practices in brewing industry in Southwestern Nigeria. Job tenure and education level acted as moderating variables in the study.

1.3 Objectives of the Study

The study mainly examined the visual-based training method and safe production practices in the brewing organisations in Southwestern Nigeria. Specifically, this study:

- assessed the nature of unsafe production practices in the brewing organisations,
- ascertained the actual consequences of these unsafe production practices in the brewing organisations,

- determined the knowledge and attitude of both the employees and the management towards safe production practices in the brewing organisations,
- examined the main effects of treatment (visual-based training method) on safe production practices in brewing organisations, and
- determined the interaction effects of job tenure and education level on treatments and safe production practices in the brewing organisations.

1.4 Research Questions

The three research questions raised in the study were as follows;

RQ_1 What is the nature of unsafe production practices in the brewing organisations?

RQ_2 To what extent would these unsafe production practices affect the workers in the brewing organisations?

RQ_3 What is the knowledge and attitude of both the employees and the management towards safe production practices in the brewing organisations?

1.5 Hypotheses

The following null hypotheses were formulated for this study and were tested at 0.05 significance level.

Ho_1: There is no significant main effect of treatment on safe production practices.

Ho_2: There is no significant main effect of job tenure on safe production practices.

Ho_3: There is no significant main effect of education level on safe production practices.

Ho_4: There is no significant two-way interaction effect of treatment and job tenure on safe production practices.

Ho_5: There is no significant two-way interaction effect of treatment and educational level on safe production practices.

Ho_6: There is no significant two-way interaction effect of job tenure and educational level on safe production practices.

Ho_7: There is no significant three-way interaction effect of treatment, job tenure and educational level on safe production practices.

1.6 Significance of the Study

The findings of the study would greatly benefit all stakeholders in the brewing industry and other sectors with similar circumstances. The study would expose safety training officers, the company safety managers and others involved in safety programme to the use of visual- based training method found to be very effective in enhancing safe production practices among workers in the brewing industry. Most organisations often embark on training programmes without using appropriate training methods, which may hinder transfer. Despite the fact that the importance of safety training is recognized and that such training helps to avert accident occurrence or reduce its severity, the actual problem lies in which method would be effective and actually promote transfer of training back on the job. It is expected that with the adoption of the visual-based training method, workers would be able to attain the anticipated result and the much expected training effectiveness and thereby ensure safe production practices.

The result of this study also would provide necessary information about the job tenure and educational attainment of workers as important variables to be considered towards promoting safe work practices in the brewing organisations. The fact that the highly educated workers and those with long experience were found to demonstrate good safe work practices and quick to grasp the intricacies of the training should give a cue to human resource persons or managers that the two factors should be considered, especially at the points of recruitment and selection and even in the process of assigning tasks to workers in the organisations.

Furthermore, the finding of the study about the nature of unsafe practices being demonstrated in the industry is an eye opener to all stakeholders, as it would help them to put necessary monitoring strategies in place, and encouraged the management also to provide a much more favourable environment, relatively free of harm for workers. The findings on the effects of unsafe practices on workers would make workers better informed and prepared to tackle the likely consequences of their actions towards safe practices. The study would also be useful to managers, employees and other stakeholders as regards their knowledge and attitude towards unsafe practices and hazard control, which would help to enhance production practices and

reduce occurrence of accidents in the brewing industry. The findings of the study would also add to the existing body of knowledge in the area of training and development and workers' health and safety. Finally, the effectiveness of the visual-based training method is expected to provide a viable research-based alternative that could be replicated anywhere all over the world, especially where similar challenges are being faced in the realm of work.

1.7 Scope of the Study

This study examined visual- based training method and safe production practices in brewing organisations in Southwestern Nigeria. The choice of the brewing organisations hinged on the fact that it is one of the manufacturing industries where the occurrence of occupational accidents is higher. Considering the viability and contribution of these organisations to the economic base of the country, the need to reduce accident occurrence and other associated hazards is imperative. The study was restricted to the International Breweries PLC, Ilesa in Osun State, and the Nigerian Breweries PLC, Ibadan, Oyo State. These organisations were selected because they are among the largest and reputable brewing industries in the country. Other reasons considered include proximity, and convenience between the selected breweries.

The study was also delimited to both the permanent and temporary workers in the production units, for instance the brewing house (workers involved in milling, mashing, filtration, and storage), packaging and engineering units. This was because they were the only set of workers working in areas such as grain storage rooms and confined spaces and, therefore, more exposed to serious job hazards and accidents than those in distribution and marketing.

In addition, the study made use of the intervention strategy that have been discussed (visual-based training method) and deemed as being very effective for use in changing adult workers' knowledge and behaviour in safety training programmes. The study was further delimited to the moderating effects of two variables (job tenure and education level) on the main effect of treatments on safe production.

1.8 Operational Definition of Terms

The following terms are operationally defined as used in the study:

Safe production practices refer to behavours and practices that prevent situations or conditions that may either inadvertently or by design cause injuries, ill-health or death to workers in the brewing organisations. These are practices that bring about safety during production processes. Examples are having adequate information about what constitutes hazards in the brewing industry, using available personal protective equipment, such as gloves, eye glasses, protective clothings, boots, and respirator, developing positive attitudes towards safety measures, participating in other safety interventions, such as workplace inspection and safety meetings, to prevent or reduce the occurrence of accidents and illnesses in the brewing organisations.

Activity-based training method is a method that focuses on learning by doing. It is a learning technique adopted by trainers whereby learners contribute actively in the learning process, bringing about efficient learning experiences. There is a wide range of activity-based methods used for training at different levels. However, this study focused on the visual-based training method in training safe production practices in the brewing organisations.

Visual- based training : This method refers to a learning process whereby brewery workers are exposed to safety training whereby visual mediums such as projectors, graphic displays, films, slides, video tape demonstration and even television were used to demonstrate a safety procedure and allows participants to reflect, interact and ask questions, like ‘what will happen if ----?’ at the debrief session.

Training methods: They consist of the techniques and materials used by the researcher to organize learning experiences. They are the determinant of the success or otherwise of the safety-related training programme.

Job Tenure: This refers to the number of years that brewery workers have put up in the industry. This also varies at three levels: short-tenured, medium- tenured and long-tenured. Short-tenured workers refer to workers that have spent 1-5 years on the job; medium-tenured workers are those who have spent 6-10; years while long-tenured workers refer to workers who have spent 11 and above years.

Education level: This refers to the educational qualification possessed by the brewing workers. This varies at three levels: least educated, moderately educated and highly educated levels. Least educated level is for those who possess school certificate and below; moderately educated level is for those who possess Diplomas and Nigeria Certificate in Education; while highly educated

level is for those who have Higher National Diplomas/Bachelor of Science/Bachelor of Education and other higher qualifications.

Brewing industry: This is a manufacturing beverage industry within the nation's economy that is specifically responsible for the production of beer. In this study, two organisations in the brewing industry were selected. The two were International Breweries PLC, Omi-Asoro, Ilesa, Osun State and the Nigerian Breweries PLC, Ibadan, Oyo State

CHAPTER TWO

LITERATURE REVIEW AND THEORETICAL FRAMEWORK.

This chapter focuses on review of relevant literature and theoretical framework. This is done under the following sub-headings:

2.1 Conceptual Review

2.1.1 Safety and safe production

2.1.2 Visual-based training method

2.1.3 Brewing Industry in Nigeria

2.1.4 Job tenure as a factor

2.1.5 Education level as a factor

2.2 Empirical Review

2.2.1 Safety and safe production among workers in the brewing industry

2.2.2 Visual- based training and safe production among workers in the brewing industry

2.2.3 Job tenure and safe production among workers in the brewing industry

2.2.4 Education level and safe production among workers in the brewing industry

2.3 Theoretical framework

2.1 Conceptual Review

2.1.1 Safety and Safe Production

Safety means different things to different people under different circumstances. Maurice et al (2001) defines safety as a condition in which perils and situations resulting to physical, cerebral or considerable damage are controlled in order to maintain the health and comfort of folks and the general public. However, workplace safety can refer to the ethical and moral responsibility of an organisation to avoid and remove hazards, implement, maintain and fortify training, perform tasks at work without injury or ailment and have inner comfort that workers have taken all reasonable precautions (Beus et al, 2016). Safety is the state of being free from danger, the condition of being protected from harm or other non-desirable consequences (INSPQ 1998). It can also refer to the management of known hazard in order to attain a satisfactory level of risk, which varies from one organisation to the other.

Safe production practices refer to those practices that prevent situations or conditions that either inadvertently or by design cause injuries, ill-health or death to workers in brewing organisations. They are practices that bring about safety during production processes. A work accident, occupational accident, workplace accident, or accident at work is a distinct occurrence in the course of work which may result in physical or psychological harm. Nishtar (2008) reported that over 300,000 workers die each year because of accidents and more than 250 million workers sustain injuries resulting from occupational accidents.

Safety in the workplace is a right and equally a responsibility. Just as it is the right of the employees to enjoy protection at work and be part of the process of keeping the workplace safe, employers has the duty of making sure that safe production practices prevail, as this is the surest

way of bringing about organizational productivity (Alli 2008). The issue of safety and safe production is a joint effort of both the employers and the workers. They are required to determine goals around health and protection and combined efforts together as a crew towards achieving them. The management must involve all members of staff within the organisation in order to have a danger-free workplace. At least, there are seven steps towards ensuring safe production in a workplace. It is the duty of the management to draw up a policy that will promote safe work practices. The policy may include employees' commitment, hazard management, information, training and supervision, incident investigation, employee participation, emergency management and return to work (Alli 2008).

Workplace Inspection

Workplace inspection, is perhaps, the major responsibility of the management to ensure safe work practices. It involves work area inspection, checking the equipment and systems regularly to assess where and if workers could get injured. Workplace inspection includes preparing an overall site design of the workplace, developing an inspection plan, involving the staff in the area of work, taking further action by fixing any observed problem immediately without any further delay.

Once hazards are recognized, all practicable and reasonable measures should be put in place to control them (OSHA 2016). Apart from workplace inspection, management will set health and safety objectives and performance criteria for all stakeholders in the areas of work and perform yearly appraisal of health and safety objectives, including managers' performance. Besides, timely and accurately reporting and recording of injuries and incidents must be encouraged by the management that will, in turn, examine and evaluate all reported cases to ascertain all causal factors and, where appropriate, formulate plans for corrective action (HSE 2013).

In a situation where any worker suffers ache or discomfort, management will provide cure and recuperation plans that ensure prompt, strong and durable return to work. The management also needs to make sure that every employee is obliged to promoting health and safety. Every manager, supervisor and foreperson is answerable to the employer for the health and safety of employees under their direct supervision.

Hazard Management

Hazard can refer to an action, procedure, condition, event, occurrence, phenomenon, practice, situation or material that can actually cause harm or be a potential source of harm. (CCOHS 2017). It can also include a circumstance where the behaviour of a person may be an actual or potential source of harm not only to the person, but also others around him or her and without any restriction. Such situations may result in physical or psychological stress, traumatic shock or other momentary conditions that may have emotional impact on a person's behaviour.

Significant hazard is a hazard that is a positive or reasonable justification for or premise of genuine damage bringing about death or any conditions that adds up to or results in some conditions. These include changeless or ephemeral loss of physical capacity, lung or respiratory ailment, clamour- initiated hearing misfortune, neurological ailment, malignant growth, dermatological malady, infectious illness and musculoskeletal ailment. Others are infirmity brought about by contact with swarmed material, decompression disorder, harming, vision inadequacy, penetrating eye-wound, bone split, genuine cut, and body part removal. Hazards can be physical, biological or chemical. Some emerge from work forms, for instance, machine-driven dangers, commotion or noxious substances, while others result from machine or machine catastrophes or abuse, control or power systems disappointments, concoction spills and auxiliary catastrophes (OCH 2016).

The management of hazards in work environments should be a steady occurrence and not something to be considered once and after that overlooked. Hazard suggests something that may cause harm or damage. It may arise from work environment or activities done in the workplace.

To distinguish every single potential risk, the management needs to look beyond the evidently physical ones and search for dangers that are inalienable in the course of carrying out work procedures. This can be completed by thinking about how extraordinary assignments are executed, the arrangement or structure of the worksite or working environment, how work is sorted out and other physical conditions. People who perform specific jobs constantly understand the danger inherent in such and how they could be controlled.

There are four stages towards overseeing risks in organisations: (Workcover 2016)

1. Recognizing dangers – distinguishing the things that may be wellsprings of damage or mischief to wellbeing

2. Surveying the dangers whether they are huge (as expressed in the Occupational Safety and Health Act), or how likely and serious the wounds or damage would be if laborers were unprotected to the dangers

3. Hazards control involves adopting all workable measures to remove, separate or reduce the significant hazards. Eliminating the hazard involves a complete removal of the hazard from the workplace but if it cannot be eliminated, then management should try and separate or isolate the hazard from workers who may get hurt by it. However if it is impossible to remove or separate then all techniques should be put in place to make sure that it is minimized by adopting strategies to moderate the exposure of people to the hazard. However, the best options are removal and separation; minimization should be the last choice measure of control. Personal protective equipment (PPE) may help to reduce hazards, but eliminating or isolating injury and health vulnerabilities through other safer or mechanised process are much more reliable.

4. Checking hazards and any contact to a danger that has been removed, separated or minimized and finally reviewing these steps regularly, especially with changing standards or introduction of new technologies.

Employees' Involvement in Health and Safety

Research has found that workers involvement in safety programmes positively relates to safety amenableness and contribution (Mashi et al 2017). Walchter and Yorio (2014), equally found that allowing worker's involvement in safety programmes resulted in calamity prevention in industries. It is the obligation of the management to ensure that representatives are offered chances to be completely engaged with creating safe work environment rehearses. The most productive well-being and safety management programmes inspire representatives to be effectively included. Since they go over work environment risks and issues each day, representatives are in a superior position to make proposals for development. By enabling them to take interest in distinguishing and proffering answers for issues, they will be focused on making the arrangements work. A well-defined policy, debated, decided upon and comprehensible by the participants is vital (Goelzer 2001). Making a gathering on a quarterly basis in any event, for structure correspondence between workers through their well-being and security agents and the board concerning well-being and security matters, and tracking such

discussion gatherings are critical. Representatives need to agree on how they will take interest in well-being and safety management.

Workers need to alert the administration of any genuine or likely danger they go over throughout work and give recommendations on how to handle those risks. Each worker ought to be focused on well-being and safety issues and every representative is relied upon to help keep up a sheltered and sound workplace. They could achieve this by following all systems for safe work, standards and guidelines, utilizing legitimately all safety gear and attire provided, reporting early any agony, taking interest in the organization's treatment and recovery plan, for timely return to duty, and reporting all dangers, injuries and incidents to the appropriate authorities.

Employees' Right to Refuse Work

While employees have explicit obligations, they similarly reserve the privilege to refuse work that they perceive could cause them harm. (OHSA Act) It is expected from the representatives to alert the employer why they will not work. They or their agents should attempt to examine and resolve the issue with the management. The worker can keep on declining to do that work, if after the talk, the issue is not addressed. However, an employee in this kind of situation should be ready to perform any other work assigned to him as long as it is within the terms of his employment contract.

Information, Training and Supervision

Information, training and supervision are very crucial in any organisation for safe production practices. Abuarejal (2016), avers that to reduce accidents in workplace, there has to be upgrading in the knowledge about safety and health rehearses among workers. The management has to ensure that well-being and safety preparation programmes are made mandatory for every new worker. The substance of the preparation programme should cover occurrence and damage reporting, risk management, staff and boss obligations, and process for guaranteeing that employees are effectively engaged with well-being and health administration. It should also cover who does what in the organisation's health and well-being supervision framework, crisis management methods concerning steps to take if a worker is harmed, worker and the board duties regarding restoration, and utilization and keeping of health and safety defensive hardware, as well as why it ought to be habitually worn.

Management equally has to decide employees' health and safety requirements for preparing for explicit jobs and duties in work environments and deliver task-explicit training. Finally, management must ensure that all employees participate in the induction/training programme and understand the information and training they have received (Abualrejal 2016).

Health and Safety Committee

A health and safety advisory group involves the manager and worker's delegates, comprising five or six individuals. The advisory group should meet about four times each year. The board is expected to boost health and safety conditions. This can be through recognizing potential health and safety hitches and conveying them to the management. For example, a board of trustees could look at injury records and determine injury patterns, and means of addressing them. The board of trustees could also inspect advancements in different work environments to determine the ones appropriate for it (OSHA Act).

Emergency Management

Emergency can refer to any spontaneous events that can fundamentally influence the activities of any organisation. These events include physical and natural harm, injuries and harm to, and loss of lives. Emergency may also incorporate events that upset organisational activities or even bring about closing down the organisation. To avoid this, each organisation must have a powerful broad emergency blueprint to deal with different types of crisis that may occur in any unit of the working environment, in line with appropriate legislation.

When the organization is threatened with an emergency situation, deciding who needs to do what may appear too late if emergency measures are not initially put in place. It is, therefore, important that organisations have an emergency plan by identifying crises that could arise and specify what should be done for each form of crisis situation identified. It is equally important that such emergency procedures are communicated to the employees.

First aid Requirements

In a situation of an emergency in workplace, arrangement for emergency treatment to any employees or guests who suffer injuries is fundamental. Working environment medical aid units ought to contain a manual providing general guidance on the utilization of emergency treatment.

This should include, wrapped clean dressings, clean eye cushions, triangular gauzes, self-clasping pins, unmedicated wound dressings, dispensable gloves, and resuscitation mask. Others are scissors, adhesive tapes, disposable aprons, and saline solution.

Return to Work

The procedure for return to duty for injured staff incorporates having a protected and gainful workplace highlights and developing a progressive approach towards dealing with their wounds. There are good reasons for encouraging workers that are injured to resume at work. Apart from being cost effective, it also helps the organisation to retain workers, and demonstrates employer's supportiveness which improves cooperation and loyalty (RTW Knowledge Base). This increases productivity and reduces the associated cost of maintaining workers with long-term disability. After the workers have resumed, selective suitable duties can be assigned to them provided they have medical clearance from their doctors declaring them fit for selective duties. Once they are back to work, their activities should be monitored in order to prevent recurrence of such incident or deterioration of their medical situation.

2.1.2 Visual-based Training Method

The visual-based training method is defined as a training and learning style wherein ideas, concepts, data, and other information are connected or linked with images and techniques. The visual-based training strategy, also seen as the spatial learning method, is an instructional method of learning whereby information is linked with pictures and graphics. This training style ensures that trainees are able to see what they are required to know. People exposed to this learning style are usually referred to as visual spatial learners. The implication is that information are better processed when they are obtainable in the form of pictures, images, graphics and charts.

The visual-based training method is one of the three basic learning methods in the commonly used Fleming VAK/VARK Model, which include kinesthetic and audio learning.Visual representations of knowledge, concepts, thoughts, or ideas are all categorized as graphic organisers. To demonstrate the relationships between different parts in a whole, the symbols are connected with each other and further clarification of meaning can be carried out with words. When information is represented with images and pictures, the learner is able to concentrate on

its meaning, rearrange and group comparable ideas easily, making a better usage of their visual memory.

Brown and Ford (2002) observe that customization denotes the training designer's effort to construct training programmes which can be modified and centres on important learner's characteristics. Learners' control refers to the efforts of the learner in modifying the learning environment to suit their own purposes. In the visual-based training method, individuals have the capability to infer and understand all information through visual elements, such as pictures. Numerous studies have been carried out on whether the usage of visual tools has positive results in teaching and learning. The results revealed that learning by visual materials is more effective than learning without visual materials. Most studies have established that usage of pictures afford learners authentic contexts that reflect how the knowledge is to be applied in real-life situations (Bush, 2007; Tonzar, Lotto and Job, 2009; Carpenter and Olson, 2011; Rokni and Karimi, 2013)

Parts of the brain affected by visual-based training

Several parts of the cerebrum work hand in hand in different ways to create the pictures that we see with our eyes and which are customized in our minds. This happens in the visual cortex of the mind. The visual cortex is arranged in the occipital projection of the cerebrum and stays in a few different structures that help visual acknowledgment, order, and learning. In the process of acquiring new visual information, the brain, among other things, will first recognize the incoming information. The inferior transient cortex, the predominant parietal cortex, and the cerebellum are portions of the brain engaged with the procedure of acknowledgment. In the course of recognizing the tasks, the activation in the left inferior transient cortex increments and initiation in the correct unrivalled parietal cortex diminishes. Recall is hence improved by neural pliancy, or the capacity of the cerebrum to restructure itself founded on newly acquired knowledge (Poldrack et al., 1998).

What follows this is the capability of the brain to classify the material. The orbitofrontal cortex and two dorsolateral prefrontal regions are the three main parts of the brain at work when classifying new visual information. This process begins with cataloguing of new information into groups and further integrating that information into previous knowledge (Vogel 2002). After

marking out and classifying, the new information moves in into the visual field where the cerebrum begins the encoding procedure, which prompts learning. There are various mind parts associated with this movement, for example, the frontal projection, the privilege extrastriate cortex, the neocortex, and the neostriatum. The limbic-diencephalic district, is essential for changing over discernments into recollections (Squire, 1992). With the gathering of undertakings of acknowledgment, arrangement and learning; illustrations empowers the way toward encoding new data and relating them to their past information. Visual pictures are greatly recalled when learners apply them to a definitely known designs. Representations or graphics actually offer improvement of visual memory and learning (Lord, 1980).

Characteristics of visual/ spatial learners

Hindal (2014) highlighted some characteristics of visual-spatial learners as follows:

- Visual spatial learners do not think in words but mostly in pictures and possess ability at reading maps.
- They need to create words in their minds before spelling them.
- They also make use of their instincts to unravel problems.
- They may possess robust creative, mechanic, or high-tech talents.
- They may more often than not be extremely perfectionistic.
- They have irregular grades in their school subjects.
- They may over and over again be late-bloomers.

Visual spatial learners often have preference for using images, portraits, colours, and charts to bring together information and interconnect with others. It is also easy for them to imagine matters, devices and results through their mind's eye. They may also possess a good spatial sense that enables them to have a good sense of track. Finding their way around with the use of maps is quite easy for them while they hardly get lost; knowing which direction to face when they get out from the elevator is mostly by instincts.

Strategies for Instruction

In Time 4 learning, the following strategies are highlighted as being quite effective in training learners with visual-spatial strengths:

- Utilize visual aids, such as document cameras, graphic representation, and visual descriptions in the course of lectures.
- Utilize calculating materials to give room for hands-on experience.
- Utilize visionary methods for reading as well as phonics.
- Utilize picturing tactic to spelling, display the word and without opening their eyes, imagine it before spelling it in reverse form which demonstrate visualisation.
- Engage learners to carry out their own studies free from others or teamwork that may contain problem-finding, including problem-solving.
- Make provision for opportunities to hypothesise, draw, or even generate pictorial illustrations of ideas. At the same time, allow use of computers to enable visual presentation of material.
- The moral, ethical, and universal implications of their knowledge should be discussed by the trainees and they should be involved in service- oriented projects.
- After teaching a concept, give enough time to trainees to ruminate on the concepts, closing their eyes and imagining what they have just learnt.
- Have trainees find out their own ways and means of solving problems, coupled with step-by-step division teaching; present a simple split-up problem to them with a divisor, dividend and quotient. Trainees can also be made to come up with how to get answers in their own way. Then, present a more difficult problem to them with the solution already worked out in order to observe how their system works.
- Rote memorization should be avoided to a considerable extent and more of conceptual or inductive approaches put in place.
- Excessive drilling and repetition must equally be avoided. Instead, expose the most intricate tasks in the unit to the trainees
- Try to discover the trainees' prior knowledge before teaching them and expose them to a more innovative, mental and multifaceted material in quick succession.
- Provide opportunities to go faster in training sessions and, if appropriate, lay emphasis on mastery of greater level of ideas instead of accomplishment of modest conceptions in rivalry with other learners.

- Put emphasis on originality, thoughts, new discernments and new tactics apart from knowledge attainment. It is important that ingenuity is stimulated in every subject area.
- Gifted visual-spatial learners should be grouped together for instructional activities.
- Enable students to draw pictures of the material they are learning by making spelling of words into portrayals, think of designs of their words, with pictures used to show an undertaking, and many others.

- Utilize computer software or applications that are highly visual and interactive and let trainees illustrate their ideas with draw and paint.

- Let the trainees prove their level of understanding of the idea by constructing a typical 'example, for instance, mud figures to explain a tale, a diorama, to express a historical happening, channel cleansers or commercially-made structural materials to display the structure of a molecule', among others.

- Show videos to accompany the material being learned

- Plan short-term visual thinking breaks for trainees which might involve solving visual-spatial puzzles, playing visual-spatial games, for instance, pictionary, or imaginative doing exercises.

Source:

SEVA Council of gifted administrators. www.hampton.k12.va.us/dept/gifted/visual

Evaluative studies on the use and effectiveness of graphic organisers (Humbert, 2014; Torres, 2015) concluded that it enhances learners' performance in the following areas:

Retention: Information is much better remembered or recalled by learners when both verbal and visual processes are employed in presenting such to learners.

Reading comprehension: Graphic organizers promote reading ability of learners.

Student's accomplishment: All classifications of students, including the debilitated ones, gain ground achievement across content areas and grade levels.

Critical thinking and learning skills: Higher-order thinking and critical thinking skills are more boosted in learners that develop and use graphic organisers.

Envisioning data: Learners are able to construct data literateness in the course of working with data as they gather and discover facts in a self-motivated logical procedure, utilizing tables and plots to outwardly investigate, work and look at information. As they investigate the mode by which information travels through different plot types, they put into words paths that connect visual similes to areas that store facts in the brain.

2.1.3 The Brewing Industry in Nigeria

The historical backdrop of the Nigerian beer industry might be traced back to the pre-independence period. It was actually the formation of the Nigerian Breweries Ltd, listed as a company in 1946; it rolled out its first bottles of beer in 1949, which pioneered brewing in Nigeria. Since then, the brewing industry has progressed gradually with several positive impacts on the growth of the economy. The approach of a vote-based government has conveyed a more business-friendly condition and privatization game plans have provoked augmentation in the measure of the drink business generally and the aging business particularly. By 1983, there existed thirty-six packaging works with a joined age level of 19.5 million hectolitres of introduced limit (Malomo, 2015). By 2010, the figure of investment in breweries had drastically reduced to twelve, with consolidated hectolitres of generation of under 6.0 million hectolitres. Several factors were accountable for this downward trend. These include the removal of beer from prohibition list, cancellation of excise duty, increased wave of religious passion and expansion endeavours of distilleries into the non-mixed refreshment business, which is considered sound for the economy.

Despite all these, the Nigerian brewing industry is a major player in the nation's economy. To date, rivalry in the country's brewing market is growing intensely, as the disposable income of the consumer is largely affected by prevailing environmental and economic conditions. The Nigerian Breweries PLC and Guinness Nigeria PLC, the first and the second largest players in the brewing industry in Nigeria, have witnessed substantial advancement in the recent years despite the harsh economic environment. This feat is attributable to their adopted strategies in responding to the environmental challenges. These two brewing organisations have virtually

dominated the beer market, promoting growth in other brands while diversifying their product bases to cut across all classes, tastes and geographical regions. This is manifested in their endeavours at maintaining cost, upgrading value adjustment, driving for excellence in item quality and endeavouring to accomplish extraordinary efficiencies (Malomo, 2015). Industry reports showed that the beer industry recorded a noticeable degeneration in growth towards the later part of 2013 owing to pressures on family unit wage and touchy security concerns. The beer business in Nigeria grew in worth by 21.8 % in 2009, increasing its value by 2.7 billion USD. Analysts projected an average yearly growth of 23.45% between 2011 and 2014. Beer is the most widespread intoxicating drink in the country, totalling up to 96% of all alcoholic sales (Olawale, 2014).

Beer is a very thriving business in Nigeria and is perceived to be growing at 10% annually for quite a while (Olawale, 2014). This is because of increase in the level of recognition of the brand by the middle class and it is this demography that the big three global operators are pursuing with other aspiring drinks, such as Hienekens, and Extra Stout. The giant operatives of the Nigerian beer segment are the Nigerian Breweries PLC, Guinness Nigeria PLC and SAB Miller, (International Breweries PLC). They ensure that they supply adequately their various brands to consumers. (Malomo, 2015).

The Brewing Procedure

Eustace (2016) highlighted the process of beer-making as follows:

Handling and storing of raw material – The raw materials for beer production are mainly cereal or oat (grain malt, rice or maize), hops, water, and yeast. The malting procedure changes the thickener in the oat into fermentable sugar, which is pulled out of the malt amid crushing. Concentrates from the hop are utilized to preserve and supplement bitterness to the sugar solution, which is changed over into liquor by adding yeast amid fermentation. Bottling techniques involve warming framework, cooling, cleaning specialists, and packaging materials.

Wort production – The cereal or oat is gauged, cleaned, and set away in storehouses until it is prepared for wort production. Cleaning and squashing and granulating activities are engaged with setting up the oat for pounding. Pounding, lautering and wort bubbling together are the stages associated with the beer making method.

Milling –The cereal is processed to yield a blend of flour and husks known as grist. The quality of the processed malt is a harmony between best concentrate yield, the picked innovation, and capacity to channel the wort. The areas designated for handling grains ought to be planned to control outrageous dust creation and limit sources of explosion, including sparkles, to avoid occurrence of blasts.

Mashing – After processing, the grist is blended with high temperature water, to frame a crush or pound and left to remain in a procedure known as crushing. The reason for crushing is to get an exceptional yield of fermentable concentrate from the malt grist and aides by removal into the blending water. This concentrate is "wort". Only a minor bit of the concentrate is obtained by being broken up, while the rest is pulled out by methods for the enzymatic breakdown of compound insoluble constituents to simple water-dissolvable substances. Physical restrictions, for example, temperature, pH, and the span of squashing interval ought to be painstakingly controlled to get ideal removal.

Mash filtration – Wort is isolated from the strong part of the mash, known as "brewer's grains" by filtration. This procedure is called lautering and happens in a lauter tun or in a squash channel at a temperature of about 75ºC to 78ºC. After lautering, the spent brewer's grains are released to storehouses and generally retailed to ranchers for consumption as dairy cattle feedstuff. Brewer's grains from lauter tuns have a parched substance content of 19-22 per cent and, from mash channels, a parched substance content of 35- 40 per cent. The rest of the wort in the lauter tun will have a low substance of concentrate and is often referred to as weak "wort".

Wort boiling – After removing the spent brewer's grains, the wort is transported to the wort container. The wort is put on a heating system to boil in a container before adding hops. The wort is boiled for one to close to two hours with a hot intensity of 5-8 per cent vaporization of throwing volume 24 per hour. Six to ten per cent total evaporation is required, while heating system and boiling of wort require an extremely intensive energy.

Wort clarification and cooling – In the wake of heating up, the wort is normally cleaned through a procedure that isolates clean wort from leftover solids known as trub by passing it through a "water gush". After elucidation, the wort is permitted to cool to the "pitching temperature" (the temperature at which the cooled wort enters the fermentation pitcher) in a warmth exchanger otherwise called the "wort cooler" which is cooled by chilled water. Wort

cooling can be accomplished with a volume of cooling water around 1.1 times the wort limit. High temperature water (75ºC to 85ºC) emerging from the wort cooler is gathered and utilized as preparing water for the following batch. Arrival of natural issue (trub) can occur through the clearing-up procedure.

Fermentation and maturation – Oxygen is added to the wort after it has cooled to the pitching temperature. The wort is subsequently pumped to the fermentation containers (FVs) where yeast is added and fermentation begins. In the course of fermentation, the sugar content in the wort is converted to liquor and carbon dioxide by yeast. The fermentation procedure is exothermic, and temperatures are precisely measured by process needs, which frequently change as per the idea of the item and area of production. The span of the maturation is controlled by the item formula. Carbon dioxide created amidst fermentation might be gathered for use in different bottling work forms. Fermentation is halted through quick cooling of the FV, at which time the yeast is collected and propelled to the capacity container. Maturation creates more yeast than is commonly necessary for the following batch. Hence, some portion of the reaped yeast is discarded, often used as cattle feed. After fermentation, the brew is drawn into containers for maturation under measured temperature conditions for a number of weeks.

Filtration – Upon maturation, most lager is separated to get rid of the remaining yeast to acquire "splendid brew", which has the predetermined level of lucidity and delayed timeframe of realistic usability. The filtration happens in a kieselguhr (diatomaceous earth) channel utilizing edge, flame, or mesh filters. Spent kieselguhr can be utilized as a part of cultivating, recycled, or building material. After filtration, brew is put away in "splendid lager tanks" and is prepared for packing in the bottling corridor.

Carbonation and dilution – The lager might be carbonated before being sent to the splendid brew tanks. Nitrogen gas may likewise be used as a part of little amounts to improve froth execution. High liquor content lager coming about because of high-gravity fermenting is weakened to definite item quality with de-circulated air through preparing quality water before packaging.

Cleaning-in-Place (CIP) – It is imperative that all procedure hardware and channels are kept spotless and sanitized. Clearing is completed by methods for CIP frameworks, where cleaning operators are circled through the hardware or sprinkled over the surface of the tanks. Caustic

soda or corrosive are frequently employed as cleaning operators. The cleaning and purification of the bottling work hardware may utilize a significant measure of energy, water, cleaning specialists, and disinfectants. The plan of CIP frameworks can change significantly, running from straightforward frameworks in which a clump of cleaning arrangements is arranged and pumped through the framework and depleted, to completely programmed frameworks comprising tanks for water and cleaning arrangements that make it conceivable to reuse some water and cleaning solutions.

Packaging operations – Lager is pumped from the splendid brew tanks and, after weakening, is packaged, canned, or kegged in the packaging zone. Amid these tasks, it is imperative that the brew is shielded from oxygen contact and carbonation loss. Bundling lines may have diverse bundling materials and levels of mechanization, and regularly create high noise levels.

Bottle washing and control – Returned bottles are arranged electronically. Remote jugs are returned to their particular producers or squashed and sent to recycling. In the wake of arranging, bottles are sent to a container washer where all inward and outer debasements are expelled. Container washer tasks ordinarily incorporate drenching and washing, high-temperature sanitization, and flushing. The jug washer devours expansive amounts of energy, water, and scathing pop. Considerable amounts of wastewater are released and the gushing may have a high natural load. At the point when a jug has been cleaned, it is examined for harm and residual dirt.

Bottle / Can filling – The containers are transported by conveyor belts from the jug washer to the filling machine. They are filled under strain as indicated by the amount of dissolved carbon dioxide in the brew. A vital capacity of the filling machine is to keep oxygen from coming into contact with the lager. The jugs are fixed instantly subsequent to filling (for the most part with crown plugs) and the filling volume is patterned. The fixed containers are then passed on to the passage pasteurizer. As for canning, owing to their low weight, it is important to pass on the jars delicately to guarantee consistent separating. Besides, exceptional consideration is given to the thin divider thickness and ensuing low stability of the jars.

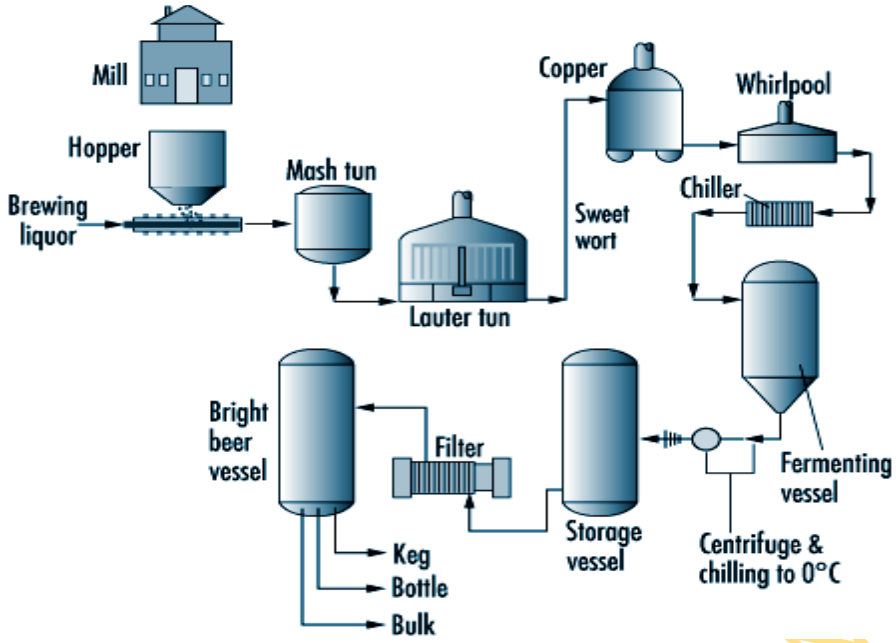
Pasteurization – Beer is normally sanitized to overwhelm any lingering live yeasts or different microorganisms. Two different strategies are utilized for purification. The first is tunnel pasteurization, whereby the lager is purified in containers or jars as a closed gathered unit; the

second is flash pasteurisation, which utilizes a warmth exchanger in which the beer is purified before it is filled into barrels.

Labeling – After pasteurization, the jugs are passed on to the labeller. Starch or protein-based pastes are utilized as glues to guarantee labels fall off effortlessly when the returnable containers are cleaned. Labelling lines expend vast amounts of power while high clamour levels can emerge from the labelling line.

Packing – Containers and jars are packed in cases, containers, or different types of transport packaging, while barrels are transported on pallets. Below is a flowchart of the brewing procedure.

Figure 2.1: Flow Chart of the Brewing Procedure



Source: - Encyclopaedia of Occupational Health and Safety, 4th edition.

2.1.4 Job Tenure as a Factor

Experience may play vital roles on the performance of people. Individuals become astute because of more exposure and encounters. For example, in African society, experience is considered a significant need for administrative positions in various organisations (Ahiasu, 1989; Kotur and Anbazhagan, 2014). An employee with credible experience in his work transforms into a front runner because of the abundance of experience attained while doing his work, which gives him professional control and makes him trustworthy (Polanyi, 1986; Andrew 2009).

Oredeyin (2004), in a study on predictors of managerial effectiveness in schools, discovered, with an observed F-ratio of 0.062, significant at P>0.05, that the job tenure of the principal was 0.052, indicating an affirmative association between job tenure and managerial effectiveness.

2.1.5 Education Level as a Factor

Education is the development of the human mind. It intensifies the capability to observe, incorporates enquiry, and promotes thoughtfulness, helps in policymaking and tuning to new situations. Education equally increases knowledge and understanding of the total environment. People that are educated are likely to perform certain chores proficiently and resourcefully when

compared with the less educated or the illiterate people. By implication, a person that is well-informed can carry out tasks that entail knowledge better. In fact, absence of education and knowledge deficiency makes a person crippled and inefficient. Level of education connotes the educational qualifications or degrees an individual has obtained. Here, highly educated workers denote individuals who hold a bachelor's degree and HND certificates because these degrees are necessary for access to many higher paying jobs. Workers with just OND/NCE are termed as moderately educated, while holders of secondary school certificate (SSCE) are categorised as least educated workers.

Fapounda (2004) posits, in her study on human resource improvement and training, that education and experience are very vital for the socio-economic uplift of a country. It is connected with investment in human beings. Gabriel (2004) found, from his study on whether there would be a significant dissimilarity between graduate and non-graduate teachers with respect to managerial factors, that educational qualification and experience at work had significant influence on teachers' supportiveness.

2.2 Empirical Review

2.2.1 Safety and Safe Production among Workers in the Brewing Industry

The desire for safety is on the increase in the manufacturing industry in general and in the brewing industry in particular. Apart from cost in lost time hours, loss of wages and equipment, the associated cost in terms of personal injury and fatality is grievous (Oyawale, Odior and Bolanle, 2011). Safe production practices denote those actions, practices and behaviours of the workforce that prevent situations or conditions that either inadvertently or by design cause injuries, ill-health or death. These include all activities of brewery workers with respect to known dangers, for instance, having adequate information about what constitutes dangers in the beer-making industry, using available personal safety equipment, such as gloves, goggles, protective clothing, boots, respirator and so on, developing positive outlooks towards protection measures, participating in additional safety mediations, such as workplace inspection and safety assemblies to avert or decrease the manifestation of calamities and ailments in the beer-making industry.

In a self-reported safety practices and associated factors cross-sectional study, conducted among employees of Dashen brewery Share Company in Ethiopia, Tezera, Chercos and Dessie (2017) found that bulk of the participants (87.2%) reported conforming with decent safe practices.

However, age, marital status, approach, safety training and organization backing were found to be main conjectures for safety practices.

Safety and safe production practices is of paramount importance in the brewing industry. Guaranteeing this can only be achieved by training and retraining all the times. Oyawale, Odior and Bolanle (2011), conducted a study using the principles of statistical expectation and efficiency index to analyse the performance of safety programme in a brewery in Oyo state, Nigeria and found a significant number of prevented accidents and the corresponding values of life and properties saved, indicating the effectiveness of the safety programme.

Beverages, regardless of whether alcoholic or non-alcoholic, are typically produced under severe sanitary rules set by legislative guidelines (OSHA 2016). To meet these rules, the equipment inside the plants is always washed and cleaned with harsh washing sanitizers, which can present medical issues to the workers in the course of performing their responsibilities. Sahiri, (2015), concluded from his work on employee motivation, workplace environment and workplace diversity influence on organization performance, having found that extreme dermatitis could happen if the scathing chemicals get in contact with the skin and eye. Another worry is that vapour or spray delivered when utilizing the chemicals, whenever breathed in, may cause harm to the lungs, nose, mouth or throat. Cuts and wounds in the eyes are regular because of glass breakage.

Most fermenting businesses have, however moved to utilizing bigger amounts of aluminum jars and plastic compartments, which has decreased the recurrence of glass-incurred wounds. Besides, present day motorized equipment has radically decreased the personnel required for work in the packaging and canning lines, which has diminished damage sustenance. The use of rapid transports and modified palletizing and de-palletizing devices can result in serious wounds. A staff, trying to put a jug in a moving conveyor, or place a can upright can get his or her attire captured and be hauled into the machine. Palletizers and depalletizers can wind up blocked, resulting in a worker sustaining limb crack when making effort to clear the equipment.

Modern-high speed equipment has prompted expanded commotion levels, particularly at higher frequencies. Loss of hearing activated by working environment clamour is classified as an infection, since it happens insidiously after some time and is irremediable (Lindahl, 2008; Cax,

2015). Frequency rates including hearing misfortune are expanding (Ward, 2011). Besides, confined spaces, for example, compartments, barrels, tanks, wastewater absolute bottom and putting away or blending bowls utilized normally in bottling works, have the likelihood of activating disastrous wounds. Self-pushed materials-taking care of gear acts present a risk. Fork-lift trucks and related devices regularly bring about pounding wounds to passer-by, workers or to the operator (Lindahl, 2008). Production plants regularly involve cramped conditions as development of generation ability in existing offices happen. Brew production require unadulterated water and cooling frameworks. Synthetic concoctions often utilized to fulfil these prerequisites are chlorine and fluid anhydrous alkali, separately, and both are viewed as immensely deadly substances. Chlorine is regularly acquired and kept in pressurized metal chambers of different sizes. Wounds can occur amid changeover, starting with one canister then onto the next, or from a spilling or flawed valve. An incidental release of anhydrous ammonia can cause burns to the flesh and respiratory system on contact. An expansive, uninhibited release of anhydrous ammonia can result in air fixations sufficiently high to detonate in a fierce manner (Lindahl, 2008; Ward, 2011; Sahiri, 2015).

As said earlier, most brewing organisations lack environmental monitoring. Conducting environmental monitoring, particularly in the manufacturing area would have helped in identifying dangerous and harmless areas, especially for dust, vapour and gases on site (Sahiri, 2015). Dust cloud could be raised from deposits of dust on surfaces, cylinders and dividers, which eventually could lead to dust explosion (Lindahl, 2008). Grain dust is highly flammable and could burn or explode if enough is accumulated in the air or on a surface and finds an ignition source. Providing good ventilation would eliminate vapours, thereby reducing secondary explosion menaces in the brewing procedure (Ball, 2013).

Having effectual air circulation in the workplace and provision of hygienic amenities could help prevent barley itch, an infection triggered by a bug infiltrating the grain, especially for people working in the sector handling grains. Carbon-based dust poisonous disorder, different from hyper-sensitivity pneumonia, slimy membrane irritation and severe respiratory incapacity are established to be prevalent among brewery workers. Suffocation is likewise a main source of death in grain stockpiling receptacles. Riedel (2011) posits that, in 2010, 51 specialists were

overwhelmed by grain put away in containers and 26, in the long, run died. The report by Purdue University, referred to in Occupational Safety and Health Administration –OSHA- (2011), on grain dust eruptions, showed a more serious picture, involving deaths and extensive property destruction. Between 1976 and 2011, 503 grain dust blasts occurred in the United States resulting in 184 deaths and 677 workers being injured (OSHA, 2011).

Water or other liquids are commonly found in and around production area, making falls and slips on damp and slimy floors a common injury. Falls could also arise from moving about in the course of working on surfaces such as floors, machines, structures, unguarded holes, walls and floor openings, and ladders (Cax, 2015; Safety, 2016)

Identified Hazards and Preventive Measures

Manual handling is responsible for the greater part of the wounds in bottling works, hands are wounded, cut or punctured by barbed circles, chips of wood and broken glass. Feet are wounded and squashed by falling or moving barrels. Efforts should be put in place to prevent these wounds by appropriate hand and foot protection. Increment in mechanization and institutionalization of barrel size can lessen the lifting dangers. The back agony caused by lifting and conveying of barrels and other items, (Coreland, 2013; Executive, 2016) can be drastically lessened by training in sound lifting techniques. Mechanical dealing with pallets can likewise diminish ergonomic issues. Falls on wet and elusive floors are common. Non-slip surfaces and footwear, and consistent arrangement of cleaning, are the best safeguard.

Treatment of grain can produce grain tingle, caused by a vermin overrunning the grain. Factory workers asthma, known as malt fever, has been recorded in grain handlers and seen as an unfavourably susceptible reaction to the grain weevil (*Sitophilus granarius*). Manual treatment of hops can create dermatitis because of the ingestion of the resinous embodiments through broken or dried out skin. Preventive measures include great washing and sanitary facilities, productive ventilation of the workrooms, and medical supervision of the specialists. At the point when grain is malted by the conventional strategy for soaking it and after that spreading it on floors to bring about germination, it might end up polluted by Aspergillus Clavatus, which can create development and spore formation. At the point when the grain is swung to anticipate root

tangling of the shoots, or when it is stacked into furnaces, the spores might be inhaled by the labourers. This may create extraneous hypersensitive alveolitis (OSHA, 2011)

An investigation of organic dusts containing large amounts of endotoxin in two breweries in Portugal found the predominance of side effects of natural residue dangerous disorder to be 18% among brewing specialists. Mucous film irritation was found among 39% of the labourers (Carveilheiro et al., 1994). In an open population, the frequency of the infection is around 5%, and continued exposure produces extreme respiratory incapacity.

Apparatus risk are discovered where malt is put away in storehouses, and the opening is not secured. Traps in the adapting amongst belts and drums can be avoided by effective apparatus guarding. There should be a compelling lockout/tagout programme for upkeep and repair. Where there are walkways crosswise over or above conveyors, regular stop buttons should be given. In the filling procedure, serious injuries can be caused by blasting containers. In such cases, sufficient guards on the hardware and face monitors, elastic gloves, rubber-treated smocks and non-slip boots for the workers can prevent injury.

Owing to moist conditions, electrical fittings and hardware require exceptional protection. This applies especially to potable devices. Ground fault circuit interrupters ought to be installed in critical areas. Wherever conceivable, low voltages ought to be utilized, particularly for potable review lights. Steam is utilized broadly, and blisters and scalds happen. Therefore, slacking and protection of channels should be given, and security bolts on steam valves will avert unintentional discharge of burning steam.

Carbon dioxide (CO_2) is shaped amid aging and is available in maturing tuns, as well as vats and vessels that have contained lager. Convergences of 10%, regardless of whether inhaled just for a brief timeframe, produce blackout, asphyxia and even death. Carbon dioxide is heavier than air. Effective ventilation with extraction at a low stature is fundamental in all aging chambers where open vats are utilized. As the gas is subtle to the faculties, there ought to be an acoustic cautioning framework which will work promptly if the ventilation framework separates. Cleaning of limited spaces presents genuine risks, the gas ought to be dispersed by portable ventilators before labourers are allowed to enter. Safety belts helps. Respiratory defensive

equipment of the self-contained or provided-air type should be promptly accessible. A back-up worker should be posted outside for supervision and safeguard.

Gassing has happened amid relining of vats with defensive coatings containing dangerous substances, (Lindahl, 2008) for example, trichloroethylene. Safety measures should be taken against this. Refrigerant gases produced from chilling during the time spent cooling the hot wort before maturation and for capacity purposes, if released coincidentally, can create harmful impacts. Before, chloromethane, bromomethane, sulfur dioxide and smelling salts were used, but, the use of alkali is common now. Satisfactory ventilation and watchful support will forestall most dangers, Spill finders and independent breathing mechanical assembly should be provided.

In a few procedures, for example, clearing out squash tuns, labourers face hot, sticky conditions while doing their work. Instances of warmth stroke and warmth issues can happen, particularly among the recently employed workforce. These conditions can be anticipated by greater salt intake, satisfactory rest periods and arrangement and utilization of shower baths. Medical supervision is important to forestall mycoses of the feet (for instance, athlete's foot), which spread quickly in hot, moist conditions.

Temperature and ventilation control, with unique vapor steam removal, and the arrangement of personal protective equipment are imperative insurances, against mischance and damage as well as dangers of moist, warmth and cold. Control ought to be exercised to avert too much drinking of the product by the people employed, and elective hot beverages ought to be available at dinner breaks.

At the point when metal barrels supplanted wooden containers, breweries were faced with an extreme noise issue (Cax, 2015). Wooden containers made next to zero uproar amid stacking, taking care of rolling; yet metal barrels when empty make high noise levels. Present day robotized packaging plants create a significant volume of clamour. Noise can be moderated by the presentation of mechanical handling of pallets. The replacement of nylon or neoprene for metal rollers and aides can significantly decrease the noise level in the beer industry.

Safety Management and Accident Prevention in the Brewing Industry

Safety management and accident prevention is a very vital issue in the Nigerian brewing industry. Personal protective equipment (PPE) connotes preventive safety wears against incidence of injuries at work. The International Labour Organization (ILO) codes of practice specify and made it compulsory for employers to make provision for personal protective equipment suitable for the nature of work to be carried out. Safety wears are expected to be suitable and fit perfectly well for convenience. To ensure proper usage of safety equipment, there is need to study the nature and extent of the expected danger, select appropriate safety wears in conformity with the specified ILO standards. Operators need to be trained on correct selection, usage and ample maintenance of safety equipment after use.

Okoye and Okolie, (2014) claim that, unsafe conditions coupled with the use of improper safety wears, contributed to high rate of accidents in Nigerian industries. Similarly, Abdelhamid and Everett (2000) assert that, constant monitoring of compliance with safety equipment use and mounting all-inclusive procurement plan are the duties of safety department**.** It is the responsibility of management to train, monitor and enforce compliance with the use of safety equipment in ensuring workers' safety in brewing organisations. Krishnamurthy (2006) studied safety in high-rise design and construction. He found that workers unawareness, negligence, carelessness and over-confidence were the major perceived reasons workers ignore proper wearing of safety equipment.

Prasad and Rao (2013) also aver that safety can be accomplished through systematic approach (engineering controls, administrative controls and implementation of personal protective equipment usage) or hierarchy of control (elimination, substitution, isolation, administrative controls and personal protective equipment). The systematic approach to occupational health safety management system offers a better approach than the five traditional treatment options agitated by the hierarchy of controls.

Osonwa, Eko and Ozah (2015) carried out a study on utilization of safety wears among wood factory workers in Calabar municipality, Southern Nigeria. They established the fact that some of the reasons responsible for non-compliance with effective use of safety wears among the workers included the wrong notion that safety wears is not necessary, not adequate, and inconvenience.

Samples of Personal Protective Equipment for Brewery work.

The selection of appropriate safety wears depends on the anticipated risks. Some of the safety equipment for the brewery work include head protective wear, such as hardhat or helmet, safety glasses, goggles or face shield, body protective wears, gloves, respirator and safety foot wears.

Head Protective Wear

Safety helmets or hard hats is used to protect human head from injury of falling or flying objects, or due to striking against objects or structures. Most safety regulations include the use of safety helmet before workers or visitors are allowed to enter the brewing premises. The safety helmet has ribs reinforcement on top for additional strength, has an adaptable in-built safety eye shade, which can be easily pushed out of the way if necessary. The helmet is light and quite convenient. Makers of helmets have modified it in a way that face shields and ear protection may be attached without any difficulty. It also has a chin strap which is helpful, especially when work involves repetitive motions, such as bending and stooping, and helps hold the hardhat firmly to the head when full-face masks are worn.

Eye Protective Wear

Face or eye goggles, shield and other appropriate contraptions must be utilized when there is plausibility of physical dangers or the eyes are being exposed to confront damage from grain residue or flying particles, perilous substances, hurtful warmth, light and different dangerous work. There ought to be standard safety wears for respiratory protection, which could be a half-face cover with no shield. Both safety glasses/goggles and face-shields are suggested because of their transparency. It is not prudent to wear contact focal points in circumstances where labourers are to utilize unsafe compound. Face shields and goggles must be worn in circumstances where work activities, include flying particles or destructive materials are to be done.

Ear Protective Wear

Ear protective wear is useful for labourers that are greatly exposed to high noise levels, which could prompt touchiness. Noise decreases labourers' capacity to focus and hearing loss can prompt mishaps. Earplugs or muffs help when noise originating from a specific undertaking becomes agonizing and problematic, for example, working around heavy equipment and metal

barrels. Hearing protection devices must be utilized, particularly for people working in regions of high-volume pumps, power-drilling machines and along bundling lines.

Foot Protective Wear

The kind of safety shoes or boots to be used is determined by the nature of the work. Wet and slippery floors pervade the brewing industry. Boots that cannot be affected by chemicals are suggested for use in the brewing industry. The pant leg should be worn over the boots to stop water from entering into the boots.

Hand Protective Wear

Defensive gloves are highly suggested for a decent material sense, flexibility and aptitude; they also give vital chemical resistance. The gloves must have capacity to prevent puncturing, must not be dangerous, must be simple to utilize and easy to dispose of. They are made of, cotton, latex, nylon or leather. The suitability of the gloves to be used depends on the nature of work expected. The only place gloves may not be utilized are circumstances where the gloves may tangle with parts of the apparatus, for example, the moving conveyor. The hands are equally as vulnerable to contamination as the feet.

Body Protective Wear

Protective body wears in different styles and materials are readily available to guide against physical harm from dangerous substances, fumes, or smokes in the industry. The overalls could be made from materials that are disposable or durable ones. Poisonous vapour/gases necessitate comprehensive protection. The best is full compressing suits which must not allow any infiltration or pervasion. Fasteners must be properly closed and closures properly attached and taped up to guard against gases. Full compressing suits also entail the use of simple safety items, such as safety boots and helmet, together with respirator.

Breathing Protective Wear

An air-purifying oxygen mask is a defensive gadgets used to control air-borne noxious waste that cannot be reduced to safe levels by industrial control. It permits work to be carried out in restricted or confined places. An alternative escape route should also be combined with an air-purifying oxygen mask.

Ways of Upholding Safety Culture in the Workplace

There are six basic steps towards safety culture excellence in the workplace:

Reference point assessment – This involves carrying out a point of departure as regards the existing safety culture, stressing the strong points and prospects for improvement. Having done that, managers should fashion out vision and strategies for improvement and communicate it to all members of the industry.

Having a safety leader – A safety leader should be appointed and assigned with the responsibility of leading the Safety Culture ingenuity. He/She should be conversant with the prevailing safety programmes, awareness appraisals, result of the reference point assessment and strategies for improvement.

Workers' education – Suitable training sessions in line with safety culture improvement process should be regularly conducted. Such programmes could be, identifying hazard and risk assessment, critical error reduction modus operandi, reporting near misses and good catch and case investigation and root cause enquiry. The use of a skilled or professional safety expert is

required for such training programmes. Much more importantly, managers must make sure that all employees know how to identify probable harmful conditions, practices and behaviours in the workplace and how to use visuals, such as posters, flyers, booklets along with emails and memos.

Employee participation – This is the most important phase of sustaining a culture of safety. Getting and sustaining employee participation in safety could be done in the following ways:

- Device a 'Good Catch and Near Miss Process': All workers in possession of smartphones can easily record and send good catches or near misses to the appropriate personnel on the spot. This practical process allows workers to report hazards on time in order to get it corrected instantaneously.
- Personalize safety – Managers should make safety issue personal by letting the workers know how safety can impact positively on their families.
- Allow for workers' participation actively by seizing every opportunity to involve them particularly on their proficiency.
- Reward and recognition for workers – Prompt recognition should be done as soon as they contribute to safety excellence and managers should particularly note what they have done right and the positive effect their action has on safety.

EHS tools and applications – The use of ergonomically correct tools and office equipment, e-training methods, e-trending analysis and assessments must be encouraged.

Sustainability/ Continuous Improvement – Managers should reevaluate, quantify and amend, be aware of improvement and obstacles, respond appropriately, and be flexible to meet with the dynamism of change.

2.2.2 Visual-based Training and Safe Production among Workers in the Brewing Industry

The usage of visual aids for presenting, training and teaching has been in use since the 1920s, comprising primarily motion picture strips, images, glides and pass around objects. Visuals have constituted an significant part of teaching over the years and most educationists seem to agree

that using visual aids can help to improve teaching, as they help to portray the actual world into the classroom, making learning more meaningful, interesting and more exciting.

Raiyn (2016) investigated the effect of visual learning strategy on the improvement of logical thinking using visual presentations, such as images, diagrams, collaborative imitations and flow charts, and found a considerable effect of visual learning on the improvement of logical skills of the experimental group over the traditional learners. He concluded that visual learning apparatuses increased the learner's high-order-thinking skills, otherwise known as logical skills, and thereby could be said to offer better results than the traditional learning systems.

Abubakar (2015) also worked on the effect of instructional video utilization in enhancing learners' recall of concepts. He found a significant difference in the academic performance of learners in the experimental group and the control group after the use of instructional video. The study argued that the use of instructional video and other visual formats enhanced better academic performance of learners.

Bamford (2003) posits that visual literacy is the key to gaining facts, building awareness and fruitful educational results. Researchers have noted that the memory for verbal-picture blend is higher than memory for verbal presentation alone or for pictures alone which is denoted to be pictorial-superiority effect (Adam and Chambers, 1962; Harber and Myers, 1982; Petterson, 2004). More recent studies on visuals and words have indicated that memory for visual has a tendency to be superior to memory for words (Clark and Lyons, 2004; Eze 2005). Research on efficacious use of visuals in educational environment revealed that visuals are capable of improving learning, they can arouse learner's interest, curiosity and motivation (Mayer and Moreno, 1998; Anglin, Vaez and Cunningham, 2004). Williams (2009) posits that visual information is mapped better in students' minds. Other benefits include promoting creativity, serving as perceptual scaffolding and promoting artistic appreciation (Carney and Levin, 2002).

Another important thing to note is that visuals may help build mental models, and communicate connections between content objects in a more efficient way than can words alone (Clark and Lyons, 2004). Clark and Lyons (2004) asserts that over the span of learning, two sorts of recollections that are included, namely working memory and long-term memory. The new fact is deposited in the working memory, which is seen as the focal point of dynamic mental work,

including the learning. At the point when the visual and phonetic data is got then it is sorted out as a strong idea which must be joined with active past learning from long-term memory. The twofold recollections work together in integral ways, to form a modernized mental model that will be secured in long-term memory, where it lasts forever. The virtual limit of the working memory is related with the level of connection between the information of the long-term memory and the area examined. The more it is connected, the more is the virtual limit (Clark and Lyons, 2004).

As computer-based safety training is gaining recognition more and more, it is argued that, despite its benefits, workers whose ages are poles apart may benefit in different ways. Wallen and Mulloy (2006) found that both older and younger workers did best in the version containing writing with images and acoustic narration, while the older workers did poorly in the version without pictures and acoustic narration. They, therefore, concluded that pictures and acoustic narration may be beneficial for employees that are above 45 years of age.

Rokni and Karimi (2013) worked on the effects of visual materials in the form of representations, tangible matters and flashcards on EFL learner's vocabulary learning using 46 female students. Both groups, the experimental and control, were administered the pretest and posttest. During the eight-week training sessions, the experimental group was taught with visuals, while the control group was taught traditionally. They found that learning of words in the treatment group significantly increased more than in the control group. They concluded that visual instruction is an effective method for learning.

Furthermore, Okorie, Okolie and Ukar (2015), in their work on impact of illiterate rural migrant workers on the effectiveness of construction of safety induction, concluded that organisations have the duty to provide translating equipment or replace written manuals with clearly understood symbols or pictures, such as the use of audio visual and digital technologies as a medium of health and safety induction has improved learning and understanding among the illiterate rural migrant construction site workers. This is also buttressed in HSE (2008), which notes that an effective site health and safety induction training should incorporate modern technologies, such as audio- visual translators. Ngozi, Samuel and Isaac (2012) claim that audio-visual materials are very important and useful in education because they constitute equipment

through which functions and a balanced pattern from any preceptor mechanisms are stimulated by external occurrence.

In conclusion, using visual-based methods for safety training will go far in promoting effectiveness with consequent effects on safety knowledge, health and safety outcomes and adoption of safe production practices amidst the workers under study.

2.2.3 Job Tenure and Safe Production among Workers in the Brewing Industry

A few publications on working environment mishaps and safety management point to the expanding significance of workers' demographic factors, especially work tenure or experience (Paul and Maiti 2007). Work experience stands out amongst the most widely inquired about ideas in the organizational literature and one of the most pertinent characteristics for anticipating work performance. An extensive body of literature has linked work experience to a scope of organizational performance, including risk taking, mishaps analysis and safety management. In any case, most investigations have concentrated on experience cum performance relations.

Three levels of job tenure/ experience are referred to in this study- workers safety perception, their attitudes and compliance with safety procedures, and measures towards safe production and accident frequency. The three levels included short-tenured, for workers that have spent 1-5 years with the industry; medium-tenured, for workers that have spent between 6-10 years; and long- tenured, for workers that have spent 11 years and above with the industry under study.

While Zeitlin 1994, cited in Gyekye and Salminen (2010) observe safety consistence to be most prevalent among the inexperienced, Paul and Maiti (2007), found no such relationship. By means of multivariate strategy, they reported that the experienced, just like their inexperienced partners, are prone to ignore safety policies. Research on work experience and mishap rate is generally steady, with a couple of opposing findings. While a considerable part of research recognized that range of job experience was associated with decreased mishap rates (Barkan, Zohar and Erev, 1998; Siu, Phillips and Leung, 2004; Kecojevic, Komljenovic, Groves, 2007; Wu, Liu and Lu 2007; Fabiano et al., 2008), some studies found involvement to be decidedly connected to mishap recurrence (Hansen, 1989; Frone, 1994) Gyekye and Salminen, (2010). The basic reason for this opinion is the close link between experience and work requirements, which involve inordinate skillfulness, obligation and exposure to greater accident risk.

However, other studies have revealed that experience solely does not reduce accident frequency without taking cognizance of age (Gum& Ryan, 1994; Paul and Maiti, 2007). In an experimental study comprising three sets of workers with various experiences, working in the same location and exposed to the same condition in terms of ecological hazards, the correlation between accident frequency and work experience presented the shape of an inverted U (Keyserling 1983). Workers with the smallest amount of experience (probationary: 1-3 months' experience), and workers with the greatest experience (incumbents: 12 months' and over) had significantly less accidents than personnel with in-between experience (recent hires: 3-12 months' experience). Butani (1988), documented injuries among workers in the coal mining industry to be different more by experience than by age. They found that workers were encountering injuries at a similar recurrence level when assembled by age, yet not when gathered by experience. In the opinion of Paul and Maiti (2007), a worker that is less experienced is similarly prone to be harmed as an experienced one.

Gyekye and Salminen (2010) examined the effect of work experience on workplace safety, compliance with safety administration procedures and rate of accidents. They found a correlation between workers' level of experience and safe work practices. The more-experienced workers had more practical perceptions regarding safety than the less-experienced ones. The inexperienced workers, particularly those in their first year at the working environment, were the most noticeably bad culprits with regard to safety strategies, consistence with safety measures and mishap involvement rate. The observed positive association between experience and safety measures could be clarified by the idea of commonality and perceptions of dangers. Evidently, the long- tenured workers profited by their stay with the industries, had gained work-related and significant learning and the consciousness of the common safety culture within the industries. The basic knowledge which they possessed allowed them to be more compliant with safety policies. By contrast, short-term tenured workers with normative information, and less acquaintance with the work environment conditions were at a higher risk of showing unseemly and mistaken safety practices. They thus misjudged and violated organizational safety strategies and consequently recorded the greatest mishap involvement rate.

Thomas and Pozzebon (2002) claim that more experienced workers had less workplace injuries than the less experienced ones. However, Gershon et al (1999), had a contradictory view, noting that younger employees comply better with workplace safety regulations than older and more experienced ones. Oltedal and McArthur (2011) also found that workers with less than a one-year of experience had lower reporting frequency of unsafe work situations than the more experienced ones.

2.2.4 Education Level and Safe Production among Workers in the Brewing Industry

Safety is one issue that is of utmost importance to both workplace management and employees. Safe practices are those practices that prevent situations or conditions that might either inadvertently or by design cause harm, ill-health or death to workers in their workplaces. The provision of safety and health training to less-educated population of workers could be challenging. Several studies have established strong support for education level and perception of workers towards safety work practices. In a study conducted by Gyekye and Salminen (2009) on whether educational attainment has influence on workers perception of workplace safety using Ghanaian industrial workers as case study, the results indicated a positive association between education and safety awareness. Highly-educated workers had the best insights on safety, complied mostly with safety procedures and had the lowest accident involvement frequency record. Jitwasinkul and Hadikusomo (2011), as cited in Jitwasinkul, Hadikusomo and Memon (2016), also view learning as an important contributor in improving operators' knowledge and capability. Operators who have the essential awareness with respect to safe work behaviour demonstrate greater amenableness with safety guidelines and regulations.

Tounalum, Yingratana and Chantawong (2014), in a study conducted on safety behaviour of brewery workers using the health model belief, in Lao PDR, discovered that, out of 229 brewery personnel who had below university education, 125 (54.6) actually demonstrated good safety behaviours; while out of 87 personnel with university education, 67 (72.4) demonstrated good safety behaviours. The result revealed that there was a correlation between education qualification, accident, number of years on the job and the company's provision for individual protective equipments. The finding was also corroborated by similar studies (Viriya, 2008; Gyekye &Salminen, 2009; Lekcharoen, 2011).

Cooper and Phillips (2004) also reported that the awareness of personnel regarding the significance of safety training and safe practices at work could be applied as contributory to the predictive model of their actual safety behaviour level. When workers are under pressure to deliver or want to get the work done, there is possibility for them to neglect safety procedures (Ansah, 2012)

According to Fang et al. (2006), educational level of workers is a major issue in the way they safely go about their jobs. Accordingly, higher-educated workers comply with safety techniques better and record the least accident involvement frequency than less-educated employees. Geller (2005) aver that education empowers workers to understand better workplace safety policies and appreciate their roles in promoting health. To Geller, (2005), this appreciation enables such workers to contribute healthily to total workplace safety. Clarke (2008), also claims that education provides employees with suitable knowledge, methods and ways that are imperative for taking defensive procedures necessary to reduce injury occurrence at work. Besides, education increases workers' confidence to take actions necessary to prevent dangerous practices. These corrective actions contribute meaningfully to improving health and safety of the workforce.

In another study conducted by Shinar et al. (2001), on education level and safe work practices, a strong relationship was found between education and workers' safe work practices. Accordingly, workers with higher education had better work safety performance rate than those workers with less educational level. Likewise, Gaber and Abdul-Latif (2012), discovered that farmers with formal education practised safety better both during and after pesticides spraying than those farmers with no formal education. However, on the contrary, they did not find any significant difference between farmers with formal education and those without formal education regarding the use of personal protective equipment during and after spraying pesticides. They therefore contend that educational attainment alone is not significant in promoting the safety behavior of workers.

A study conducted by Cornelissen, Hoof and Vuuren (2014) is on the impact of motivation and ability in the design of safety instructions, enabling the workforce to perform their job in a safe manner. The study confirmed the correlation between knowledge, that is ability and safe work

practices, as shown in previous research (Zhou, Fang and Wang, 2008; Gyekye and Salminen 2009; Jiang,Yu, Li and Li, 2010).

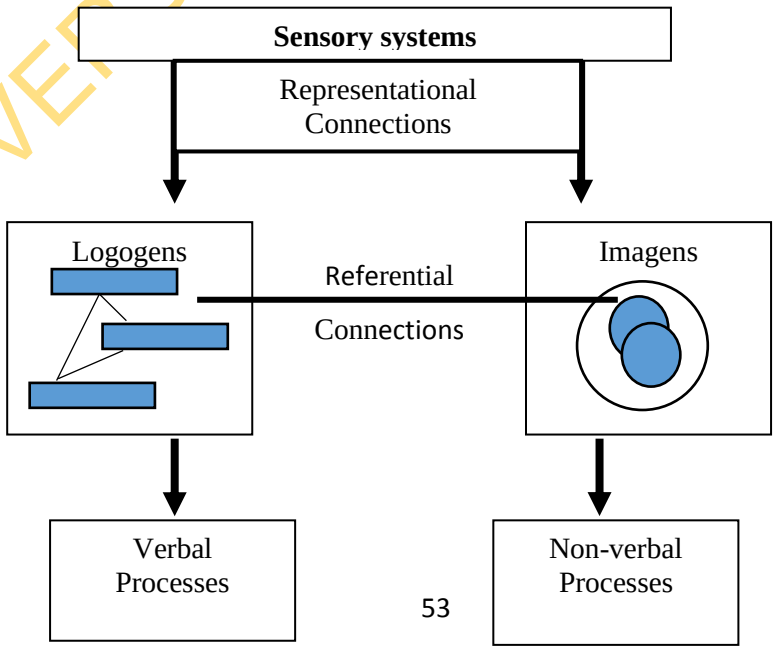
2.3 Theoretical Framework

The theoretical framework forms the basis for understanding, analyzing and designing ways to investigate the effect of the visual-based training method on safe production practices of workers in brewing industry. The theories adopted for this study were the dual-coding theory and the cognitive theory of multimedia learning.

The Dual- Coding Theory

The dual coding theory was proposed by Allan Paivio in 1986. The theory stresses that recall/recognition is improved when data is exhibited in both visual and verbal structure. The theory gives equivalent weight to verbal and non-verbal processing. Paivio (1986) argues that human insight is unmistakable in that it is capable of managing language with nonverbal items and events. Besides, the language framework is peculiar, in that it is fit for managing phonetic input and output (either in the form of speech or recorded as a hard copy), while in the meantime serving an allegorical capacity concerning nonverbal articles, events, and practices.

Figure 2.2: Dual Coding Theory



Source: Allan Paivio 1986 (Dual Coding Theory)

The assumption of this theory is that there are two cognitive subsystems, one specialized for the representation and processing of nonverbal objects/events (that is, imagery and pictures), and the other specialized for dealing with language. There are two different types of representational units: "imagens" for mental images and "logogens" for verbal entities, which he describes as being similar to "chunks". Logogens are organized in terms of associations and hierarchies while imagens are organized in terms of part-whole relationships.

Dual coding theory identifies three types of processing;

– Representatio-nal, which involves direct activation of verbal or nonverbal representations,

– Referential, that is the activation of the verbal system by the nonverbal system or vice-versa

–Associative processing, involving the activation of representations within the same verbal or nonverbal system. Any given task may require any or all of the three kinds of processing as the case may be; (The assumption in this theory is that there are two intellectual subsystems, one specific for the portrayal and handling of nonverbal items/events (symbolism and pictures), and the other particular for managing language. Paivio likewise proposes two distinct kinds of authentic units: "imagens" for mental pictures and "logogens" for verbal substances, which he portrays as being like "pieces", as depicted by Miller. Logogens are composed as far as affiliations and progressions, while imagens are sorted out as far as part-entire connections.

According to Paivio (1990), pictures and words have diverse intellectual portrayals. In this manner, the cerebrum utilizes separate memory frameworks for various sorts of data: verbal memory and picture memory. Verbal memory is identified with language frameworks, while picture memory incorporates illustrations, sounds, tastes, and nonverbal contemplations. Pavio showed that, when verbal data is obtained from tactile memory, it moves to verbal processors.

Similarly, when visual data is obtained, it moves from tactile memory to visual processors. The urgent point happens when data in either processor can enact the data in the other processor. For a word like "shrek", people who have viewed the motion picture with a similar name quickly reference a picture of a green beast. In this precedent, the individual recalls both the content and the picture since it is significant. Interestingly, for individuals who don't know Shrek, that word is more averse to trigger the picture processor. Therefore, it is difficult to recall.

Pavio's dual-coding theory is also appropriate when referring to the retrieval of information from memory systems. Paivio claims that memory is set up as a network with different paths, verbal and image, that lead to the same information. The more pathways learners use to remember information, the more learners can recall that information later on.

Furthermore, the theory explains part of the way the brain processes the new information (the input). As Paivio (1991) puts it, cognition is formed by two subsystems, a verbal one and a nonverbal one. The first is in charge of dealing directly with the language, and the second is specialized in dealing with non-linguistic objects and events. These two systems are assumed to work together in language acquisition. Therefore 'combining pictures, mental imagery, and verbal elaboration could be an effective method in promoting understanding and learning in learners. Pavio's theory is also relevant when alluding to the recovery of data from memory frameworks. He claims that memory is set up as a system with various ways, verbal and picture, that lead to a similar data. The more pathways students use to recollect data, the more fixes students can review that data later on.

The theory has been connected to numerous cognitive marvels including memory helpers, critical thinking, idea learning and language. It also represents the significance of spatial capacities in theories of intellect. Numerous experiments revealed by Paivio and others bolster the significance of symbolism in intellectual activities. In one analysis, members saw sets of things that varied in roundness (for example, tomato and cup) and were asked to demonstrate which part from the pair was rounder. The articles were displayed as words, pictures, or word-picture sets. The reaction times were slowest for word-word sets, halfway for the image word sets, and quickest for the image picture sets.

The Cognitive Theory of Multimedia Learning

Richard Mayer propounded the cognitive theory of multi-media learning in (1947). His multi-media theory was drawn on Paivio's Dual Coding Theory (1990), Sweller's Cognitive Load Theory (1994), and Bruner's Constructivist Theory. The code, also known as the "multi-media code", expresses that individuals will, in general, adapt best and more profoundly too from words and pictures than from words alone. This theory proposes three major suppositions concerning learning with mixed media:

1. There are two separate channels (sound-related and visual) for preparing data (now and again alluded to as dual-coding theory);
2. Each channel has a constrained (limited) limit (like Sweller's thought of Cognitive Load);
3. Learning is a functioning procedure of sifting, choosing, arranging, and coordinating data dependent on earlier information.

The assumption is that human beings have the capacity to process a partial volume of facts in a channel at a given period, and they rationalise received facts by vigorously forming psychological symbols or images. Mayer, in addition, highlighted the functions of three memory stores:

- Sensory memory store (where stimuli are received and stored within a very short period),
- Working memory store (where information is stored to form psychological paradigms (or "schema"), and
- Long-term memory store (the storehouse of all things learned).

Mayer's cognitive theory of multimedia learning explains that the mind is not capable of interpreting a multimedia presentation of verbal, images, and audio statistics exclusively but rather selects and organizes these elements dynamically to come up with logical mental paradigms. Furthermore, Mayer accentuates the significance of learning (in the light of testing of substance and showing the effective exchange of learning) when new data is combined with previous information.

This theory provides planned principles that include articulate verbal and pictographic information which guides the learners to pick pertinent words and images, and consequently reduces the burden for a lone processing passage.

In summary, the theory is based on three key norms:

– There are two separate channels (sound-related and visual) for preparing data.

– There is constrained channel limit.

– Learning is a functioning procedure of sifting, choosing, sorting out, and incorporating data.

The theory further proposes that self-motivated learning happens when a learner takes part in three intellectual procedures: choice / selection, organisation and incorporation / integration.

Choice / Selection: The student chooses pertinent words and applicable pictures for verbal presentation and visual processing respectively. Throughout the period of preparing lumped data, students need to choose applicable words and pictures to be put away in verbal and visual memory frameworks so as to overcome the confines of memory.

Organization: The student sorts out words into intelligent verbal models and composes pictures into the reasonable visual models. It is accepted that the more we consider and compose data in significant ways, the more such data is revised in our working memory, upgrading better review or maintenance. Our minds sort out new data in diverse ways. Some data might be masterminded sequentially, progressively, or erratically, as indicated by the idea of data; while some might be organized based largely on an individual's awareness and prior experience.

Integration: Students adapt better when parallel verbal and visual data are assembled in the light of the fact that they consider progressively significant learning. In a perfect world, when verbal and visual data are associated and connected with one another, thereby accepting verbal data and pictures simultaneously, the learner forms diverse methods of information at the same time.

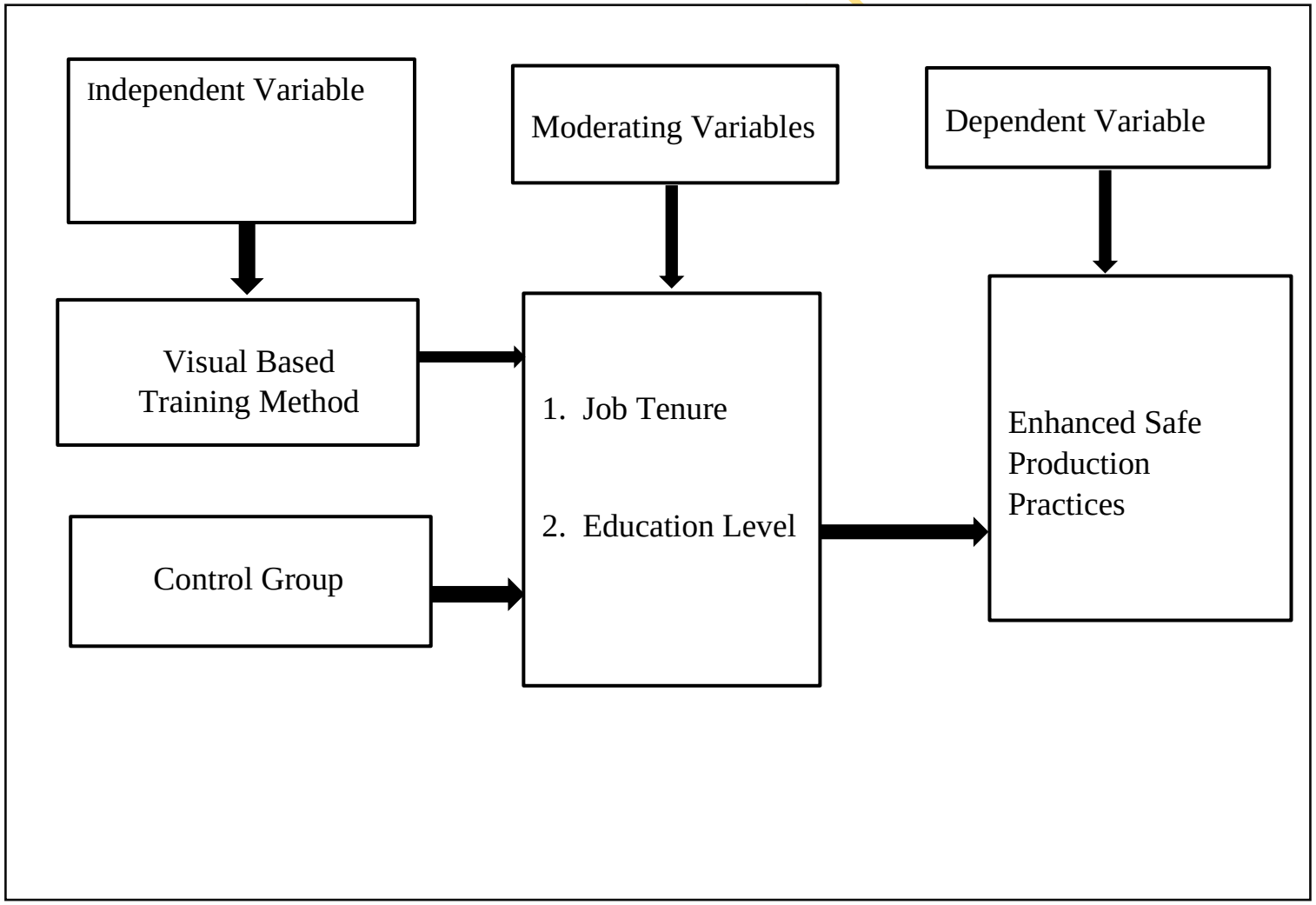
Relevance of the Theories to the Study

The dual-coding and the multimedia theories are particularly relevant to this study because both emphasize that adults learn best when information is presented in both verbal and visual forms.

Not only that, the theories emphasise engaging and challenging the learners in a training environment. The visual-based method is deeply rooted in the multimedia principles as trainers are expected to establishing connections between facts and tailor the responses of trainees towards selecting, organizing and integrating verbal and visual information to produce more meaningful learning. In addition, the theories emphasise the use of on-the-job training where learners are taught new information within the context of their working environment.

The framework for the study is presented below:

Figure 2.3: The Conceptual Framework for the Study



Source: Self Developed

From the model, the visual-based training method is the independent variable, which was the treatment package used in the study. The independent variable was manipulated by the researcher in order to examine its effect on the dependent variable, which was safe production practices. The moderating variables were job tenure and education level. The manipulation of the independent variable and the interaction with the moderating variables produced a resultant effect, which was enhanced safe production practices.

CHAPTER THREE

METHODOLOGY

This chapter discusses the methodology used in carrying out the study. It covers the following sub-headings: research design, population, sample and sampling technique, instrumentation, procedure, description of the sessions, control of extraneous variables and method of data analysis.

3.1 Research Design

The study adopted the mixed method of survey and the pretest-posttest, control group, quasi experimental design with a 2x3x3 factorial matrix. The 2x3x3 factorial design employed enabled the researcher to consider the effects of the moderating variables (job tenure and education level) alongside the effect of the treatment on the safe production practices. This is presented below:

TABLE 3.1: 2x3x3 Factorial Matrix

Treatments	Job Tenure									
	Short B1			Medium B2			Long B3			
	Educational Level									
	Least Educated C1	Moderately Educated C2	Highly Educated C3	Least Educated C1	Moderately Educated C2	Highly Educated C3	Least Educated C1	Moderately Educated C2	Highly Educated C3	
VBT A1	A1+B1+C1	A1+B1+C2	A1+B1+C3	A1+B2+C1	A1+B2+C2	A1+B2+C3	A1+B3+C1	A1+B3+C2	A1+B3+C3	
Control A2	A2+B1+C1	A2+B1+C2	A2+B1+C3	A2+B2+C1	A2+B2+C2	A2+B2+C3	A2+B3+C1	A2+B3+C2	A2+B3+C3	
Total										

Key:
A1 = Visual-Based Training Method Group
A2 = Control Group
B1 = Short tenured
B2 = Medium tenured
B3 = Long tenured
C1 = Least Educated
C2 = Moderately Educated
C3 = Highly Educated
The rows comprise the treatment group (the Visual-Based Training Method) and the control group, while the columns contain job tenure at three levels (short-tenured, medium-tenured long-tenured) and education level at three levels (least-educated, moderately-educated and highly-educated

3.2 Population for the Study

The population of the study comprised all workers in the production units (the brew house, packaging and engineering) including the frontline managers and or unit supervisors in the brewing organisations in Southwestern Nigeria. All the workers, both permanent and temporary, that were involved in the production process were included.

3.3 Sample and Sampling Technique

The purposive sampling technique was used to select two reputable brewing organisations in Southwestern Nigeria. These brewing organisations were then randomised into both experimental and control groups. The International Breweries PLC, Ilesa was used as experimental group, while the Nigerian Breweries PLC, Ibadan was the control group. Fifty-four (54) and forty-five (45) workers were, respectively, selected from each brewery to give a total of ninety-nine (99) for the treatment. At the end of the training, forty-six (46) and thirty-two (32), making a total of seventy-eight (78), remained and participated in the posttest exercise. The employees of the two organisations that met the inclusion criteria were used as participants and assigned to the treatment and control groups.

Inclusion Criteria

The inclusion criteria for the study were:

1. Participants should be workers in the selected organisations.
2. Participants should be fully involved in the production process.
3. Participants should be ready and willing to participate fully and actively in all the activities and training processes throughout the period of study.

3.4. Instrumentation

A total of five instruments were used in this study:

(1) Safe Production Practices Questionnaire:

The Safe Production Practices Questionnaire was a self- structured assessment scale that contained demographical information items, such as age, educational qualification, job tenure and other relevant information in the first section. Section two contained items on safe production practices, specifically on workers' attitudes and disposition towards safety at work, level of compliance with safety rules and usage of personal and other protective equipment. It was designed on the 4-point Likert scale format of Most Regularly (MR), More Regularly (OR) Regularly (R) Not Regularly (NR). Section three focused on items on hazards management and control, designed on the 4-point Likert scale format of Strongly Agreed (SA) Agreed (A) Disagreed (D) and Strongly Disagreed (SD) and contained 29 items altogether.

(2) Knowledge, Attitude and Management of Brewing Safe Practices Questionnaire:

This was a 10-item self-structured instrument that contained questions determining the general knowledge of workers with regard to the potential hazards that are associated with brewing jobs. It was designed on the 4-point Likert scale format of Strongly Agreed (SA) Agreed (A) Disagreed (D) and Strongly Disagreed (SD).

(3) Key Informant Interview

The qualitative method of key informant interview was used to complement the quantitative method. This was carried out with the key officials in the breweries, such as human resource persons, the safety controller and supervisors in the production units.

Key Informant Interview Guide

The following subthemes served as guidelines for discussions with the Human Resource / Personnel Managers and Frontline Managers in the brewing organisations.

- The nature of unsafe production practices
- The knowledge and attitude of both the management and workers towards these unsafe practices
- The extent that these unsafe practices affect workers health and the productivity in the industry
- Management of unsafe practices among workers

- Enforcing compliance with safety measures
- Conduct of safety meetings and workers involvement
- Regular inspections of the workplace
- Provisions of Personal Protective Equipment

(3) In-depth Interview: This was also conducted with selected workers, such as unit leaders and workers' representatives in the three units, brewing house, packaging and engineering. There were two sessions each for both key informant interview and in-depth interview.

In- Depth Interview Guide

The following subthemes served as guidelines for discussions with unit leaders and workers' representatives in constituted committees.

- Their knowledge of the hazards associated with their jobs in the industry
- Their attitudes towards unsafe practices
- Their involvement in the health and safety programmes of their industry
- Their level of awareness as to their rights in the industry.
- Involvement at safety meetings
- Use of Personal Protective Equipment

(5) The Visual-Based Training Guide

The visual-based training guide used in training the workers was self-developed.

Validity of the Instruments

The instruments were given to experts in the field of Industrial Relations, experts in measurement and evaluation , the researcher's supervisor as well as the training managers and trainee apprentices in the brewing organisations under study to ascertain the content validity and other errors. All corrections relating to spelling mistakes and ambiguous statements were effected appropriately before the instruments were administered to the participants.

Reliability of the Instruments

A pilot study was conducted before the main study. Twenty-five male and fifteen female workers in Premier Brewery, Onitsha, Delta State, Nigeria were used for the pilot study. The researcher personally, with the assistance of the training manager, administered the two sets of questionnaire at the first instance and went back after four weeks to re-administer the same instruments. The reliability of the instruments was measured by a test-retest method and

Cronbach alpha value of 0.78, 0.74, 0.78 and 0.77 were obtained. These figures were considered adequate to say the instruments were reliable.

3.5 Procedure for the Study

The researcher obtained a letter of introduction from the Department of Adult Education, University of Ibadan, which was presented to the Human Resource Persons of the organisations selected for the study. The researcher was introduced to the workers in order to establish rapport between them after seeking permission from necessary quarters. The workers were educated on the purpose, procedure and duration of the study and the need to have them cooperate and participate actively and effectively towards a successful conduct of the study. Ideas that could help in carrying out the study effectively were also sought from the key officials, especially considering the work schedule of brewery workers.

Four research assistants were trained to assist in the course of the study. Two for the experimental group and two for the control group. The participants in both groups were made to undergo a 2-hour training session per week spanning a period of eight weeks. The experimental group was exposed to a pretest and a training programme on safe production practices using the visual-based training method, while the control group was exposed to a pretest and a totally different training programme (building leadership skills training) using the traditional method of teaching. For the pretest data, general information about the participants and the accident and illness frequency records were collected alongside the questionnaire. Details of the visual-based training method procedures are outlined in the appendices. The researcher also performed post-training observation eight weeks after the treatment to ascertain the effectiveness of the training programme.

3.6. Description of the Sessions

The guide for the treatment condition used in training the workers was also self-developed. The visual-based training method package, which contained the instructions on implementation of the procedural layout, was implemented by the research assistants that handled the interactions. There was one experimental group and one control group. The training package on safe production practices used on the experimental group was based on the visual-based training method while the control group was exposed to leadership skills training programme based on

the traditional lecture method. The researcher, with the help of four research assistants previously trained by the researcher, conducted the training.

Table 3.2: Description of Sessions

TIME DURATION	TEACHING CONTENT / ACTIVITIES	VISUAL-BASED TRAINING GROUP	CONTROL GROUP	
1st Week 2 hours	OPENING SESSION • Prayers • Self-Introduction by Participants • Setting of rules Opening Remarks Objectives Pre-Test Administration			
2nd Week 2 hours	SESSION TWO • Definition of key concepts, e.g; work accidents, workplace safety, safety, hazards, safe practices • Overview of safe production practices.	Flash cards showing each of the concepts, explanations and project displays of accidents victims	Definition of concepts such as leader/leadership, vision, trust and work climate	Traditional lecture method
3rd Week 2 hours	SESSION THREE Accidents in the Breweries • What is an accident? • Types of accidents • Causes of accidents	Flash cards showing types, causes and graphic displays of accident scenes on the projector	Five phases of leading staff through change	Traditional lecture method
4th Week 2 hours	SESSION FOUR Awareness of Hazards/Risks • Hazards in brewing • Ergonomics, Physical, Confined Spaces and Explosion hazards • Safe Practices	Visual-based Training Sessions Flash cards, photos and Picture illustrations of hazards and suggested safe practices	Leadership competences; list of leadership styles and description of leadership competences	Traditional lecture method

5th Week 2 hours	SESSION FIVE Awareness of Hazards/Risks • Hazards in brewing ctd. • Chemical, thermal, kegs Safety, Noise, PIT/ Mechanical hazards, Head injuries and cuts • Safe Practices	Visual-based Training Sessions flash cards, photos and picture illustrations of hazards and suggested safe practices	Building vision and trust; criteria for inspiring vision and building trust	Traditional lecture method
6th Week 2 hours	SESSION SIX Management of Hazards • Eliminating, isolating, minimizing & Monitoring hazards • Proactive approaches- safety meetings/ job hazard analysis	Visual-based Training Sessions Explanations and picture illustrations of hazard management and suggested safe practices	Recognition and motivation: five ways of motivating staff.	Traditional lecture method
7th Week 2 hours	PLENARY SESSION	Summary and general discussions on safe production practices and accident and illnesses prevention	Improving work climate through good leadership; General discussions	Traditional lecture method
8th Week 2 hours	CONCLUSION	Lesson learnt and Post-Test Administration	Lesson learnt and Posttest Administration	Post Test Administration

3.7. Control of Extraneous Variables

Extraneous variables are factors, apart from the independent variables, that might affect the dependent variable and which are not intended for consideration in the study. The participants were assigned into groups randomly and separate industries were assigned to both experimental and control groups in the study to avoid possible interference.

3.8 Method of Data Analysis

The descriptive statistics of percentages, standard deviation and frequency counts were used to analyse the demographic characteristics of the participants collected, while inferential statistics of Analysis of Covariance (ANCOVA) was used to test the hypotheses at 0.05 level of significance. The in-depth interview (IDI) and the key informant interview (KII) data were subjected to content analysis.

CHAPTER FOUR

RESULTS AND DISCUSSION OF FINDINGS

The study was carried out to determine the effect of the Visual-based training method on safe production practices in the brewing industry in southwestern Nigeria. Data were collected through pretest and posttest performance of the participants following their exposure to the treatment. The data are presented in frequency distribution tables, charts and cross-tabs, using Analysis of Covariance. Where appropriate, the quantitative and qualitative results are discussed together.

PRESENTATION OF RESULTS

4.1. Descriptive statistics of demographic variables

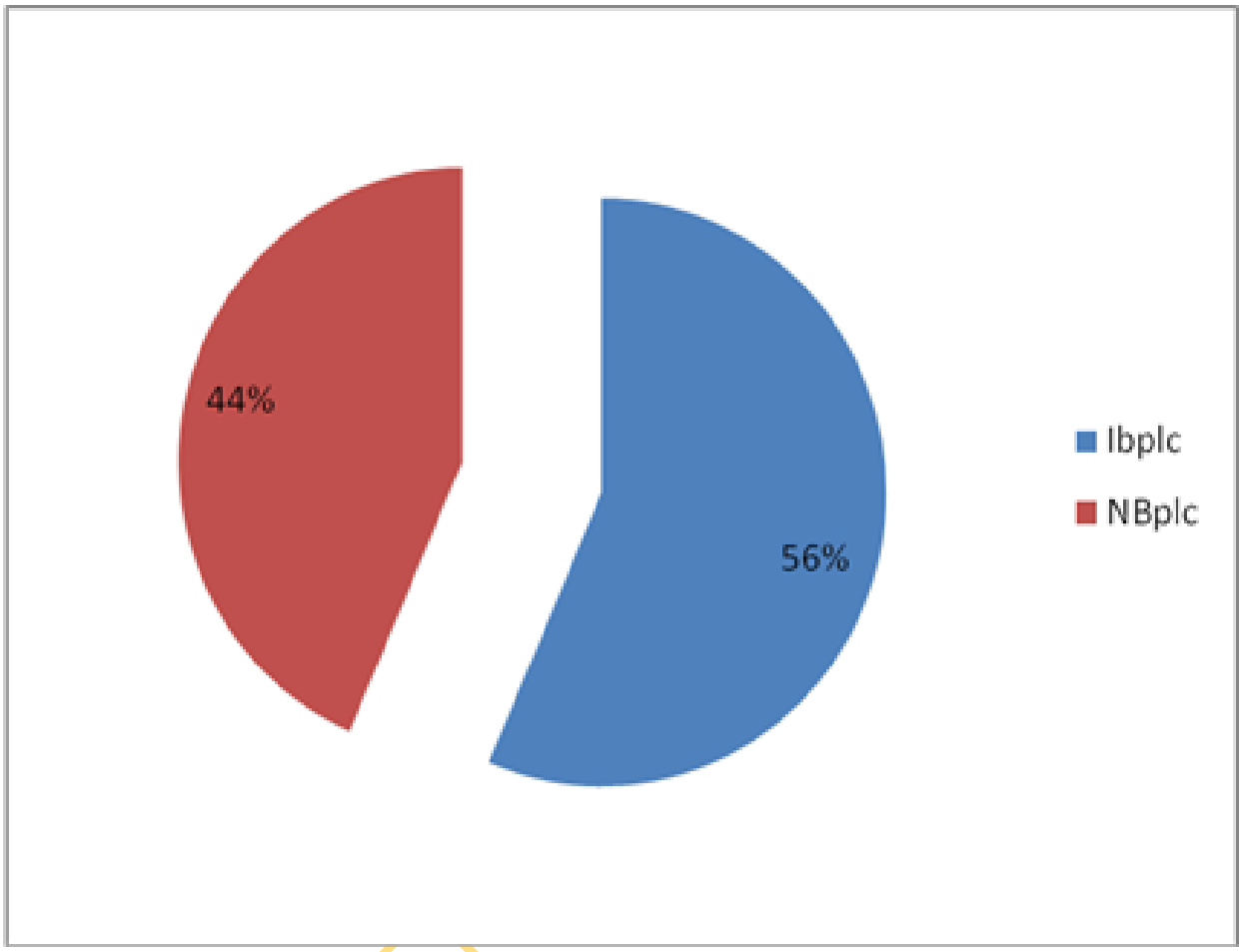


Figure 4.1.1: Group Distribution of Participants

The result in figure 4.1.1 showed that 56.0% of the respondents were from the experimental group (International Breweries PLC. IBPlc) while the remaining 44.0% were from the control group (Nigerian Breweries PLC. NBPlc). This indicates that the majority of the respondents were from the experimental group.

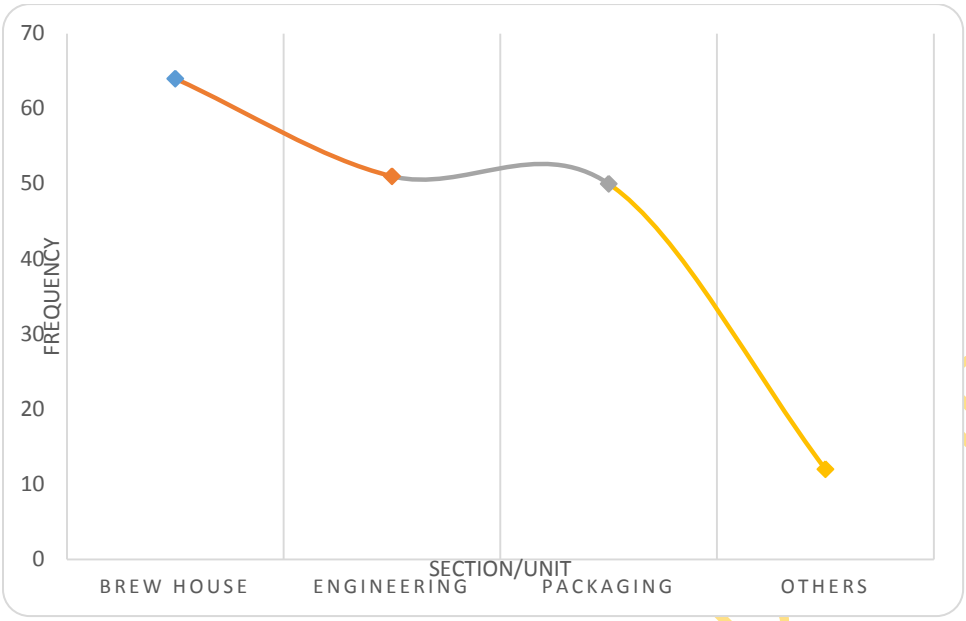


Figure 4.1.2: Participants in Each Section/Units

Source: ***Field survey, 2017***

The result in figure 4.1.2 indicated that 36.3% of the respondents were from the brew house, 28.8% from engineering, 28.2% from packaging and 6.7% were from other units. This showed that the training participants cut across production units, with the majority coming from the brew house.

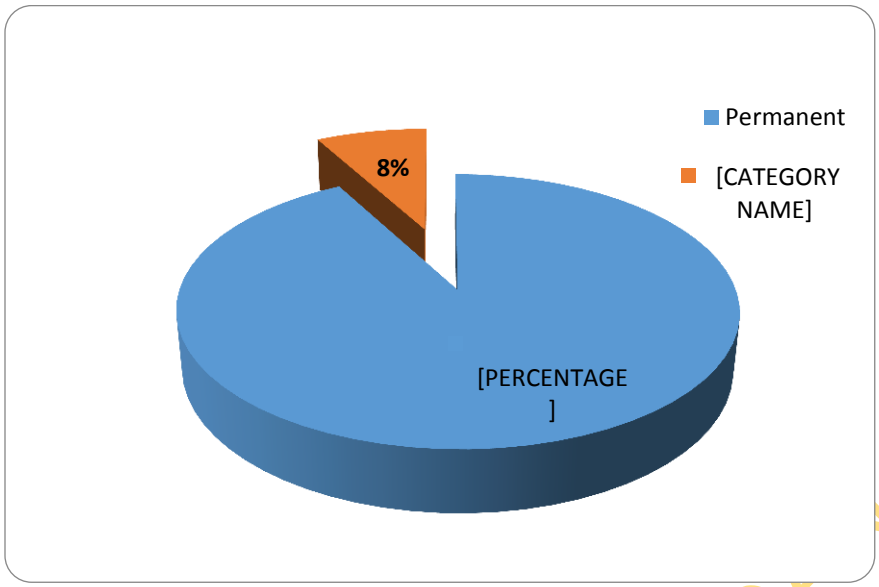


Figure 4.1.3: Nature of Employment of Participants

Source: ***Field survey, 2017***

Figure 4.1.3 reveals that the majority 92.0% of the respondents were on permanent employment, while only 8.0% were on temporary employment. This showed that a larger percentage of the workers in the brewing industry were on permanent employment.

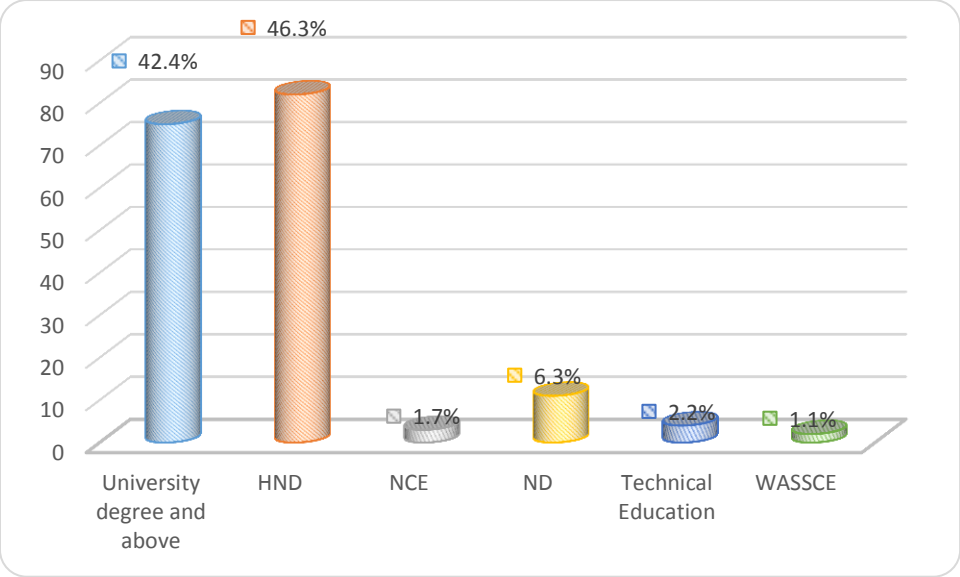


Figure 4.1.4: Education Level of Participants

Source: ***Field survey, 2017***

As seen in figure 4.1.4, 42.4%% of the respondents had university degree and above, 46.3% had Higher National Diploma (HND), while 6.3% had National Diploma (ND). Also, 2.2%, 1.7% and 3.7% had Technical education, Nigerian Certificate in Education (NCE) and West Africa Senior Secondary Certificates (WASSCE), respectively. This showed that the majority of the respondents had HND, university degree and above, and so had the requisite knowledge required in the industry.

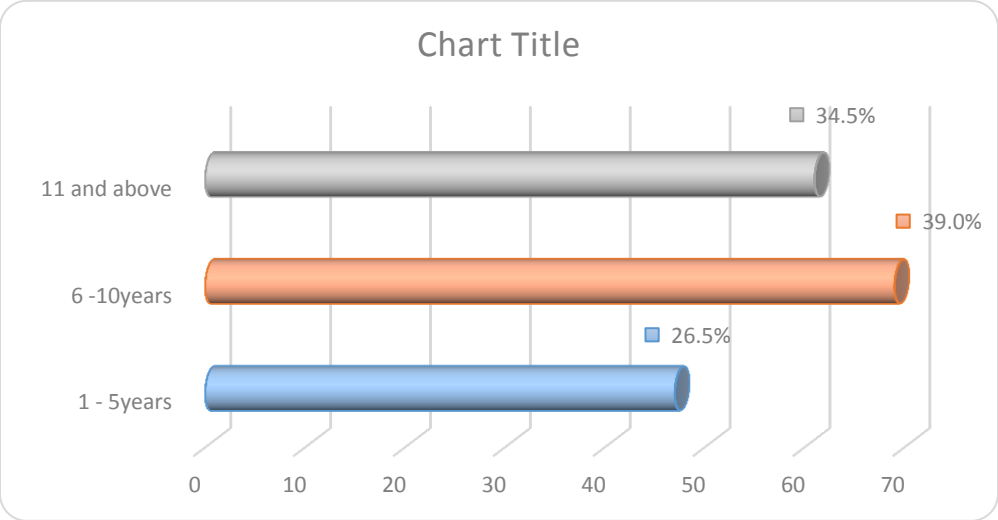


Figure 4.1.5: Participants Years on the Job

Source: ***Field survey, 2017***

As captured in figure 4.1.5, the respondents' years on the job are as follows: 39.0%, 6 -10 years; 34.5%, 11 years and above; and 26.5%, 1 - 5 years. This indicated that the modal year on the job of the respondent was 6 - 10 years. This showed that the respondents had stayed long on the job to understand safe production practices and the importance of adhering to laid-down standard operational procedures in the brewing industry.

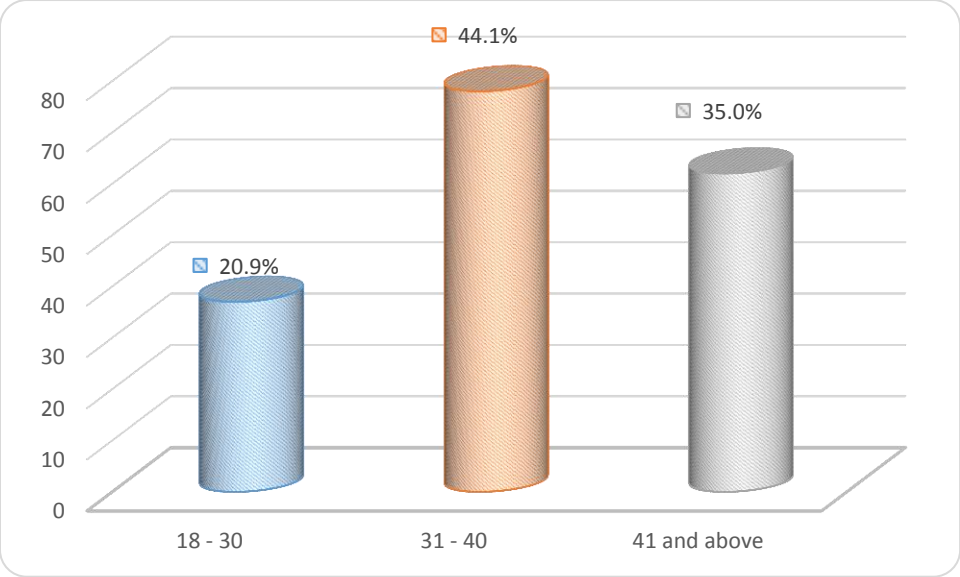


Figure 4.1.6: Participants Age - Group

Source: ***Field survey, 2017***

The result Figure 4.1.6 showed that 44.1% of the respondents were within the age range of 31-40 years, 35.0% were within the age range of 41 years and above; while the remaining 20.9% were within age range of 18 - 30 years. This showed that the modal age of the respondent fell within age 31 - 40 years. The respondents were mature and old enough to understand issues relating to safe production practices in the brewing industry.

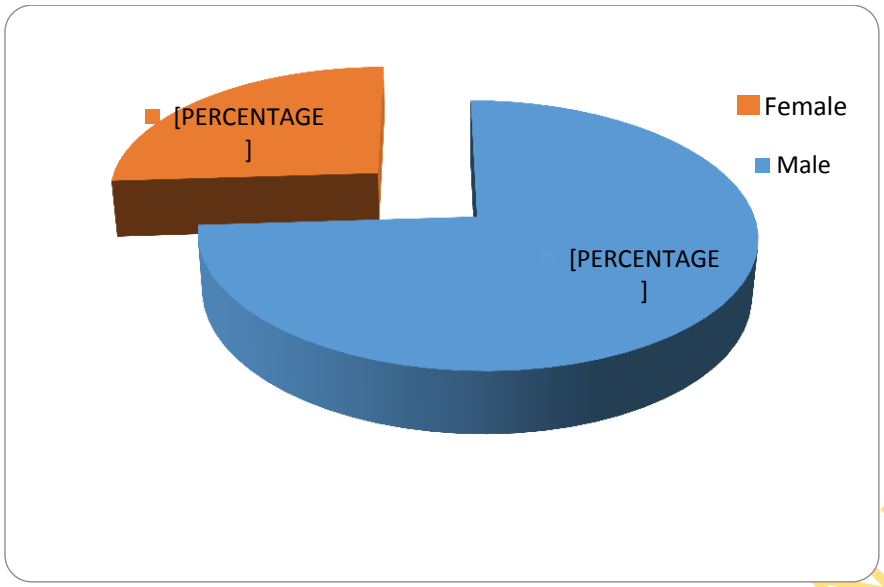


Figure 4.1.7: Participants Gender

Source: ***Field survey, 2017***

Figure 4.1.7 indicates that the majority (74.0%) of the respondents were male, while the remaining 26.0% were female. This showed that most of the respondents were male.

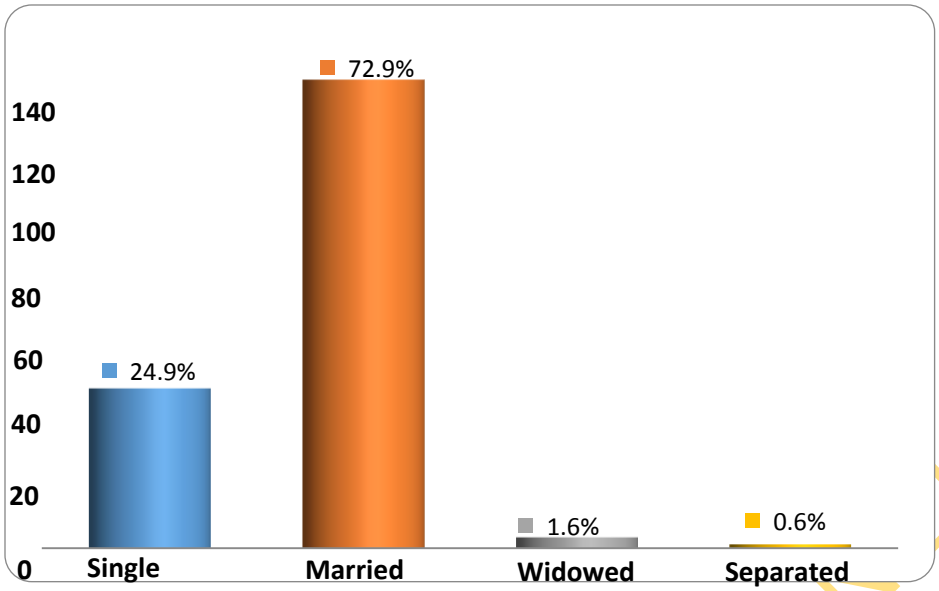


Figure 4.1.8: Participants Marital status

Source: ***Field survey, 2017***

As seen in Figure 4.1.8, the majority (72.9%) of the respondents were married, 24.9% were single, while 1.6% were widowed and only 0.6% was separated. This showed that most of the respondents were married and could be regarded as responsible adults who understand that any occurrence of fatality will have a spiral effect not only on them, but also on their families.

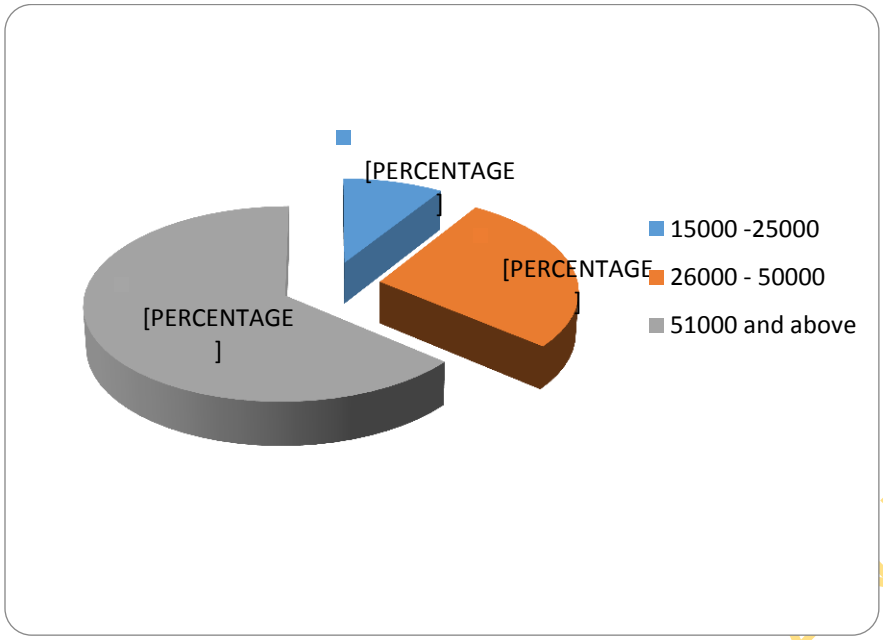


Figure 4.1.9: Participants Monthly Salary/Income

Source: ***Field survey, 2017***

The result on Figure 4.1.9 showed that 64.0% of the respondents collected ₦51000 and above income per month; 27.0% collected between ₦ 26000 and ₦ 50000; while only 9.0% collected between ₦ 15000 and ₦ 25000 per month. This indicated that most of the respondents had a take-home pay of ₦ 51000 and above every month.

4.2 Research Questions

This section discusses the analysis of results obtained as well as the content analysis of the key informant interview and the in-depth interview conducted among the key officials and workers' representatives in the brewing organisations.

Research Question One: What is the nature of unsafe production practices in the brewing organisations?

Table 4.2.1: The Nature of Unsafe Production Practices within the Brewing organisations

Items	MR (%)	OR (%)	R (%)	NR (%)	Mean	SD
I wear bump cap at the bottling line to prevent head injuries.	(36.7)	(12.5)	(7.9)	(42.9)	**2.6**	**1.36**
I have appropriate information on the selection of personal protective equipment.	(23.2)	(11.3)	(9.0)	(56.5)	**2.9**	**1.27**
I can identify safety symbol on sign post and use it to avoid workplace hazard.	(2.8)	(16.4)	(17.5)	(63.3)	**3.4**	**0.86**
I am always careful in putting bottles into a moving conveyor to avoid being dragged into the machine.	(15.8)	(14.7)	(10.2)	(51.3)	**3.1**	**1.17**
I avoid lifting heavy objects alone to avoid ergonomics problem.	(24.9)	(13.0)	(15.3)	(46.9)	**2.8**	**1.26**
I always implement general housekeeping procedures.	(25.4)	(10.2)	(13.6)	(50.8)	**2.9**	**1.28**

Source: ***Field survey, 2017***
MR = Most regularly, OR = More regularly R = Regularly, NR = Not regularly
IBplc= International Breweries, NBplc= Nigerian Breweries

The results in Table 4.2.1 revealed the nature of unsafe production practices sampled. The result revealed 42.9% with the mean and standard deviation value of 2.6 ±1.36 as not wearing bump cap at the bottling lines to prevent head injuries; 56.5% with the mean and standard deviation value of 2.9 ±1.27 as not having appropriate information on the selection of personal protective equipment; 63.3%, with the mean and standard deviation values of 3.4 ±0.86 as not being able to identify safety symbol on sign post and use it to avoid workplace hazard; 51.3%, with the mean and standard deviation values of 3.1±1.17, as not carefully putting bottles into moving conveyor and avoid being dragged into the machine; 46.9% with the mean and standard deviation values of 2.8 ±1.26 as not avoiding lifting heavy objects alone to avoid ergonomics problem; and 50.8% with the mean and standard deviation values of 2.9±1.28 as not always implementing general housekeeping procedures. By implication, the above results showed the nature of unsafe practices particularly on the part of workers as: failure to use bump cap regularly at the bottling lines to prevent head injuries, inability of majority of them to identify safety symbols on signpost and use it to avoid workplace hazards, demonstrating carelessness in the course of putting bottles into a moving conveyor and trying to lift heavy objects alone not minding the ergonomics hazard involved.

On the part of the management, the results showed that most workers did not have appropriate information on the selection and maintenance of personal protective equipment and poor implementation of general housekeeping procedures, making the physical environment unfavourable for workers. Generally, the above results showed that the majority of the workers did not follow the standard operation procedures and did not use protective equipment most times.

The report from the key informant interview and in-depth interview further revealed the nature of unsafe practices among workers, and that, despite the efforts of the management in enforcing compliance with safety measures, some still demonstrate nonchalant attitudes at times. This is noticeable in areas such as not complying with the standard operation procedure (SOP), especially when on night shifts, occasional neglect of appropriate personal protective equipment for the plant job, use of mobile phones during work, which may cause distraction, not using the designated walkway; and not carrying out proper safety audit before using machinery, which is particularly dangerous because there are safety devices on the machine and a worker is supposed

to do safety audit before usage. Most times, workers will just mark the audit forms without checking the machine, which may result in serious accident. Others include not checking the oxygen level in the confined space to ensure its suitability for the work to be done; and using tissue papers or handkerchiefs instead of nose masks and respiratory protector, especially those working in the milling areas. Other unsafe practices include working at unsafe speed or taking a shortcut by not following the laid-down operational standard in order to meet the set target; over confidence which can be dangerous at times when a worker feels he has been doing the job repeatedly over years and assumes nothing can go wrong; not obtaining safety permit before entering a confined place for proper check of the oxygen content; and not using the horn, especially in blind areas, when using the forklift or driving trucks within the work premises.

Much more importantly, is failure to use the complete safety attire and other personal protective equipment. Some workers deliberately ignore the use of safety clothings as well as personal protective equipment, under the pretext that it is not convenient, which may in turn, endanger their lives, and those around them.

Research Question Two: To what extent would these unsafe production practices affect the workers' in the brewing organisations?

Table 4.2.2: The Effect of Unsafe Production Practices on the Workers within the Brewing organisations

Items	SA (%)	A (%)	D (%)	SD (%)	Mean	SD
Physical hazard such as falls and slips on wet floors.	(69.5)	(26.0)	(3.4)	(1.1)	**3.6**	**0.61**
Exposure to mechanical hazards resulting in cuts and other injuries.	(59.3)	(31.1)	(9.0)	(0.6)	**3.5**	**0.68**
Hearing loss from increased noise levels from high- speed equipment and metal barrels.	(49.2)	(36.7)	(13.6)	(0.6)	**3.6**	**0.73**
Unsafe actions and practices constitute hazards.	(60.5)	(23.7)	(11.3)	(4.5)	**3.6**	**0.63**
Awareness of common ergonomics problems.	(58.2)	(22.0)	(15.8)	(4.0)	**3.3**	**0.89**
Chemical hazard such as chlorine, anhydrous - ammonia, acids, caustics, refrigerant oil can cause serious health problems.	(57.6)	(26.0)	(11.9)	(4.5)	**3.4**	**0.86**

Source: ***Field survey, 2017***
SA= Strongly Agree, A = Agree D = Disagree, SD = Strongly Disagree

The results in Table 4.2.2 showed the extent to which the unsafe practices sampled revealed could affect workers. A total of 69.5% with mean and standard deviation values of 3.6 ±0.61 agreed that physical hazard, such as falls and slips on wet floors could affect the workers, (59.3%) with the mean and standard deviation values of 3.5 ±0.68 agreed with the fact that exposure to mechanical hazards results in cuts in head, body and other injuries; 49.2%, with the mean and standard deviation values of 3.6 ±0.73, also agreed that hearing loss could arise from increased noise levels from high-speed equipment and metal barrels; 60.5%, with the mean and standard deviation values of 3.6 ±0.63 agreed that unsafe actions and practices could constitute hazards; 58.2%, with the mean and standard deviation values of 3.3 ±0.89 also agreed that ergonomics problem is common, such as severe waist pain; and 57.6%, with the mean and standard deviation values of 3.4 ±0.86 agreed that chemical hazard, such as chlorine, anhydrous -ammonia, acids, caustics, refrigerant oil, can result in serious health problems.

Therefore, the consequences of unsafe production practices in the brewing organisations are enormous including falls and slips on wet floor, hearing impairment due to increased noise levels. Exposure to chemicals and acids can cause serious health problems, such as lung diseases and respiratory tract infections, burns, eyes and other body injury. Also included are mechanical hazard that leads to physical damages to the body and dust hazard that can cause or lead to asthma. Others include fatigue, permanent physical disability or worse, death. All the brewing workers strongly agreed to and recognized all these as effects of unsafe practices on them.

Each unsafe action has its accompanied effect. For example, not implementing general housekeeping procedures, such as keeping the floor clean and dry regularly, might constitute physical hazard, which may result in falls and slips; dust and gas, if not constantly removed, might affect the workers, as they may develop respiratory tract infections and other lung diseases. Besides, unsafe actions, like not wearing bump caps at the bottling lines, could result in head injuries and cuts. Carelessly putting bottles in a moving conveyor constitute mechanical hazard and could result in a worker being dragged into the machine, leading to injury. Carrying or lifting heavy load or objects could lead to severe waist and body pain. Inadequate information or occasional neglect as to the use of safety equipment, such as earmuffs, nose mask, hard hat, goggles, safety attire and others may lead to wrong usage and may cause burns from chemical spills, hearing loss as a result of increased noise level, asthma, permanent disability and others.

The report gathered from the key informant interview and the in-depth interview further revealed that, apart from the above listed effects of workers' unsafe practices, which include sustaining head injuries or other body injuries if dragged into a moving conveyor, and ergonomics problems from bending and lifting, fatality, disability, lung disease and respiratory problems, consequences of unsafe practices are categorized into four in the industry. These are (a) Lost Time Injury (LTI), which include fatality and disability; (b) Modified Duty Injury (MDI), which include severe injury; (c) Medical Treated Injury (MTI), such as emission of dust and chemicals leading to different diseases, such as lung disease, and other respiratory problems, especially for those working in the milling sections; and (d) First Aid Injury (FAI), which includes just minor cuts, injury to hands and skin, burns fatigue and risk of fire. Other consequences include suffocation in a confined space if the oxygen content is not properly checked.

Research Question Three: What is the knowledge and attitude of both the employees and management towards safe production practices in the brewing industry?

Table 4.2.3a. The Knowledge of Safe Production Practices in the Brewing Industry

S/N	Items	Mean	Standard deviation
1	Wearing bump cap at the bottling lines to prevent head injuries	2.6	1.36
2	Having appropriate information on the selection of personal protective equipment	2.9	1.27
3	Always implementing general housekeeping procedures	2.9	1.28
4	Always careful in putting bottles into moving conveyor to avoid being dragged into the machine	3.1	1.17
5	Avoiding lifting heavy objects alone to avoid ergonomics problems	2.8	1.26

Source: ***Field survey, 2017***
IBplc= International Breweries, NBplc= Nigerian Breweries

The results in Table 4.2.3.a revealed that the knowledge of safe production practices in the brewing industry was very high. The mean and standard deviation values of 2.6 ±1.36, indicated that wearing of bump cap at the bottling lines could prevent head injuries; 2.9 ±1.27 revealed that not having appropriate information on the selection of personal protective equipment is unsafe for workers; 2.9±1.28 indicated value for regular implementation of general housekeeping procedures; 3.1±1.17 revealed value for carefully putting bottles into the moving conveyor to prevent being dragged into the machine; while 2.8 ±1.26 revealed that lifting heavy load or objects alone could lead to ergonomics problems. By implication, both the management and workers agreed that use of bump caps, keeping the environment clean and dry, the use of and having adequate information on personal safety equipment, being careful in the course of work to avoid mechanical hazard and taking proper posture under suspended loads all constitute safe practices in the brewing industry.

The reports of the key informant interview and the in-depth interview also revealed that awareness about risks and hazards associated with the brewing job and safe practices are quite high in the industry. No worker, can claim ignorance of the risks and hazards in the brewing industry, especially with the daily safety meetings being conducted in the organisations. The report revealed further that the daily safety meetings where topics surrounding hazards are discussed are quite helpful and mandatory for all employees to be in attendance. The slogan of every employee is ‘safety first, quality along voyagers plant optimization (VPO) forever’

All workers, both permanent and temporary are involved in safety training programmes, where safety training agencies, are brought in to train them. In fact, there are documented training programmes, organized on monthly basis, to increase the knowledge of workers on safe production practices.

Table 4.2.3.b: Attitude towards Safe Production Practices in the Brewing Industry

Items	SA (%)	A (%)	D (%)	SD (%)	Mean	SD
A constant safety training and safety meetings will help in controlling hazard.	(78.0)	(20.3)	(1.7)	-	**3.7**	**0.47**
Vapour elimination, environmental monitoring, removal of dust and gases ways of controlling hazard.	(69.9)	(27.2)	(2.3)	(0.6)	**3.6**	**0.55**
Labelling and storing acids and chemicals separately in a cabinet are ways of controlling hazards.	(71.2)	(26.9)	(2.3)	-	**3.7**	**0.51**
Providing good sanitation and following hygiene facilities can help in controlling hazards	(67.2)	(27.7)	(5.1)	-	**3.6**	**0.58**
Enforcing compliance and sanctions as regards the use of the personal protective equipment such as nose masks, earmuffs, goggles, hard hat and boots will help in controlling hazards	(73.4)	(23.7)	(2.9)	-	**3.7**	**0.50**

Source: ***Field survey, 2017***
SA= Strongly Agree, A = Agree D = Disagree, SD = Strongly Disagree

Table 4.2.3b, the attitude of both the employees and management towards safe production practices revealed that 78.0%, with the mean and standard deviation values of 3.7 ±0.47 agreed that constant safety training and safety meetings will help in controlling hazard; 69.9%, with the mean and standard deviation values of 3.6 ±0.55 also agreed that vapour elimination within the industry will help to control hazard; 71.2%, with the mean and standard deviation values of 3.7 ±0.51 agreed that environmental monitoring is a way of controlling hazard; 71.2%, with the mean and standard deviation values of 3.7 ±0.51 equally agreed that removal of dust and gases is one of the ways of controlling hazard; 67.2%, with the mean and standard deviation values of 3.6 ±0.58 agreed that providing good sanitation and following hygiene facilities can help in controlling hazard. Finally, 73.4%, with the mean and standard deviation value of 3.7 ±0.50 strongly agreed that labelling and storing acids and chemicals separately in a cabinet are ways of controlling hazards. Also, enforcing compliance and sanctions as regards the use of personal protective equipment, such as nose masks, earmuffs, goggles, hard hat and safety boots will help in controlling hazard respectively.

The reports of the key Informant interview and in-depth interview also revealed that, on the part of the management, once adequate provision has been made for protective equipment, such as, safety boots, reflective jackets, nose masks, safety goggles, ear-plugs and ear-muffs, hard hat or helmet, safety harness, bump cap, rain or rubber boots, sucks, hand gloves, and chemical overall, hundred per cent compliance with safety measures is expected from the workers. There are laid-down sanctions for erring workers as well as contractors. In fact, there is zero tolerance for unsafe practices. For erring workers, punishment can be as severe as termination of appointment, suspension and even dismissal, depending on the gravity of unsafe practice demonstrated. In the case of contractors, the contract can be terminated and the contractor will be sent out of the industry. Towards enforcing compliance with safety measures, management strives to improve the safety culture in the industry by creating awareness through training and retraining and making workers realize the consequences of not following the standard operation procedures, enlightenment and coaching and using emotional intelligence to get them to use protective equipment. Furthermore, the management conduct daily walkabout around the plant to observe level of compliance with safety measures. Each departmental safety representative is expected to train the employees in their units as to the use of safety equipment, oversee the safety behaviours

of the workers in their units and carry out a weekly inspection of the workplace while overall inspection is done on a monthly basis. There is also reward and recognition for workers who demonstrate exceptional safety behaviours on a monthly basis to inspire others. There are also safety health and environment representatives, (SHER) who act as enforcer of compliance with safety rules and measures, also put in place for effective monitoring.

The report further revealed that there are safety committees for each staff category, the managerial staff, senior and junior staff. Safety meetings are conducted on a daily basis. Inspection of the workplace is also conducted on a regular basis. Finally, there is the monthly feedback for both staff and contractors.

4.3 Analysis of Hypotheses

This section deals with the result of the visual-based training method adopted in training the participants. It contains the analysis of the result obtained from the pretest and posttest questions responded to by the participants. The results are presented according to the hypothesis raised in tables and detailed discussion of findings.

Hypothesis One ($H_0$1): There is no significant main effect of treatment on safe production practices.

The first hypothesis tested if the treatment, that is the visual-based training method, has a significant effect on safe production practices of participants in the brewing industry

Table 4.3.1: Mean and Standard Deviation Score of Treatment on Safe Production Practices

Safe Product Practices (SPP)	Treatment group		Total
	Experimental (VBTM)	Control	
Mean	50.63	44.83	48.85
Standard deviation	8.81	11.22	9.91
N	46	32	78

Table 4.3.1 summarises safe production practices by treatment group. It shows that the experimental group was better than the control group, as the mean safe production practices was greater ($Mean_{VBTM} > Mean_{control}$).

Table 4.3.2: (ANCOVA) Main effect of Treatment Group on Safe Production Practices in the Brewing Industry in Southwestern Nigeria

Variable	Type III Sum of Square	df	Mean Square	F	Sig	Partial eta squared (β)
Corrected Model	1370.17	2	685.009	8.297	.001	.181
Intercept	13022.013	1	13022.013	157.724	.000	.678
Type(Pre/Post)	811.789	1	811.789	9.833	.002	.116
Treatment	844.017	1	844.017	10.223	.002	.120
Error	6192.137	75	82.562			
Total	193666.000	78				
Corrected total	7562.154	77				

Source: Field Survey 2017, Dependent variable: Safe Production Practices**,** $\mathbf{R^2}$ = 0.181**, Adj** $\mathbf{R^2}$ = 0.159

Interpretation of Result and Discussion

The result in table 4.3.2 revealed that a significant main effect of treatment on safe production practices ($F_{(1;175)} = 10.223$; $p < 0.05$). The partial eta square ($\mu^2 = 0.120$) was recorded. It was small in comparison with Cohen's guidelines with ($\mu^2 = 0.2$) which means small effect. It can be seen that, for the treatment group, the effect size was small (.120). This value describe how much of the variance in the dependent variable was explained by the independent variable (12%). This means there was significant difference in the mean scores of safe production practices of workers in the brewing industry that were in the experimental treatment (VBT) when compared with the control group. Therefore, the null hypothesis which states that there is no significant main effect of treatment on safe production practices, was rejected. It was, therefore, concluded that there was significant main effect of treatments on safe production practices among the participants. This implies that Visual-based Training (VBT) is effective in enhancing the safe production practices of workers in the brewing industry.

The result from the study showed that exposing workers in the brewing industry to safe production practices with the use of the visual-based method assisted them in developing a more positive attitude towards safe practices. The participants in the experimental group exhibited a more positive attitude and better performance than the control group, which implies that the training programme was effective. The experimental group was involved in various activities, such as projecting images and pictures of accident scenes and victims of accidents in the brewing industry, using flash cards to state different categories of causes and types of hazards that could lead to accident, and using picture diagrams to illustrate the best and safest ways of doing brewery work and displaying practical examples of these safe ways on the projector for participants to observe, digest, ruminate and discuss on what could happen to them if they failed to do all these at the debrief sessions.

The participants were also exposed to categories of hazards with the use of flash cards, which included ergonomics hazard involving repetitive, motions such as packing and cleaning, lifting and carrying malt bags, kegs and hoses, leaning, bending and assuming awkward postures, picture images of handling of glass bottles, use of machines and tools, and the safety equipment to use in working and walking on slippery surfaces. Besides, the best way to handle chemicals, such as caustics, acids, ammonia and lubricants, was displayed on the projector. Finally, how to

overcome thermal hazard involving kettle boil-overs and wort overflow, toxic fumes, which could be life-threatening was also illustrated with pictures of what to do, the safety equipment to select to avoid accident.

This finding established the fact that appropriate methods of training are very germane if there will be an improvement in safe production practices of workers in the brewing organisations. Safety training needs to incorporate the use of visual formats which will aid retention and recall and ability to transfer the training experience to real life situations. The finding is consistent with the work of Raiyn (2016), who investigated the effect of the visual learning strategy on the improvement of logical thinking using visual presentations, such as images, diagrams, collaborative imitations and flow charts. He found a substantial effect of visual learning on the improvement of the logical skills of the experimental group over the traditional learners. Therefore, he concluded that visual learning apparatuses increased the learner's high-order-thinking skills, otherwise known as logical skills, and thereby could be said to offer better results than the traditional learning systems. Abubakar (2015) also corroborated this finding. In his work on effect of instructional video utilization in enhancing learners' recall of concepts, he found a significant difference in academic performance of learners in the experimental group and the control group after the use of instructional video. The study concluded that the use of instructional video and other visual formats enhanced better academic performance of learners. Similarly, Rokni and Karimi (2013) discovered, in their study on the effects of visual materials on EFL learners' vocabulary using concrete objects, pictures, and flash cards, that learning of words significantly increased among the experimental group more than the control group and, thereby, concluded that visual instruction is an effective technique for learning.

The training programme impacted positively on the attitude of the participants towards safe production practices. Presenting vivid pictures of what could happen to them if they failed to do their job safely helped to provoke emotions that helped them to imbibe safe practices and thereby reduced occurrence of accidents. The finding is also in line with Bamford's (2003) position that visual literacy is very crucial to gaining information, building up knowledge and constructing successful educational results. Furthermore, Okorie, Okolie and Ukar (2015), assert that organisation has the responsibility of providing translating equipment or substitute printed instructional manuals with clearly implicit symbols, images or pictures as a medium of health

and safety induction. These enhanced learning and understanding among the illiterate rural migrant construction site workers sampled. This is also buttressed in HSE (2008), which claims that an effective site health and safety induction training should incorporate modern technologies such as audio-visual translators.

Other researchers seemed to agree that the memory for blended picture-word is greater than the memory for either words or pictures alone, which could be referred to as pictorial-superiority influence, and that visual information is mapped better in students' minds (Adam and Chambers, 1962; Harber and Myers, 1982; Petterson, 2004; Williams, 2009). Other studies on visuals and words have shown that memory for visual tends to be better than memory for words (Clark and Lyons, 2004; Eze, 2005).

Research on the efficacy of the use of visual aids in the learning environment has also revealed that they can improve learning, as visuals can stimulate learner's inspiration, interest and inquisitiveness. (Mayer and Moreno, 1998; Anglin, Vaez and Cunningham, 2004; Ngozi, Samuel and Isaac, 2012). The finding is also in consonance with Fang's (as cited in Carney and Levin, 2002) position that the visual learning method equally helps in promoting ingenuity, serving as rational platform and promoting aesthetic appreciation. Inculcating the values of safe production practices through visuals has the ability to improve workers attitudes towards safe practices. The training also has positive impact on the workers by enabling them to identify, control and minimize hazards, thereby reducing accident occurrence during production process.

The report from the key informant interview conducted, also buttressed that the use of safety related video clips at safety meetings, to demonstrate the impact of not following the standard operation procedure is quite helpful in developing a more positive attitude towards safe practices among workers.

Hypothesis Two ($H_0$2): There is no significant main effect of job tenure on safe production practices

The second hypothesis raised tested if job tenure of brewery workers had a significant effect on their safe production practices.

Table 4.3.3: Mean and Standard Deviation Score of Job Tenure Effect on Safe Production Practices in the Brewing Industry in Southwestern Nigeria

Safe Production Practices (SPP)	Job Tenure			Total
	Short	Medium	Long	
Mean	49.21	47.37	50.71	48.84
Standard deviation	9.94	10.45	9.10	9.91
N	19	35	24	78

Table 4.3.3 summarizes safe production practices by job tenure. The result showed that the long job tenure seems better than other job tenures as the mean of safe production practices was greater ($Mean_{long} > Mean_{medium}$ and $Mean_{short}$).

Table 4.3.3a: (ANCOVA) Main Effect of Job Tenure on Safe Production Practices in the Brewing Industry in Southwestern Nigeria

Variable	Type III Sum of Square	Df	Mean Square	F	Sig	Partial eta squared (μ^2)
Corrected model	609.701	3	203.234	2.163	.002	.081
Intercept	16582.209	1	16582.209	176.496	.000	.705
SPP	447.835	1	447.835	4.767	.032	.061
Job tenure	83.702	2	41.851	.445	.042	.012
Error	6952.453	74	93.952			
Total	193666.000	78				
Corrected total	7562.154	77				

Source: Field Survey 2017, Dependent variable: Safe Production Practices, **R^2 =** 0.81**, Adj R^2 =** 0.043

Interpretation of Result and Discussion

The result in table 4.3.3a revealed a significant main effect of job tenure on safe production practices ($F_{(2;174)} = 3.001$; $p < 0.05$). The partial eta square ($\mu^2 = 0.061$) was recorded. This was small in comparison with Cohen's guidelines (when $\mu^2 = 0.2$) which means small effect. It can be seen, that for job tenure, the effect size was small (.061). This value describe how much of the variance in the dependent variable was explained by the independent variable (6.1%). This implies that job tenure had a significant impact on the group test scores on safe production practices. The null hypothesis, that there is no significant main effect of job tenure on safe production practices, was, therefore, rejected. It was, therefore, concluded that job tenure had significant main effect on safe production practices in the brewing industry in the Southwestern Nigeria.

This finding corroborates Gyekye and Salminen (2010), who examined the influence of job experience on safety at the workplace, complying with safety organization policies and accident rate of recurrence. They established a link between employees' level of experience and safe work practices. To them, the more-experienced workers had more positive perceptions regarding safety than the less-experienced ones. The less-experienced workers, especially those in their first year, at the workplace, were the worst guilty party regarding safety policies, compliance with safety measures and accident involvement rate. The notion of familiarity and awareness of hazard could be said to be responsible for the perceived affirmative relationship between experience and safety measures. The long-tenured workers profited from their prolonged stay with the industries, and had learnt job-related and pertinent information about the fundamental safety culture within the industries, which, in turn, enabled them to be more compliant with safety policies. However, the short-tenured employees, who were less familiar with the workplace conditions and did not possess much information, were at a greater risk of demonstrating unsuitable and wrong safety behaviours.

The finding is also consistent with considerable body of research which established that length of job experience was connected to reduced accident rates (Barkan, Zohar and Erev, 1998; Siu, Phillips and Leung, 2004; Kecojevic, Komljenovic and Groves, 2007; Wu, Liu and Lu, 2007; Fabiano et al.,2008), Another study that found experience to be positively related to accident

frequency included that of Thomas and Pozzebon (2002), who also claimed that more-experienced employees had fewer workplace injuries than the less-experienced ones. The finding also buttressed Wallen and Mulloy's (2006) finding that both older and younger workers did best with the version containing text with pictures and audio narration while the older workers did poorly in the version without pictures and audio narration. They concluded that pictures and audio narration might be beneficial for workers over 45 years of age.

However, the above finding disagrees with Gershon et al. (1999), as cited in Ansah (2012), who found that younger employees observe better workplace safety regulations than older and more experienced ones. Also, Oltedal and McArthur (2011) found that workers with less than one year experience had lesser reporting frequency of unsafe work situations than the more experienced ones.

The reports from the key informant and in-depth interviews, also supported the fact that majority of their workers with long job tenures have benefitted from their long stay in the organization and therefore exhibited better safety behavious than the short tenure workers.

Post hoc test

Table 4.3.3b: Pairwise comparisons (Job tenure)

Variable	Mean differences	Std. Error	Sig	95% CI Interval for difference	
				Lower bound	Upper Bound
Short					
Medium	2.045	2.764	.949	-5.986	3.862
Long	- 1.094*	3.045	.021	-11.262	-1.043
Medium					
Short	-1.164	2.764	.949	-3.862	5.986
Long	-5.191*	2.627	.010	-9.644	-0.536
Long					
Short	- 1.094*	3.045	.021	1.043	11.262
Medium	5.191*	2.627	.010	0.536	9.644

The mean difference significant at 0.05

The result in Table 4.3.3b revealed a significant difference between long and short job tenures, and likewise between long and medium job tenure with respect to safe production practices (p – values =.021 and 010, $p < 0.05$) respectively.

Table. 4.3.3c: Estimated Marginal Means (Job Tenure)

Job Tenure	Mean	Std. Error	95% CI Interval for difference	
			Lower bound	Upper Bound
Short	47.735	2.237	45.279	54.192
Medium	47.690	1.645	44.412	50.967
Long	49.829	2.019	45.805	53.852

Table 4.3.3c indicated the estimated means section of the output, which gives the adjusted mean (controlling for the "test (pre/post)") for each job tenure level. From these adjusted means, it is clear that long job tenure safe production practices were better after adjusting for test (pre/post).

Hypothesis Three ($H_0$3): There is no significant main effect of education level on safe production practices

This hypothesis tested the effect of education level on safe production practices in the brewing industry. The next table presents the findings

Table 4.3.4: Mean and Standard Deviation Score of Effect of Educational Level on Safe Production Practices

Safe Production Practices (SPP)	Educational level			Total
	Less Education	Educated	Highly Education	
Mean	47.50	47.55	50.80	48.85
Standard deviation	2.12	10.98	7.05	9.91
N	2	51	25	78

Dependent variable: SPP

Table 4.3.4 summarises safe production practices by educational level. It shows that the highly educated were better than others with other educational levels as the mean safe production practices were greater (Mean $_{\text{highly educated}}$ > Mean$_{\text{educated}}$ and Mean$_{\text{less educated}}$).

Table 4.3.4a: (ANCOVA) Main Effect of Education Level on Safe Production Practices

Variable	Type III Sum of Square	Df	Mean Square	F	Sig	Partial eta squared (μ^2)
Corrected Model	668.696	3	222.889	2.393	.031	.088
Intercept	11033.229	1	11033.299	118.440	.000	.615
Test(Pre/Post)	337.670	1	337.670	3.625	.016	.047
Educational Level	142.696	2	71.348	0.766	.022	.033
Error	6893.458	74	93.155			
Total	193666.000	78				
Corrected total	7562.154	77				

Source: Field Survey 2017, Dependent variable: Safe Production Practices, **R^2 =** 0.41**, Adj R^2 =** 0.25

Interpretation of Result and Discussion

The result in Table 4.3.4a revealed a significant main effect of educational level on safe production practices ($F_{(2;174)} = 3.265$; $p < 0.05$). The partial eta square ($\mu^2 = .033$) was recorded; this was small in comparison with Cohen's guidelines (when $\mu^2 = 0.2$) which means small effect. It can be seen that, for educational level, the effect size was small (.033). This value describes how much of the variance in the dependent variable was explained by the independent variable (3.3%). This implies that education level had significant impact on the group test scores on safe production practices. The null hypothesis, that there is no significant main effect of education level on safe production practices, was, therefore, rejected. Therefore, it was concluded that there was significant main effect of education level on safe production practices in the brewing industry in Southwestern Nigeria. This showed that participants who were highly educated responded more positively to the treatments compared with those that were least educated. The participants demonstrated more understanding of the contents of the training due to the level of their educational status, and were therefore able to cope better in the treatment groups.

This finding is in line with Jitwasinkul, Hadikusomo and Memon (2016), who view learning as an important factor in improving operatives' awareness and competency. They found that operatives who have the requisite knowledge regarding safe work behaviour have displayed better compliance with safety policies. The finding is also consistent with Tounalum, Yingratana and Chantawong (2014), who examined safety behaviour of brewery workers. They discovered that, out of the 229 brewery workers who had below university education, 125 (54.6) actually demonstrated good safety behaviours while out of 87 workers who had university education, 67 (72.4) demonstrated good safety behaviours. By implication, there was a relationship among education level, accident, experience and the company's provision for personal protective equipment. Also, Cornelissen, Hoof and Vuuren (2014), confirmed the relationship between knowledge, ability and safe work practices in their study on the impact of motivation and ability in the design of safety instructions. The study also agrees with Gyekye and Salminen (2009), who also established from their study on educational attainment and workers' perception of workplace safety using industrial workers in Ghana as case study, that there was a positive relationship between education and safety perception. The study found that the highly educated workers had the best insights on safety, were the most obedient with safety procedures, and had

the lowest record of accident involvement rate. Other similar studies included Viriya (2008) Zhou, Fang and Wang, (2008) Gyekye and Salminen (2009), Jiang,Yu, Li and Li,(2010) and Lekcharoen, (2011)).

The report gathered from both the key informant and in depth interviews also buttressed the importance of employing educated workers more than less educated ones. It was emphasized that workers that were highly educated were always quick to grasp the intricacies of training which has further improved their attitude to safe practices. Particularly, the safety representatives who were expected to receive the training first before proceeding to train the workers in their various units, were supposed to be highly educated to be able to do this effectively.

Post hoc test

Table 4.3.4b: Pairwise comparison (Education level)

Variable	Mean differences	Std. Error	Sig	95% CI Interval for difference	
				Lower bound	Upper Bound
Less educated					
Educated	8.012	7.031	.775	-9.213	25.236
Highly educated	6.379	7.095	.884	-11.000	23.758
Educated					
Less educated	-8.012	7.031	. 775	-25.236	9.213
Highly educated	-1.633*	2.505	.011	-7.769	-1.088
Highly educated					
Less educated	-6.379	7.095	.844	-23.758	11.000
Educated	-1.633*	2.505	.011	-.4.504	7.769

Source: Field Survey 2017, **Dependent variable:** Safe Production Practices

The mean difference significant at 0.05

The result in Table 4.3.4b indicated a significant difference between highly educated and educated educational levels on safe production practices ($p = .011$, $p < 0.05$).

Table 4.3.4c: Estimated Marginal Means (Education Level)

Educational level	Mean	Std. Error	95% CI Interval for difference	
			Lower bound	Upper Bound
Highly Educated	49.357	9.358	30.887	67.827
Least Educated	42.856	1.340	40.200	45.491
Moderately Educated	47.966	1.518	44.970	50.963

Source: Field Survey 2017, Dependent variable: Safe Production Practices

Table 4.3.4c captures the estimated means section of the output, giving the adjusted mean (controlling for the "test (pre/post)") for each educational level. From these adjusted means, it is clear that the safe production practices of the less-educated improved after adjusting for test (pre/post).

Hypothesis Four ($H_0$4): There is no significant two-way interaction effect of treatment and job tenure on safe production practices

Hypothesis four tested the two-way interaction effect of treatment and job tenure on safe production practices. The result is explained in the table below.

Table 4.3.5: Mean and Standard Deviation Score of Two-way Interaction Effect of Treatment and Job Tenure on Safe Production Practices

Treatment	Job tenure	Mean	Std. Deviation	N
Experimental (VTBM)	Short	41.49	13.194	16
	Medium	43.08	13.667	20
	Long	45.52	14.405	10
	Total	43.13	13.641	46
Control	Short	48.36	12.274	9
	Medium	44.35	14.020	12
	Long	50.60	12.601	11
	Total	47.77	13.302	32
Total	Short	43.13	13.184	25
	Medium	43.63	13.738	32
	Long	48.48	13.501	21
	Total	45.15	13.652	78

Table 4.3.5 summarises safe production practices by treatment and job tenure. It shows that the control*long-term job tenure was better than experimental*long-term job tenure as the mean safe production practices was greater ($Mean_{control*long} > Mean_{experimental*long}$).

Table 4.3.5a: (ANCOVA) Main Effect of Two-way Interaction Effect of Treatment and Job Tenure on Safe Production Practices in the Brewing Industry

Variable	Type III Sum of Square	Df	Mean Square	F	Sig	Partial eta squared (μ^2)
Corrected Model	1632.694	6	272.116	3.258	.002	.116
Intercept	11045.089	1	11045.089	132.255	.000	.429
Test(Pre/Post)	684.007	1	684.007	8.190	.001	.064
Treatment	177.414	1	177.414	2.124	.039	.025
Job tenure	109.504	2	54.752	.656	.127	.024
Treatment*Job tenure	141.547	2	70.774	.847	. 462	.009
Error	5929.460	71	83.514			
Total	193666.000	78				
Corrected total	7562.154	77				

Source: Field Survey 2017, Dependent variable: Safe Production Practices, **R^2** = 0.216, **Adj R^2** = 0.150

Interpretation of Result and Discussion

Table 4.3.5a indicates that there was no significant two-way interaction effect of treatment and job tenure on safe production practices $_{(2;171)}$ = 0.656; p >0.05). The partial eta square (μ^2 = .009) was recorded; this was small in comparison with Cohen's guidelines (when μ^2 = 0.2) which means small effect. It can be seen that, for effect of treatment and job tenure, the effect size was small (.009). The null hypothesis was, therefore, accepted. This implies that there was no significant two-way interaction effect of treatment and job tenure on safe production practices in the brewing industry. It showed that job tenure did not significantly moderate the effectiveness of the treatment in enhancing workers' safe production practices. By implication, whether the workers are short-, medium- or long-tenured, the treatment improved the safe production practices of the participants. This then suggests that the visual-based training method can be used for all categories of staff regardless of the number of years they have spent on the job. It is equally important to expose all staff to safety training periodically using appropriate training methods, like the visual-based method, to enhance a more positive attitude towards safety measures in the industry.

Hypothesis Five ($H_0$5): There is no significant two-way interaction effect of treatment and educational level on safe production practices.

Hypothesis five tested the two-way interaction effect of treatment and education level on safe production practices. The result is presented in the table below:

Table 4.3.6: Mean and Standard Deviation Score of the Two-way Interaction Effect of Treatment and Educational Level on Safe Production Practices

Treatment	Educational level	Mean	Std. Deviation	N
Experimental (VTBM)	Less educated	47.00	1.414	2
	Educated	41.92	14.211	30
	Highly Educated	45.00	12.933	14
	Total	43.13	13.641	46
Control	Educated	43.31	16.253	19
	Highly Educated	51.68	8.451	13
	Total	47.77	13.302	32
Total	Less educated	47.00	1.414	2
	Educated	42.43	14.925	49
	Highly Educated	48.56	11.220	27
	Total	45.15	13.652	78

Dependent variable: SPP

Table 4.3.6 summarises safe production practices by treatment and educational level. It indicates that the control*highly educated seems better than the experimental* highly educated educational levels, as the mean safe production practices was greater ($Mean_{control*highly\ educated} > Mean_{experimental*\ highly\ educated}$).

Table 4.3.6a: (ANCOVA) Main Effect of Two-way Interaction Effect of Treatment and Education Level on Safe Production Practices

Variable	Type III Sum of Square	Df	Mean Square	F	Sig	Partial eta squared (μ^2)
Corrected Model	1578.606	5	315.721	3.799	.001	.115
Intercept	9226.975	1	9226.975	111.028	.000	.396
Test(Pre/Post)	353.274	1	353.274	4.251	.007	.041
Treatment	473.211	1	473.211	5.694	.027	.028
Job tenure	155.116	2	77.558	.933	.069	.031
Treatment*Educational	131.840	1	131.840	1.586	. 297	.006
Error	5983.548	72	83.105			
Total	193666.000	78				
Corrected total	7562.154	77				

Source: Field Survey 2017, Dependent variable: Safe Production Practices, **R^2** = 0.209, **Adj R^2** = 0.154

Interpretation of Result and Discussion

The result in Table 4.3.6a revealed that there was no significant two-way interaction effect of treatment and educational level on safe production practices ($F_{(1;172)} = 1.095$; $p > 0.05$). The partial eta square ($\mu^2 = .006$) was recorded. This was small in comparison with Cohen's guidelines (when $\mu^2 = 0.2$), which means small effect. It can be seen that, for effect of treatment and educational level, the effect size was small (.006). The null hypothesis was therefore, accepted. By implication, there was no significant two-way interaction effect of treatment and education level on safe production practices of participants. This means that education level did not significantly moderate the efficacy of the treatment in enhancing safe production practices in the brewing industry. This demonstrates that with the workers, whether they are less, moderately or highly educated, safe production practices got improved by the treatment.

Hypothesis Six ($H_0$6): There is no significant two-way interaction effect of Job tenure and educational level on safe production practices

This hypothesis tested the two-way interaction effect of job tenure and educational level on safe production practices. The finding is presented in the table below:

Table 4.3.7: Mean and Standard Deviation Scores of Two-way Interaction Effect of Job Tenure and Educational Level on safe Production Practices

Job Tenure	Educational level	Mean	Std. Deviation	N
Short				
	Less educated	48.00		1
	Educated	40.75	14.411	13
	Highly Educated	45.00	11.737	5
	Total	43.13	13.184	19
Medium	Less educated	46.00	0.000	1
	Educated	40.07	14.608	24
	Highly Educated	49.22	10.475	10
	Total	43.63	13.738	35
Long				
	Educated	47.00	15.181	14
	Highly Educated	50.07	11.495	10
	Total	48.48	13.501	24
Total				
	Less educated	47.00	1.414	2
	Educated	42.43	14.925	51
	Highly Educated	48.56	11.220	25
	Total	45.15	13.652	78

Dependent variable: SPP

Table 4.3.7 summarises safe production practices by job tenure and educational level which shows that the control*highly educated seems better than the experimental* highly educated educational levels, as the mean safe production practices was greater ($Mean_{control*highly\ educated} > Mean_{experimental*\ highly\ educated}$).

Table 4.3.7a: (ANCOVA) Main Effect of Two-way Interaction Effect of Job Tenure and Educational Level on Safe Production Practices

Variable	Type III Sum of Square	Df	Mean Square	F	Sig	Partial eta squared (μ^2)
Corrected Model	963.084	8	120.386	1.259	.001	.115
Intercept	11400.882	1	11400.882	119.208	.000	.396
Test(Pre/Post)	253.236	1	253.236	2.648	.007	.041
Job tenure	50.892	2	25.446	.266	.027	.028
Educational level	127.119	2	63.559	.665	.069	.031
Job tenure*Educational	205.730	3	68.577 95.639	.717	. 297	.006
Error	6599.069	69				
Total	193666.000	78				
Corrected total	7562.154	77				

Source: Field Survey 2017, Dependent variable: Safe Production Practices, **R^2** = 0.116, **Adj R^2** = 0.085

Interpretation of Result and Discussion

The result in Table 4.3.7a revealed that there was no significant two-way interaction effect of job tenure and educational level on safe production practices ($F_{(3;169)} = 717$; $p > 0.05$). The partial eta square ($\mu^2 = .006$) was recorded; this was small in comparison with Cohen's guidelines (when $\mu^2 = 0.2$), which means small effect. It can be seen that, for effect of job tenure and educational level, the effect size was small (.006). This value describes how much of the variance in the dependent variable was explained by the independent variable (0.6%) The null hypothesis, that there is no significant two-way interaction effect of job tenure and educational level on safe production practices, was, therefore, accepted. This means that job tenure and educational level did not significantly interact to enhance safe production practices in the brewing industry. This further confirms that job tenure and educational level did not influence the positive effect of the treatment, the visual-based training method, on safe production practices in the brewing industry. This implies that the visual-based training method could be used to train workers regardless of the years spent on the job or their educational level to enhance safe production practices in the brewing industry.

Hypothesis Seven ($H_0$7): There is no significant three-way interaction effect of treatment, job tenure and education level on safe production practices

This hypothesis tested whether the treatment with the two moderating variables of job tenure and educational level interacted together to have a significant effect on safe production practices in the brewing industry. The result obtained is shown in the table below:

Table 4.3.8: Mean and Standard Deviation Scores of the Three-way Interaction Effect of Treatment, Job Tenure and Educational Level on Safe Production Practices

Treatment	Job Tenure	Educational level	Mean	Std. deviation	N
VBTM	Short	Less educated	48.00	0.0	1
		Educated	38.26	13.64	9
		Highly educated	45.13	12.34	5
		Total	41.49	13.19	15
	Medium	Less educated	46.00		1
		Educated	43.03	14.01	12
		Highly educated	42.89	14.06	7
		Total	43.08	13.68	20
	Long	Educated	44.69	15.51	7
		Highly educated	46.42	13.73	4
		Total	45.52	14.40	11
	Total	Less educated	47.00	1.41	2
		Educated	41.92	14.21	28
		Highly educated	45.00	12.93	16
		Total	43.13	13.64	46
Control	Short	Educated	50.20	14.70	1
		Total	48.36	12.27	1
	Medium	Educated	33.23	14.14	13
		Highly educated	52.39	6.55	3
		Total	48.36	14.02	16
	Long	Educated	48.67	15.16	5
		Highly educated	52.65	9.19	10
		Total	50.60	12.60	15
	Total	Educated	43.31	16.25	19
		Highly educated	51.68	8.45	13
		Total	47.77	13.30	32

Table 4.3.8 summaries safe production practices by treatment, job tenure and educational level which shows that the control*highly educated seems better than experimental* highly educated educational levels as the mean safe production practices was greater ($Mean_{control*highly\ educated} > Mean_{experimental*\ highly\ educated}$).

Table 4.3.8a: (ANCOVA) Main Effect of Three-way Interaction Effect of Treatment, Job Tenure and Education Level on Safe Production Practices

Variable	Type III Sum of Square	df	Mean Square	F	Sig	Partial eta squared (μ^2)
Corrected Model	2147.108	13	469.282	2.898	.001	.200
Intercept	8528.908	1	18010.226	111.216	.000	.407
Test(Pre/Post)	304.927	1	1344.826	8.304	.004	.049
Treatment	197.057	1	571.402	3.528	.062	.021
Job tenure	52.577	2	364.567	2.251	.109	.027
Education level	138.387	2	223.414	1.380	. 255	.017
Treatment*Job tenure	161.302	2	206.665	1.276	.282	.016
Treatment*Educational	87.029	1	29.637	.183	.669	.001
Job Tenure*Educational	81.919	3	233.205	1.440	.233	.026
Trt*JobT*Educational	110.474	1	537.671	3.320	.039	.039
Error	5415.046	64	161.940			
Total	193666.000	78				
Corrected total	32804.181	77				

Source: Field Survey 2017, Dependent variable: Safe Production Practices, **R^2** = 0.133**, Adj R^2** = 0.092

Interpretation of Result and Discussion

The result in Table 4.3.8a indicated that there was a significant three-way interaction effect of treatment, job tenure and educational level on safe production practices ($F_{(2;164)} = 3.320$; $p < 0.05$). The partial eta square ($\mu^2 = .039$) was recorded; this was small in comparison with Cohen's guidelines (when $\mu^2 = 0.2$), which means small effect. It can be seen that, for effect of treatment, job tenure and educational level, the effect size was small (.039). This value describes how much of the variance in the dependent variable was explained by the independent variable (3.9%) The null hypothesis was, therefore, rejected. This means there was significant three-way interaction effect of treatment, job tenure and educational level on safe production practices in the brewing industry in Southwestern Nigeria. By implication, the workers demonstrated improved safe production practices after the training programme. This was evident in their attitude which improved positively with respect to how they went about with their daily operations in the industry after the training programme.

Table 4.3.8b: Estimated Marginal Means

Treatment	Job Tenure	Educational level	Mean	Std. error	95% CI	
					Lower	Upper
VBTM	Short	Less educated	50.68	12.76	25.48	75.87
		Educated	38.73	2.924	32.96	44.50
		Highly educated	43.81	3.318	37.26	50.36
	Medium	Less educated	48.68	12.76	23.479	73.87
		Educated	42.71	2.326	38.12	47.31
		Highly educated	44.23	4.267	35.81	52.65
	Long	Educated	45.06	3.53	38.09	52.04
		Highly educated	45.096	13.73	37.79	52.40
Control	Short	Educated	51.68	5.72	40.39	62.96
		Highly educated	43.52	5.32	33.01	54.03
	Medium	Educated	34.52	3.56	27.49	41.55
		Highly educated	51.04	3.02	45.44	57.36
	Long	Educated	49.68	3.02	43.71	55.64
		Highly educated	53.02	3.09	47.10	59.31

Source: Field Survey 2017, **Dependent variable:** Safe Production Practices **(SPP)**

Table 4.3.8b revealed that the estimated means section of the output gives the adjusted mean (controlling for the "test (pre/post)") for each interaction level. From these adjusted means, it is clear that the interaction (Control*Short*Educated) caused safe production practice to improve after adjusting for test (pre/post).

4.4 Post- treatment Observation

A two-week post-treatment observation was conducted about two months after the initial training ended. The following observations were made.

- There was tremendous improvement in the attitude of workers towards safe production practices in the brewing industry in southwestern Nigeria.
- The training programme impacted positively on their attitude towards the use of personal protective equipment as the majority of them were seen in their complete safety attires in their various units.
- The use of mobile phones while at work has greatly reduced among the workers, as they had realized that it causes distraction and could result in accident.
- The workers adhered strictly to the safety slogan in the industry, which is safety first, quality along VPO (Voyager Plant Optimisation) forever. Voyager Plant Optimisation means “best operation practices”.
- There was no record of serious accident within the period when training ended and when the post training observation was conducted as displayed on the industry safety board within the first quarter of 2018 (as attached in the appendices)

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

This chapter consists of the summary, conclusion and recommendations of the study. It also discusses contributions to knowledge, limitations to the study and suggestions for further studies.

5.1 Summary

The main objective of this study was to establish the effect of visual-based training method on safe production practices in the brewing industry in Southwestern Nigeria. Also the interaction effects of job tenure and education level as moderating variables was determined. The study consisted of five chapters, beginning with the introduction, where the gap that the study sought to fill in the literature, objectives, research questions and hypotheses, significance and scope of the study were extensively discussed. Relevant literature was also discussed and the Dual-coding Theory and the Cognitive Theory of Multimedia Learning were considered as relevant theories to the study.

The study adopted the mix method of survey and pretest-posttest control group quasi experimental design with a 2x3x3 matrix. Seventy-eight (78) brewery workers from two purposively selected brewing organisations in the southwest were used as participants. The treatment period lasted eight weeks. The method of data analysis included descriptive statistics, analysis of covariance (ANCOVA) and post hoc at 0.05 level of significance. These were captured in chapter three. The data collected generated the following results after analysis.

Treatment had significant main effect on safe production practices in the brewing industry. By implication, there was significant improvement in the safe production practices of workers in the brewing industry after they had been exposed to the treatment. Job tenure had significant main effect on safe production practices in the brewery. This implies that workers that had spent longer years on the job demonstrated better safe production practices than the short-tenured workers. Educational level also had significant main effect on safe production practices in the brewing industry. This equally implies that the highly educated workers exhibited more understanding and positive attitude towards safe production practices in the brewing industry. There were no significant two-way interaction effects of treatment and job tenure, treatment and educational level and job tenure and educational level on safe production practices in the

brewing industry. This implies that the visual-based training method could be used to enhance safe production practices in the brewing industry regardless of the number of years spent on the job and their level of education. Finally, there was significant three-way interaction effects of treatment, job tenure and education level on safe production practices in the brewing industry. This implies that all the variables interacted to enhance safe production practices in the brewing industry. The key informant and the in-depth interviews revealed that despite the efforts of managements in enforcing compliance with safety measures, and providing the needed safety equipment, some still demonstrate nonchalant attitude at times, such as not complying with standard operation procedures especially when working on night shifts, occasional neglect of the personal protective equipment, use of mobile phones and others. These results were presented and discussed in chapter four.

5.2 Conclusion

Organised safety training is recognized in the literature as a universal remedy for controlling hazards and reducing accidents and fatalities. Despite the level of awareness of workers as regards safety, as well as the safety training programmes they are exposed to, accidents are very common in the brewing industry. It is obvious that the success or otherwise of any safety training programme depends largely on the method of instruction adopted in disseminating information to workers. The study has established that the visual-based training method is effective in promoting safe production practices in the brewing industry in Southwestern Nigeria. Therefore, if there would be any improvement in the safe production practices in the industry, it is necessary to adopt the activity-based training method (visual-based) in training the workers to reduce or eliminate occurrence of accidents in the industry.

5.3 Recommendations

Based on the findings of this study, the following recommendations are offered:

- Organisations, government agencies, institutions and safety training programme designers should endeavour to combine the use of the visual-based training method in promoting safe production practices of brewery workers and thereby eliminate or reduce accidents and diseases in the industry.

- The visual-based training method should form the basis of safety training programmes. Providing workers with vivid pictures of how to do their work safely and what could happen to them if they fail to do so will provoke emotions that will deter them from unsafe actions and practices and thereby reduce accidents and ailment in the industry.
- The use of the visual-based training method should also be adopted in training workers in other sectors of the economy where workers are prone to high risks or other hazards, for example, the steel rolling mills, nail manufacturing industry, distilleries industry and beverage industry. Using the visual-based training method will enhance safe production practices among workers in these industries.
- The inspectorate division of the Federal Ministry of Labour and Productivity, apart from conducting regular inspection of the workplace, should also ensure that brewing organisations conduct regular safety training, using appropriate methods, such as the visual-based method, for effective training programme.
- There should also be sensitization programmes for the brewery workers as regards their involvement in safety programmes, having safety representatives and knowing their right of refusal to work if they identify any potential danger in the course of work.
- The management of the brewing industry should also make adequate and timely provisions for protective equipment and train the workers on the selection and how to use the materials to reduce accidents and diseases.
- The management should also ensure that health and safety induction/training programmes are conducted regularly with the use of the visual-based training method and made compulsory for all categories of employees, old and new, permanent or temporary, and even for employees transferring to new roles or tasks in the industry.

5.4 Contributions to knowledge

The findings of the study has contributed to knowledge in the following ways:

- The study showed that the visual-based training method is very effective in safety training programmes and could be used in promoting safe production practices in the brewing industry in Southwestern Nigeria. This study is different from the previous studies on the use of activity-based training methods such as the syndicate training and guided-practice which mainly focused on occupational and health competencies of

workers in the construction industries, and the effect of team-teaching and blended learning on health promotion competences among student nurses and midwives to mention a few. The study has shown that incorporation of visual-formats, such as images, flashcards, flowcharts, power point decks, instructional videos, will go a long way in promoting understanding and learning among adults, particularly in brewing organisations and other manufacturing industries generally.

- The study also showed that the use of the activity-based method, like the visual-based method, will achieve a better result than the conventional or traditional lecture method.
- The study showed that the visual-based training method could be used for learners cutting across all ages.
- The study has provided an opportunity to bridge the gap in research on the use of the activity-based method for training workers in the manufacturing and brewing organisations.
- The outcome of the research has also provided a clearer understanding and usage of the visual-based training method.

5.5. Limitations of the study

The major limitation encountered during the study arose because of the nature of work in the brewing industry. The brewing work involves three shifts - morning, afternoon and night shifts. It was, therefore, difficult to gather the required number of participants for the entire training period. The researcher eventually settled for early morning hours meant for their pep talk, with a lot of assistance from the brewery supervisors.

Also, the moderating variables selected in the study were job tenure and education level, leaving out other variables, such as age or gender which could also affect the outcome of the treatment on safe production practices of the participants.

5.6 Suggestions for further studies

The study investigated visual-based training method and safe production practices of workers in the brewing organisations in Southwestern Nigeria. This study could be replicated in other sectors where risks of accidents and diseases are also high, such as steel rolling mills,

machine tools, beverages industries and distillery industries. Other studies, could concentrate on other geo-political zones in the country, such as the south-east, south-south and the northern parts of the country. Besides, more research is needed to determine other variables, such as age and gender, which may mediate or moderate the effect of treatment on safe production practices. Finally, other activity-based methods, such as cooperative method, collaborative method, brainstorming, drama and simulations, could also be examined, to determine their effectiveness on safe production practices of workers.

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APPENDIX 1
SAFE PRODUCTION QUESTIONNAIRE (SPQ)
DEPARTMENT OF ADULT EDUCATION
UNIVERSITY OF IBADAN

Dear Respondent,

The purpose of this research is to investigate the effect of activity-based training method on safe production of workers in the Brewing Industry. This questionnaire is strictly for research purpose and any response got from this scale will be treated confidentially. The sincerity and cooperation of respondents will be highly appreciated.

Instruction: Please indicate your response by ticking (√) the relevant options and in some cases state your response in words.

Section 1. Demographic Information

1. Name of the Brewing Industry _____
2. Section: Brew House { } Engineering{ } Packaging { }
3. Nature of Employment: Permanent { } Temporary { }
4. Highest Educational Qualification: University Degree and Above { } HND { } NCE { } ND { } Technical Education { } WASSCE { } Primary Six Certificate { }
5. Years on the Job: 1 – 5 years { } 6 – 10 { } 11 and above { }
6. Age Group: 18 – 30 years { } 31 – 40 years { } 41 and above { }
7. Sex: Male { } Female { }
8. Marital Status: Single { } Married { } Widowed { } Separated
9. Salary / Income per month: 15,000 – 25,000 { } 26,000 – 50,000 { } 51,000 – above { }
10. Religion: Islam { } Christianity { } others { }
11. Ethnic Affiliation: Yoruba { } Hausa { } Igbo { } others { }

SECTION 2. BREWING INDUSTRY SAFE PRODUCTION QUESTIONNAIRE

Dear respondents, this questionnaire contains questions that are designed to elicit information on your safe production practices. These include your attitude to safety at work, level of compliance with safety rules and usage of personal and other protective equipment. Please be as honest as possible as your response will be strictly confidential. Use this format as a guide. Most Regularly (MR) More Regularly (OR) Regularly (R) Not Regularly (NR)

S/N	QUESTIONNAIRE ITEMS	RESPONSE			
		MR	OR	R	NR
1	I undertook pre-employment physical and medical examination and usually undergo periodic medical evaluation.				

2	I always use safety glasses, gloves, goggles, chemical resistant clothing, and face shield, boots and respirators to prevent chemical hazard at work				
3	I have appropriate information on the selection of personal protective equipment e.g. safety belt, respiratory protective equipment of supplied air type.				
4	I always use alternative methods of working in order to prevent job hazards such as adding worts to tank without entering the confined space				
5	I guide against irritation and skin dermatitis by wearing protective clothings such as boots, gloves and overall				
6	I use alternative method of entering the confined spaces or minimize entry by cleaning in place systems.				
7	I avoid lifting heavy objects alone to avoid ergonomic problems				
8	I am always careful in putting bottles into a moving conveyor to avoid being dragged into the machine				
9	I can identify safety symbol on sign post and use it to avoid workplace hazard				
10	I always implement general housekeeping procedures and keep walkways free of clutters to avoid falls and trips				
11	I guide against heat stroke and heat cramps by increasing my salt intake and adequate rest periods				
12	I guide against barley itch and other irritation by having a thorough bath after work				
13	I ensure that kettles have ample head space to accommodate frothy boils to prevent boil-overs				
14	I wear bump cap at the bottling lines to prevent head injuries				
15	First aid kits is readily available in my industry for emergency.				

Section 3: Hazard Management and Control

S/N	QUESTIONNAIRE ITEMS	RESPONSE			
		SA	A	D	SD
1	Eliminating the hazard for example, vapour elimination, environmental monitoring, removal of dust and gases is one of the ways of controlling hazards				
2	Providing good sanitation and following hygiene facilities can help in controlling hazards				
3	Using the personal protective equipment such as respiratory, hearing, eyes or face, hand and body protections help in controlling hazards				
4	Labelling and storing acids and chemicals separately in a cabinet is a way of controlling hazards.				
5	A constant safety training and safety meetings will help in controlling hazard.				

KNOWLEDGE, ATTITUDE AND MANAGEMENT OF BREWING SAFE PRACTICES QUESTIONNAIRE (KAMBSPQ)

Dear Respondents,

This section contains questions in determining your general knowledge of the potential hazards that are associated with your job in the brewing industry. Your response will be treated with strict confidence. Use the following format as a guide. Strongly Agree {SA} Agree {A} Disagree {D) Strongly Disagree {SD}

Hazard Identification

S/N	QUESTIONNAIRE ITEMS	RESPONSE			
		SA	A	D	SD
1	I am aware that unsafe actions and practices can constitute				

	hazards in my job				
2	I know that physical hazard such as falls and slips on wet floors are part of the hazards encountered in my job				
3	I know that hearing loss from increased noise levels from high – speed equipment and metal barrels is one of the hazards in my job.				
4	I am aware that chemical hazards such as chlorine, anhydrous-ammonia, acids, caustics, refrigerant's, oils and lubricants can cause serious health problems.				
5	I know that confined and enclosed spaces such as tanks, grain bins, casks, vats, have the potential of causing injuries				
6	Am aware that cuts and eye injuries are common in my industry				
7	I know that carbon dioxide, nitric and other toxic substances have the potential of causing hazards in my work place				
8	I know that my job exposes me to mechanical hazards like being caught in a moving conveyor resulting in cuts and other injuries				
9	I am aware that grain entrapment, dust explosions and suffocation are leading causes of death in my industry				
10	I am aware that ergonomics hazards are common in my industry				

APPENDIX II

EXPERIMENTAL GROUP

Visual-Based Training Manual on Safe Production Practices

Introduction

SESSION 1/WEEK 1

Topic: General Orientation and Administration of Pretest Instrument

In this session, the researcher together with the assistant researchers will familiarize themselves with the participants, make the purpose of the research known to them, set ground rules and also administer the pretest instrument.

Objectives: At the end of this session, the researcher should be able to

- Initiate and establish good rapport with the participants
- Create a conducive atmosphere for discussion
- Clarify the objectives of the programme so as to enhance the commitment of the participants
- Establish the rules that will guide the training sessions.
- Administer the pretest

Activities:

Step 1: Starts with opening prayer from one of the participants.

Step 2: The researcher will welcome the participants warmly and thank them for responding to the invitation

Step 3: The researcher introduces herself as well as the research assistants after which participants are asked to do self-introduction with the aim of establishing good rapport with them.

Step 4: The Researcher explains what the programme is all about and what they stand to gain from the training programme

Importance / Benefits of the programme

- Raising the level of awareness of workers about the risks associated with their jobs
- Helps in the development of a more positive attitude towards safe production practices in the brewing industry
- Inculcates the values of safe production practices in the workers
- Enables them to identify, control and minimize hazards
- Reduction of accidents occurrence, injuries and diseases during production process

Step 5: The facilitator with the assistants will describe the procedures to be followed and the programme duration, which is eight weeks, covering

- General orientation and pretest administration
- Group briefing
- Plenary session and posttest administration

Step 6: The facilitator emphasizes the importance of regularity and punctuality and appeals to the participants to be up and doing throughout the training period

Step 7: The facilitator, with the involvement of the participants set rules to be followed during the programme:

- Regularity and punctuality at the training sessions
- Full participation and concentration by all attendants
- Putting of mobile phones on silence or switching off completely

Step 8: The participants are allowed to ask questions on confusing areas for clarification.

Evaluation: The following questions are posed to the participants

- Mention some of the activities for the training
- What do you hope to gain from the training?
- Mention some of the established rules that will guide the training sessions

UNIT 2 Administration of pretest instrument

Objectives: At the end of this unit, the participants should have filled the pretest instrument with necessary guidance from the research assistants

Activities

Step 1: The facilitator will introduce the pretest, explain the items on the instrument and let them know why they need to be very honest in their responses. He will build their confidence that whatever their responses are will be strictly between them and the researcher.

Step 2: The research assistants together with the researcher will move round to ensure that the participants are doing the right thing.

Evaluation: The pretest questionnaire administration

SESSION 2/WEEK 2

General Group Briefing

TOPICS

UNIT: 1 Definition of key concepts in Safe production

UNIT: 2 Safe production practices: An Overview

Introduction: Discussion in this session centers on key concepts like work accidents, safety, workplace safety, hazard, significant hazard and safe practices

Objective: At the end of the session, participants should be able to:

- Define key concepts in Safe Production

Content

Work accident, work environment mishap, work related mishap or mishap at work is a discrete event over the span of work prompting physical or mental work related damage.

Safety is the condition of being sheltered, the state of being shielded from mischief or other non-alluring results. It can likewise allude to the control of perceived peril so as to accomplish an adequate dimension of hazard which of course varies from one organisation to the other.

Workplace Safety can refer to a moral and moral responsibility of an organisation to evade and get rid of hazards, implement, maintain and strengthen training, perform tasks at work without injury or illness and having inner comfort that workers have taken all reasonable precautions.

Safe practices refer to those practices that prevent situations or conditions that either inadvertently or by design cause injuries, ill-health or death to workers

Hazard can allude to an action, course of action, condition, occasion, event, marvel, procedure, circumstance or substance that is a real or potential reason or source of damage. It might incorporate a circumstance where an individual's conduct might be a genuine or potential reason or wellspring of damage to the individual or someone else and without impediment, such circumstances may result in physical or mental exhaustion, awful shock or other impermanent condition that influences an individual's conduct. A risk is something that could cause harm, damage or death and incorporates movement or an undertaking, for example, lifting, conveying or tedious work, how work is masterminded or sorted out, something physical like a wet and dangerous floor, or an uneven surface, introduction to a concoction or dissolvable, or another substance that is poisonous, combustible or touchy, for example, petroleum, carbon dioxide, asbestos or tidies, the workplace or conditions, for example, cool, heat, exhaust, residue, clamor or a restricted work area.

Significant hazard is a danger that is a genuine or potential reason or wellspring of genuine mischief bringing about death or any conditions that adds up to or results in changeless loss of substantial capacity or transitory serious loss of real capacity, respiratory malady, noise-induced hearing misfortune, neurological ailment, malignant growth, dermatological ailment, transferable ailment, musculoskeletal ailment, ailment brought about by introduction to tainted material, decompression affliction, harming, vision weakness, compound or hot-metal consume of eye, infiltrating injury of eye, bone crack, cut, smashing. Removal of a body part, etc. Perils can be physical, organic or synthetic. Some emerge from work procedures, for example, mechanical

dangers, clamor or harmful substances, while others result from gear or machine disappointments or abuse, control or power framework disappointments, concoction spills and basic disappointments. Overseeing dangers in the work environment is something that ought to happen constantly and not something to be considered once and afterward overlooked

Activities

Step 1: The facilitator welcomes the participants to the second session of the training and briefly remind them about the proceedings of the first session.

Step 2: Graphic display of the key concepts on the Projector

Step 3: The facilitator also explains the key concepts and ask their opinions about these concepts

Step 4: The participants are asked to express their opinions on the concepts

Evaluation: The following questions are posed to the participants

- Mention at least four concepts in safe production practices
- Explain with critical examples three of the concepts mentioned.

UNIT 2 Safe Production Practices: An Overview

Objectives: At the end of this session, participants should be able to

- Describe Safe production practices
- Mention the features of Safe production practices
- Highlight the importance of safe production practices

Content

Safe production practices refer to those practices that prevent situations or conditions that either inadvertently or by design cause injuries, ill-health or death to workers in the brewing organisations. These are practices that bring about safety during production processes.

Features of Safe production practices

- Having adequate information about what constitutes hazards in the brewing industry.
- Using available personal protective equipment such as gloves, eye glasses protective clothings, face shields, boots, respirator and so on,
- Developing positive attitudes towards safety measures.

- Employing other safety interventions such as workplace inspections and safety meetings to prevent or reduce the occurrence of accidents and illnesses in the brewing industry.

Justify the need for ensuring safe production practices

- Enhances workers safety, keep employees safe, prevent injuries, illnesses and fatalities
- Reduces frequency of risks/accidents and its severity rates
- Increases productivity and thereby enabling the industry to meet its productivity target
- Boosts workers morale and help them to work better, thereby enhancing quality
- Saves money, reduces quantity, severity and financial impact of injuries and illnesses
- Reduces insurance and workers compensation costs
- Promotes efficient and effective work practices and procedures.
- Prevents the industry from incurring unnecessary debts in settling medical bills

Activities

Step 1: The facilitator welcomes the participants to the second unit of the training session.

Step 2: The facilitator explains what safe production practices is and presents a graphic displays of safe production practices in the brewery

Step 3: The facilitator explains the justification or the need for ensuring safe production practices

Step 4: The participants are asked to express their opinions on the concepts

Evaluation: The participants are asked to respond to the following questions

- What is Safe Production Practices?
- Justify the need for ensuring Safe Production Practices among workers

SESSION 3/ WEEK 3

Accidents in breweries

Unit 1: What is an accident?

- Identifying types of accidents.

Unit 2: Causes of accidents in the Brewery

Introduction

This session, focus will be on what constitutes accidents in the breweries, the types, both general and peculiar types of accidents to be able to prevent occurrence

Objectives: - At the end of this session, participants should be able to

- Describe what an accident is.
- List the general types of accident and explain the peculiar types in the brewery.

Content

An accident is an abrupt and sudden event in the industry which interferes with the organized advancement of the work. It is an event in an industry causing real damage to an individual making him unfit to continue work schedule within forty-eight hours. As it were, an accident is a startling occasion over the span of employment which is neither foreseen nor intended to happen. Consequently, an accident is an impromptu and uncontrolled occasion in which an activity or response of an item, a substance, an individual, or a radiation results in personal damage.

Types of Accidents. (General)

Accidents might be of various sorts relying upon seriousness, strength and level of damage. A mishap causing demise or permanent incapacity is known as a noteworthy mishap while a cut that does not render the worker incapacitated is alluded to as a minor mishap. At the point when an employee gets injured with outward sign, it is external injury while damage without outward sign is internal damage. Again when damage renders a harmed worker inert for a brief period, it is a temporary mishap yet in the event that a worker is rendered incapacitated permanently, it is a called permanent disability. Finally, inability brought about coincidentally might be halfway, complete, deadly or non-lethal.

ACCIDENTS

Internal	External
Major	Minor
Fatal	Disability
	Permanent
Temporary	
Partial Total	Total Partial

Types of accidents and illnesses in Breweries

- Burns resulting from chemical exposure and spills from boiling froths
- Back injuries resulting from improper lifting, over exertion
- Crushing injuries resulting from falling objects
- Slips and falls from heights
- Hearing loss resulting from incessant noises and vibrations
- Acute bronchitis/ lung disease resulting from dust and fumes inhalation.
- Cuts, bumps and others
- Deaths resulting from inhaling carbon dioxide Co_2

Activities

Step 1: The facilitator welcomes the participants to another session and briefly summarises the topic for the previous session.

Step 2: The facilitator presents images and pictures of accident scenes and victims of brewing accidents on the projector

Step 3: The facilitator allows interactions among the participants to enable them ruminate on what will happen if ?

Step 4: The facilitator displays the general and peculiar types of accidents on the projector and explains step by step

Evaluation: The following questions are posed to the participants

- What is an accident?
- Highlight eight types of accidents in the brewing industry

Unit 2

Causes of accidents

Objectives

At the end of the unit session, participants should be able to;

- Categorise three typical causes of accidents in the brewery
- Illustrate with typical examples from their departments in the brewery

Content

The Industrial safety specialists have categorized the various causes of accidents into three comprehensive categories

- Unsafe Acts / Practices
- Unsafe Conditions
- Other Causes

Unsafe acts/ practices :- A larger part of workers appear to find faults when work environment mishaps happen as opposed to investigating the underlying causes, while most mishaps that happen are actually the faults of the individual associated with the mishap. Mishaps happen because of specific follows up on the part of the workers. These demonstrations or practices might be because of absence of information or expertise with respect to the worker. Instances of these unsafe practices include:

- Short cuts: - Human beings are extremely lazy and so taking shortcuts is a somewhat common practice everywhere, not necessarily the brewing industry alone. When workers take shortcuts especially when they are at work with hazardous tools and poisonous substances, they are exposing themselves to probable tragedy. Taking shortcuts simply increases the employees' threat of damage or worse, loss of life.
- Over certainty/ confidence: - When employees stroll into work each day with the frame of mind that 'accident will never occur to me' they are setting a mentality that prompts off inappropriate techniques, methodology, and devices while at work.
- Poor or Lack of Housekeeping: - Poor or Lack of Housekeeping: - Housekeeping is amongst the most precise pointers of the industry' demeanor towards production, quality and employees' security. An ineffectively kept environment prompts risks and dangers all over the place while great housekeeping increases safety.
- Starting an assignment before getting all fundamental instructions/Operating without expert directive: - To carry out a responsibility right is to ensure that all relevant information identifying with the errand are all around processed. Workers who start a vocation with simply half information or half guidelines are basically carrying out the responsibility indiscriminately
- Neglecting Safety Procedures/Failure to utilize safe clothing and individual protective equipments: - This is likely the most exceedingly bad as purposely dismissing set safety methods or inability to utilize the sheltered clothings as well as defensive supplies in the

brewing organisations endangers the worker as well as others around him and the industry in general. Following set techniques casually does not work either.

- Mental Disturbances: - Every individual has life outside the work environment and sometimes when life takes a down turn, emotions and mood may be negatively affected. Employees should therefore not allow mental disturbances and personal troubles have emotional impact on their performance at work. They will not only become unaware of their surroundings, not as much safe, they will also become less industrious, costing the industry money and time.
- Working at unsafe speed
- The use of unsafe tools or using tools in an unsafe manner
- Get rid of safety strategies
- Assuming or positioning oneself in an unsafe manner under heavy loads

Precarious Conditions (Job-related)

Precarious working conditions are perhaps the greatest reasons for mishaps. These are related with damaged plants, devices, types of gear, machines and materials. Such causes are known as technical causes. They emerge when there are ill-advised protected types of gear, deficient hardware, insufficient lighting and ventilation, risky capacity and lack of security gadgets. Other reasons include;

- Psychosomatic reasons such as monotony, fatigue, working extra time and danger zones in the industry.

Others

These causes emerge out of hazardous situational, ecological and climatic conditions and varieties which may incorporate unreasonable commotion, muggy conditions, awful working conditions, undesirable condition, elusive floors, residue and vapor, inadmissible clothings, poor fire alert frameworks and contact with radiations.

Activities

Step 1: The facilitator introduces the topic in this unit as causes of accidents in the brewing industry.

Step 2: The facilitator presents images and pictures of accident scenes and victims of brewing accidents on the projector

Step 3: The facilitator allows interactions among the participants to enable them ruminate on what will happen if ?

Step 4: The facilitator displays the classification of causes of accidents on the projector and explains step by step

Evaluation: Participants are asked to respond to the following questions

- Mention the three classifications of causes of accidents in the brewery
- Discuss elaborately with examples each of these classification of accident causes.

SESSION 4/WEEK 4

Awareness of Hazard / Risk in Brewing and Workers' Safe Practices

Introduction: The facilitator will display flash cards of hazards in the brewery. Such as ergonomics hazards, physical hazards, confined spaces, explosion hazard and safe practices to prevent occurrence of accidents and illnesses.

Objectives:

At the end of the session, participants should be able to:

- Identify the various forms of hazard associated w:ith their work with concrete examples
- Explain the consequences of these hazards to their health
- Suggest safe practices of workers to prevent accidents and illnesses

Content

Ergonomics Hazards: - Repetitive motions at packaging lines

Brewing works that may open employees to dangers normally emerge from substantial manual lifting and conveying, repetitive work includes

- packing and cleaning
- Lifting and carrying malt baggage, movable hoses, kegs
- Uncomfortable posture such as tilting, reaching and meandering

Consequences on workers' health: - Work- related musculoskeletal disorders WMDs

Suggested Safe Practices

- Using mechanical lifting aids where possible
- Avoid heavy or awkward lifting
- Using height adjustable tools or tables

- Avoiding handling loads with unprotected edges
- Two person lift that is do not lift alone
- Using employee stretching programme like body rotation
- Have micro breaks

Physical hazards

These include: Exposure to same dimension fall because of elusive conditions, working and walking surfaces, treatment of glass bottles, utilization of machines and tools, crashes with internal transport types of equipment, for example, plants, blenders, processors and transports

Consequences: - slips and trips, glass inflicted injuries and fingers, hair and clothing getting caught up in the moving machines.

Suggested Safe Practices

- Prevent spillage and where it is unavoidable, clean up spills immediately
- Implementation of general cleaning processes like keeping staircases, platforms, and aisle clutter free, stockpile supplies appropriately on shelves to prevent obstructions
- Avoid uneven floors and obstructions in walkways
- Use appropriate personal protective equipment such as slip resistant threads boots, safe clothing's and eye goggles

Confined Spaces

This is prevalent in brew houses and can be life threatening if toxic fumes are inhaled in a confined area. Confined space is

- Big enough to allow for human entrance and perform work
- Has constraint methods of access and departure
- Not intended for persistent human inhabitance

Consequences: - Death

Suggested Safe Practices

- Minimise need for entry into confined space by cleaning in place systems (CIP)
- Provide non-restricted admittance for example increase stairways or pathway
- Carry out tank checkup from outside
- Add to tanks without entering
- Monitor conditions during entry and have rescue services in place

- Use appropriate personal protective equipment (PPE) such as safety belts and respiratory protective equipments

Explosion Risk

Natural dusts emerging from grain stockpiling, processing and transport tasks present a blast in areas of the bottling works where these activities happen.

Consequences: - Barley itch, organic dust toxic syndrome, mucous membrane irritation, acute bronchitis or lung disease and severe respiratory incapacity / suffocation /death

Suggested Safe Practices

- Having a thorough wash and good sanitary practices
- Frequent sweeping to control dust accumulation
- Using dust removal and reusing systems to get rid of dust from work environments
- Regulating all smoldering things
- No smoking to prevent ignition
- No use of cell phone
- Use appropriated personal protective equipment like nose cover to prevent inhalation of substance

Activities

Step 1: The Facilitator welcomes the training group once again to the session and asks them questions on the previous session.

Step 2: Practical examples are displayed on the projector for the participants to observe

Step 3: The facilitator then explains some of these hazards, state their consequences on workers' health and finally suggest safe practices for workers to prevent accidents and illnesses

Step 4: The facilitator displays pictures of some of these safe practices

Evaluation

- Identify four hazards in the brewery and explain their health consequences
- Mention at least three suggested safe practices that are associated with each hazard

SESSION 5/WEEK 5

Awareness of Hazard and Risk in Brewing and Workers' Safe Practices

Introduction

This session continues with the hazards and risks in brewing which include thermal hazard, chemical hazard, machinery/ powered industrial trucks hazard, keg safety, noise, head injuries and cuts. Their health implications and suggested safe practices to prevent or control accidents and illnesses are also discussed.

Objectives:

At the end of the session, participants should be able to

- Identify the various forms of hazard associated w:ith their work citing practical examples
- Explain the consequences of the hazards on workers' health
- Suggest safe practices of workers to prevent accidents and illnesses

Content

Thermal Hazard

Boil overs are one of the most dangerous and frequent incidents in the brewery. Mash and Lauter tuns can reach 170^{o} F making the kettles boiling the worts to overflow. The use of plastic kegs is equally hazardous as plastic kegs can explode during the process of cleaning out.

Consequences on Health: - Severe burns

Suggested Safe Practices

- Kettles must have ample headspace to accommodate frothy boil, so brewers should not overload their kettles beyond volume limits
- Installing an over-boil sensors that cut off the kettle heat if an over-boil is imminent
- For keg safety, the Brewers' Association Performance Guiding principle for reusable kegs include:
- Never change or mess with security gadgets
- Never mess with barrel valve
- Systems associated with barrels ought to have a weight controller and weight alleviation valve
- Maintain weight temperature, volume and stream settings as per the producer
- Only use barrel from your distillery
- Enclosed pressurized cleaning technique
- Always assess barrels, Sankey valve, steel ball and o ring.
- Always use personal protective equipment, for example, long protective cover and jeans, safety goggles and gloves and face shield for protection.

Chemical hazards

Common chemicals include:

- Caustics: - Potassium hydroxide, sodium hydroxide, sodium hypochlorite
- Acids: - Phosphoric, nitric, iodophil and peracetic acid
- Gases: - Carbon dioxide, Oxygen, ammonia, Ozone
- Glues
- Oils and lubricants
- Refridgerants

Consequences on health

Caustics - Contact with the skin can cause severe dermatitis,

Acids and ammonia - severe burns to the skin and respiratory problems.

Carbon dioxide CO_2: - CO2 is produced during fermentation and maturation process. Uncontrolled discharge of these gases or insufficient ventilation especially in limited spots can result in aggregation of adequate focus to display suffocation dangers. If breathed in for a brief span may produce blackout, asphyxia and possible death.

Suggested Safe Practices

- Having a thorough wash and proper sanitary habits
- Adequate ventilation throughout the brew house
- Have a chemical inventory and storage cabinet in place
- Separate the incompatibles and label all chemical containers appropriately
- A C02 monitor or an acoustic warning systems should be installed
- Workers should recognize alarms and know evacuation procedures
- Use of suitable personal protective equipment like the breathing protecting apparatus of the supplied air type or self-contained
- A standby worker should be available for supervision or rescue services

Powered Industrial Trucks/ Machinery Hazard

These are power driven van used to convey, shove, jerk, boost or pile materials. For example, fork lifts, pallets lorries, rider trucks or lift trucks, conveyor belts etc**.**

Consequences:

- Body or clothing may get caught up in the machine causing severe damage or death

Suggested Safe Practices

- Daily inspections of machines
- Never load a power industrial truck beyond its rated capacity
- Designate aisles or walkways
- Inspect pallets before moving
- Limit access to Power industrial truck area
- No speeding

Exposure to commotion and vibrations: - Brew workers might be exposed to clamor emerging from transport of crude materials and finished items and from procedures and utility hardware.

Consequences on health

- Irreversible hearing loss

Suggested Safe Practices

- Using ear cover to block noise and vibrations

Head injuries and cuts

Head injuries such as bumps and cuts are common around bottling lines

Suggested Safe Practice

- Use bump cap that looks like regular baseball cap customized with the company logo.

Activities

Step 1: The Facilitator welcomes the participants once again to the session and asks them questions on the previous session.

Step 2: The facilitator displays flash cards on the hazards which include thermal, chemical, Machinery or power industrial trucks, head injuries, cuts and exposure to noise and vibrations hazards and their consequences on workers' health.

Step 3: The facilitator picks each of the flash card and discuss elaborately on them

Step 4: Participants are also asked to cite examples from their various units.

Step 5: The facilitator then suggests safe practices for each of the hazard and show pictures on the projector for illustration.

Evaluation

- Identify four hazards in the brewery and explain their health consequences
- Mention at least three suggested safe practices that are associated with each hazard

SESSION 6/ WEEK 6

Management of Hazard in the Brewing Industry

Introduction

This session will focus on ways by which hazards can be managed in the industry.

Objectives: At the end of the session, participants should be able to:

- State the four steps towards managing hazards
- Discuss the proactive approaches to reducing hazards

Content

Dealing with hazards in the industry should be a constant issue and not something to be considered at once and forgotten. There are basically four steps towards managing hazards in the brewing industry and these include

- Identifying hazards: - This involve ascertaining the things that may cause damage or impairment to health. Here, the management needs to look further than the apparently bodily ones and look for vulnerabilities that go along with work processes in the industry, such as how different tasks are performed, the layout, how work is organized and the physical conditions.
- Evaluating the hazards: - Whether they are substantial or not, or the probability and severity of the wounds or harm would be in the likely event workers are exposed to such vulnerabilities
- Controlling the risks involves adopting practical steps to remove, separate or minimize the hazard. Elimination involves removing the hazard completely from the industry but if it cannot be eliminated, then it should be isolated from workers, if it cannot be isolated, it should be minimized by limiting the exposure of people to such hazards with the provision of personal protective equipment. PPE.
- Monitoring hazards and any contact with a menace that has been removed, seperated or minimized and reviewing these policies on a regular basis particularly if there is any newly introduced technologies or changing standards.

Proactive approaches to reducing hazards

Safety meetings committees

- Use gatherings to proactively ascertain and fix threats
- Discuss mishaps and close misses, advance proposals and assign activities
- Permits all workers to have a voice and shared obligation in keeping up a safe workplace

- Generates and stimulates a safety values.

Job Hazard Analysis

Implement controls based on the following order: -

- Elimination / replacement.
- Industrial controls
- Organizational control
- Personal Protective Equipment (PPE) e.g safety glasses, goggles, face shields, steel-toed boots or fall resistant thread boots, chemical resistant suits or safety clothings, gloves, bump cap, respirators, hearing protection and nose cover e.t.c

Summary

- Breweries have many hazards
- Safety should be a state of the mind
- Proactively recognize and deal with hazard
- Do not delay in developing a safe attitude towards production until an injury or death occurs.

Activities

Step 1: The facilitator once again welcomes the participants to yet another session of the training programme and reminds them of the proceedings of the previous session

Step 1: Graghic displays of the steps towards managing hazards in the brewery is displayed on the projector while the facilitator explains step by step

Step 2: Participants are encouraged to make specific reference to their units/departments

Step 3: The facilitator also display the proactive approaches towards hazard reduction and explains while participants are encouraged to cite examples

Evaluation: Participants are asked to respond to the following questions;

- Discuss the four steps towards hazard management in your industry
- What are the proactive approaches towards hazard reduction

SESSION 7/ WEEK 7

Plenary Session

Introduction

All the salient points raised during the training period are presented here for general debrief. Further reviews, questions and suggestions are made towards ensuring safe production practices in the brewing industry

Objectives:

At the end of the session, participants should be able

- To compare notes.

Step 1: The facilitator welcomes the participants and inform them the basis for the session is to review all that has been discussed during the training period

Step 2: After general review, the participants are allowed to raise questions and other suggestions

SESSION 8/WEEK 8

Conclusion

Lessons learnt and suggestions

Posttest administration.

APPENDIX 111

Control Group

Building Leadership Skills Training Manual

Introduction

SESSION 1/WEEK 1

Topic: General Orientation and Administration of Pretest Instrument

In this session, the researcher together with the assistant researchers will familiarize themselves with the participants, make the purpose of the research known to them, set ground rules and also administer the pretest instrument.

Objectives: At the end of this session, the researcher should be able to

- Initiate and establish good rapport with the participants
- Create a conducive atmosphere for discussion
- Clarify the objectives of the programme so as to enhance the commitment of the participants
- Establish the rules that will guide the training sessions.
- Administer the pretest

Activities:

Step 1: Starts with opening prayer from one of the participants.

Step 2: The researcher will welcome the participants warmly and thank them for responding to the invitation

Step 3: The researcher introduces herself as well as the research assistants after which participants are asked to do self-introduction with the aim of establishing good rapport with them.

Step 4: The Researcher explains what the programme is all about and what they stand to gain from the training programme

Importance / Benefits of the programme

- Ability to encourage others, create trust, and promote cooperation.
- Ability to manage and superintend systems and processes.
- Concentrating on doing things appropriately.
- Judicious use of resources

Step 5: The facilitator with the assistants will describe the procedures to be followed and the programme duration, which is eight weeks, covering

- General orientation and pretest administration
- Group briefing
- Plenary session and posttest administration

Step 6: The facilitator emphasizes the importance of regularity and punctuality and appeals to the participants to be up and doing throughout the training period

Step 7: The facilitator, with the involvement of the participants set rules to be followed during the programme:

- Regularity and punctuality at the training sessions
- Full participation and concentration by all attendants

- Putting of mobile phones on silence or switching off completely

Step 8: The participants are allowed to ask questions on confusing areas for clarification.

Evaluation: The following questions are posed to the participants

- Mention some of the activities for the training
- What do you hope to gain from the training?

UNIT 2 Administration of pretest instrument

Objectives: At the end of this unit, the participants should have filled the pretest instrument with necessary guidance from the research assistants

Activities

Step 1: The facilitator will introduce the pretest, explain the items on the instrument and let them know why they need to be very honest in their responses. He will build their confidence that whatever their responses are will be strictly between them and the researcher.

Step 2: The research assistants together with the researcher will move round to ensure that the participants are doing the right thing.

Evaluation: The pretest questionnaire administration

SESSION 2/ WEEK 2

General Group Briefing

Topics

UNIT 1. Definition of Key Concepts

UNIT 2. Leading Staff through Change

Objectives

At the end of this session, participants should be able to:

- Describe a leader
- Mention the key concepts in leadership skills
- Define the concepts

Content

Definition of Key concepts: -

LEADER: - Someone who inspires and directs others toward the attainment of a goal.

MISSION: - A mission connotes a proclamation that recapitulates the purpose of an organization and offers the justification for crucial aims and intentions.

VISION: - A vision is a dream of expectation, somewhat one sincerely aspires to generate.

TRUST: - This implies an awareness or feelings of safety, that another person will not take advantage of someone, thereby putting one's self-worth and position in that person's hand.

WORK ENVIRONMENT: - is the dominant workplace atmosphere as experienced by workers. It is the expression of what workplace should be.

Activities

Step 1: The facilitator welcomes the participants to the second session of the training and briefly remind them about the proceedings of the first session.

Step 2: The facilitator also explains the key concepts

Step 3: The participants are asked to express their opinions on the concepts

Evaluation: The following questions are posed to the participants

- Mention at least four concepts in building leadership skills training
- Explain with critical examples three of the concepts mention

UNIT 2: -

Content

Directing staff through change: - Up-and-coming supervisors lead their staff through five stages:

1. Make out a task

2. Ascertaining encouraging practices

3. Adjusting and trying one auspicious practice or established practices

4. Executing innovative practices

5. Surmounting the fruitful new practices

Objective: - By the end of this session, the participants should be able to:

- State the five stages of directing staff through change

Activities

Step 1: The facilitator welcomes the participants to the second unit of the training session.

Step 2: The facilitator explains each stage of change one by one

Step 3: The participants are asked to express their opinions on the stages

Evaluation: The participants are asked to respond to the following questions

- How many stages are involved in directing staff through change?
- Discuss at least three stages out of the identified

SESSION 3/ WEEK 3

UNIT 1: Leadership and Leadership styles

UNIT 2: Leadership Competences

Objectives: At the end of the session, participants should be able to:

- Define leadership
- Analyze distinctive initiative
- List and depict leadership aptitudes

Content

A Leader is somebody who energizes and manages others toward the accomplishment of an objective. Leadership characteristics incorporate the capacity to spur others, create trust, and advance cooperative work. In order to do so, possession of knowledge and skills are required by supervisors.

Leadership Styles, Narrative, Benefits and Shortcomings

Authoritarian Leader: - Takes decisions and pronounces them to the workers.

Benefits:

• Style avoids unnecessary wastage of time.

• Decisions are usually flawless and unambiguous.

• Leader is perfectly in control.

Shortcomings:

• No consideration for other options that may even be better.

• Staff may remain noncommittal to the decision imposed on them.

• Staff may be indignant or unhelpful.

Authoritarian Style, with input: - Leader takes decisions having received input from one or more staff members and announces such decisions to the staff

Benefits:

• Style leads to well informed decision making.

• Decision making process are relatively quick with this approach.

• Decisions are usually clear and final.

Shortcomings

• Uninvolved staff may demonstrate lack of commitment or cooperation.

• Other, better alternatives may not be considered.

Consensus-oriented Style: - The entire team discusses and agrees to decisions taken jointly.

Benefits:

- Staff feel more involved and committed to decisions taken
- Greater support and opportunity for implementation are better achieved.
- Authority is vested and maintained by the leader.

Shortcomings:

• The style is time-consuming and may require several meetings before final decision is taken.

• Decisions may be unclear especially if it is compromised.

• To reach a consensus may not always be possible.

Democratic Style: - The entire members of the group vote for their favored decision.

Benefits:

• Staff sense of involvement is guaranteed.

• High level of support is received on decisions taken.

• Opportunity for implementation is assured.

Shortcomings:

• Decision-making procedure may take additional time.

• Most famous decision may not be best option obtainable.

• Those that are not in support of the choice may feel indignant.

Delegating Leader: - This leader relegates basic leadership duty to someone else or a group.

Benefits:

• This style offers open door policy for creating leadership characteristics in others.

• Chance of usage is a lot higher.

Shortcomings

• Leader loses control.

• Pronouncements may take longer than should be expected.

• Group may not possess the required abilities and awareness to make an informed choice.

Activities

Step 1: The facilitator welcomes the participants to another session and briefly summarises the topic for the previous session.

Step 2: The facilitator describes a leader and what leadership entails to the participants.

Step 3: The facilitator goes further to identify leadership styles and explain each style

Step 4: The facilitator states and explains the advantages and disadvantages of each style

Step 5: The facilitator allows interactions and questions from the participants

Evaluation: The following questions are posed to the participants

- What is leadership?
- Highlight five styles of leadership in an organization

UNIT 2

Objectives: At the end of this unit, participants should be able to:

- Identify leadership proficiency skills
- Explain each skill extensively

Content

Leadership Proficiency Skills

- Aptitude Application: - Self-mastery and reflection, awareness of one's impact on others, effective management of emotions, utilising strengths and working on weaknesses.
- Examining the big picture: - Have a broad focus of conditions beyond the immediate work environment.
- Generate a shared vision: - Team work with others in the organisation to envisage a better future and utilise this vision to concentrate all your efforts.
- Elucidate purpose and main concerns: - Identify your own principles and the most important things to achieve.
- Connect effectively: - Have conversations that are directed on outcomes, balance encouragement with investigation, and simplify expectations, views, and state of mind within yourself and others.
- Stimulate dedicated teams: - Make for precision, conviction, and appreciation that are essential to guide to greater performance that can be constant over a given period.
- Discuss conflict: - Consensus reached can be beneficial to both sides.
- Direct change: - Empower group of workers to own tasks, procure interested party, and traverse through unsteady conditions

Activities

Step 1: The facilitator introduces the topic in this unit as proficiency skills in leadership

Step 2: The facilitator lists these skills

Step 3: The facilitator explains each of the proficiency skills one by one

Step 4: The facilitator allows the participants to ask questions for further clarifications

Evaluation: Participants are asked to respond to the following questions

- Mention at least five types of leadership proficiency skills

- Discuss elaborately the five types mentioned.

SESSION 4/WEEK 4

Building Trust and Vision

Objectives: - By the end of this session, the participants will be able to:

- Describe the behaviours that aid in nurturing trust
- Itemise the criteria for stimulating vision

Content

Criteria for nurturing vision:

• Reflection of a great standard of routine

• Representation of impending and quantifiable accomplishments

• Invokes images and pictures

What Is Trust? : -Trust implies awareness that a different person can not take advantage of someone, allowing the feeling of safety and entrusting one's self-worth and place in a different individual's care.

Behaviours that assist in fostering trust

- Creating and maintaining an environment that is conducive and not threatening.
- Maintaining confidentiality in general meetings, accord all staff the desired respect and as contemporaries using enabling expertise to ensure mutual respect among all staff irrespective of status.
- Pay consideration regarding the physical condition, including seating plan amidst gatherings.
- Ensuring free flow of information is germane. People feel valued when people are kept informed and see themselves as vital part of the team, secrecy breeds threat. Communiqué ought to be as comprehensive as conceivable and must convey constructive memoranda of conviction.
- Constructive response should be provided.
- Model appropriate conduct by demonstrating trust in others while being steadfast yourself.
- Ensure constancy between your words and activities. On the off chance that you scheduled the next supervision visit at a particular time, make sure that commitment is respected.
- - Ensure consistency between your words and activities. On the off chance that you state that your next supervision visit will hold at a specific time, ensure that dedication is

regarded. If for one reason or the other. Such promised visit will not hold, communicate the reasons and schedule another appointment. If a training is slated and promised, be sure that it is arranged.

- Indicate your trust in workers by assigning responsibilities to them as frequently as could be allowed and by recognizing and commending their accomplishments.
- Exercise suitable openness: Sharing your thoughts and wants with people brings trust and understanding. However, revealing too much may become problematic especially in cultures where sharing one's thoughts and feelings are uncommon. Cultural constraints should be kept in mind when practicing self-disclosure.

Activities

Step 1: The Facilitator welcomes the participants once again to the session and asks them questions on the previous session.

Step 2: The facilitator lists and explains the criteria for arousing vision

Step 3: The facilitator further describes trust to the participants

Step 4: The facilitator discusses the various ways of building vision and trust in leadership

Evaluation

- Identify three criteria for inspiring vision
- Mention at least five ways of building vision and trust in leadership

SESSION 5/WEEK 5

Recognition and Motivation: Guidelines for Leading Staff

Objectives: - By the end of this session, the participants will be able to:

• Define motivation as a concept

• Define the concepts of external motivation and internal motivation.

• List three or four indications of low motivation and performance

• Mention five best methods of motivating staff

Content

What is motivation? Motivation infers vitality to accomplish something. Every individual has intentions, necessities, and pools of vitality that speak to potential practices.

External and internal motivation

External Motivation: - External motivation includes utilizing helpers that accompany work. For instance, compensations, benefits, office space, and wellbeing. A dangerous worksite or pay at survival level demotivates numerous representatives. Outer inspiration can likewise incorporate giving positive criticism and acknowledgment, frequently useful sparks.

Internal Motivation: - Internal motivation originates from inside An employee. It very well may be impacted by the inclination that a director thinks about her or him as an individual and by open doors for development, movement, acknowledgment, and commitments. In the work environment, inner assets of inspiration invigorate staff as they work. Individuals regularly feel inspired for elite by one of three essential helpers or a blend of the three, power, alliance or accomplishment. For instance, individuals roused by power need places of obvious obligation. Individuals roused by alliance need to work in a gathering where the relational relations are lovely and steady. Individuals spurred by accomplishment need to see the outcomes and to realize that their endeavors added to those outcomes.

Indicators of Low Motivation and Performance Signs: - Staff may hint at specific low inspiration or execution, for example,

- Truancy and lateness
- Reduced efficiency
- Detachment and rigidity of work propensities
- Displeasure among customers
- Failure of a work gathering to accomplish specific execution targets
- Recurrent or uncertain clash among staff
- Poor correspondence among gathering individuals and with the boss
- Hostility to new procedures and thoughts

Ways to Motivate Staff

1. Personally, thank representatives for completing a decent either verbally, recorded as a hard copy, or both in an opportune manner, consistently and with genuineness.

2. Take time to meet with and tune in to your staff.
3. Provision of explicit and regular inputs to staff concerning their execution and bolster them in improving execution.
4. Reward, perceive and advance superior workers while low or peripheral entertainers ought to be managed with the goal that they improve or leave.
5. Keep staff educated about the advancement of the association, approaching administrations or items, aggressive strategies, monetary status and new arrangements,
6. Involve staff in basic leadership, particularly in choices that influence them. Support prompts responsibility and feeling of possession.
7. Provide open door for staff to create and adapt new aptitudes while urging them to put forth a valiant effort.
8. Show all staff how you can enable them to meet their work objectives while accomplishing the objectives of the association. Make an association with each representative
9. Create an open, trusting and fascinating workplace. Rouse new thoughts, recommendations, and activity. Gain from slip-ups as opposed to rebuff for them.
10. Celebrate accomplishments of the association, division, and individual staff individuals. Give chances to group and encourage morale-building and exercises.

Activities

Step 1: The Facilitator welcomes the participants once again to the session and asks them questions on the previous session.

Step 2: The facilitator defines motivation

Step 3: The facilitator further explain the two types, internal and external motivation

Step 4: Participants goes on to list and discuss the indicators or signs of low motivation and performance

Step 5: The facilitator then suggests ways of motivating staff to the participants

Evaluation

- What is motivation
- Identify and explain two types of motivation
- Highlight and discuss five indicators of low motivation and performance
- Suggest five ways of motivating staff in an organisation

SESSION 6 WEEK 6

Refining the Climate in Your Workplace through Good Leadership

Objectives

• Give a definition of work climate and elucidate its impact on staff performance

• Describe ways by which a supervisor can influence a work group's environment

• Clarify instructions for guiding the workers staff

Content

Work Climate: -Work atmosphere is the common working environment air as experienced by laborers. It indicates what it feels like to work in a spot. An organisation's work atmosphere is influenced by numerous elements inside and outside an association. The history, culture, the administrative procedures and structures, outer condition, just as inner administration and the executives practices of the organisation. Bosses and supervisors can control a portion of these components, for example, their very own administration and initiative practices without any control on others.

Key Dimensions of Climate

• Clarity

• An environment gives lucidity when the gathering knows about its jobs and duties inside the master plan. Members of the group know about the requirements of their customers, and the consequences of not having the capacity to accomplish these models.

• **Support**

In an atmosphere of support, the individual members in the group feel they have the assets and support required to accomplish the objectives. Assets incorporate basic supplies, hardware, apparatuses, staff, and spending plan. Passionate help incorporates an air of trust, common help, and merited acknowledgement plus people's deepest assets. Such an environment is made when individuals feel their skills are perceived, when they take an interest in choices that impact the work gathering, and when they sense obligation and reward for both individual and group attainments.

Challenge

An atmosphere of test exists when bunch of individuals experience prospects of putting themselves on trials with practical dangers, and find better approaches for getting things done to be increasingly fascinating. Individual groups feel a feeling of pride in having a place with their work team, feel an affirmation to shared objectives and purposes, and be prepared to grasp an alternate actions when necessary. They effectively assume liability, create aptitudes and capacities to convey fitting amenities, and are better outfitted to assume realistic risks.

Every one of the three of these measurements are basic for encouraging implementation. Workers that are faced with difficulties yet inadequate support and directness can encounter pressure and disappointment. They might feel set up to be unsuccessful. Without test or backing, workers who are distinct about desires may discover their workday prohibitive, stifling, or even reformatory. Bolstered staff won't extend themselves or fabricate their abilities on the off chance that they feel unrestrained.

Guidelines designed for Leading Staff

The subsequent tips will enable you to control staff in cooperative choice-making and encouraging responsibility.

- Share the vision of amazing services: - One of the most ideal approaches is to propel individuals is to share a motivating vision. In the event that you are excited about what the future holds for the site, on the off chance that you are idealistic about the staff's capacity to accomplish that future, and in the event that you can express it, you will

motivate them to follow you toward that objective. A staff that is amped up for the objective will be all the more eager to experience a procedure of progress so as to accomplish it. A leader could empower staff to imagine what their administration would resemble on the off chance that it were a model that everybody came to see and gain from.

- Build assurance and certainty: - Emphasize the significance of value improvement. Use acknowledgment, acclaim, and uplifting feedback to assemble certainty. At the beginning, direct the gathering toward taking care of little issues so as to assemble the certainty and aptitude to handle bigger issues.
- Be very much educated and equipped: - You can't anticipate that individuals should follow you in the event that you don't know where you are going or what you are doing. Become proficient in the abilities, quality improvement instruments, and critical thinking systems that you will exchange with your partners. At all times, be ready for gatherings and inclusions.
- Facilitation of proficiency use: - Demonstrate administration in the group's gatherings by utilizing assistance aptitudes to keep the gathering on track and oversee intuitive and control related clash.
- Fix genuine work: - Participate effectively in the undertaking by showing facilitative conduct, partaking in critical thinking exercises, and filling in as connection between the site and off-site assets. At the point when your partners see your dynamic interest, they will be influenced by your promise to the procedure and to them, and they will enthusiastically stick to this same pattern.
- Be principled: - Be straightforward in your interchanges. Offer help for staff as they actualize the quality improvement approaches that are recommended and as they participate in facilitative management.

Activities

Step 1: The facilitator welcomes the participants once again to this session

Step 2: The facilitator describes work climate to them

Step 3: The facilitator moves on to discuss the three key dimensions of work climate

Step 4: The facilitator also identifies the guidelines for leading staff and goes further to explain them one by one

Evaluation: Participants are asked to respond to the following questions;

- What is work climate?
- Discuss the three dimensions of work climate
- Mention and discuss the guidelines for leading staff?

SESSION 7 WEEK 7

Introduction

All the salient points raised during the training period are presented here for general discussion. Further reviews, questions and suggestions are made towards building leadership skills in organisations.

Objectives:

At the end of the session, participants should be able

- To compare notes.

Step 1: The facilitator welcomes the participants and inform them the basis for the session is to review all that has been discussed during the training period

Step 2: After general review, the participants are allowed to raise questions and other suggestions

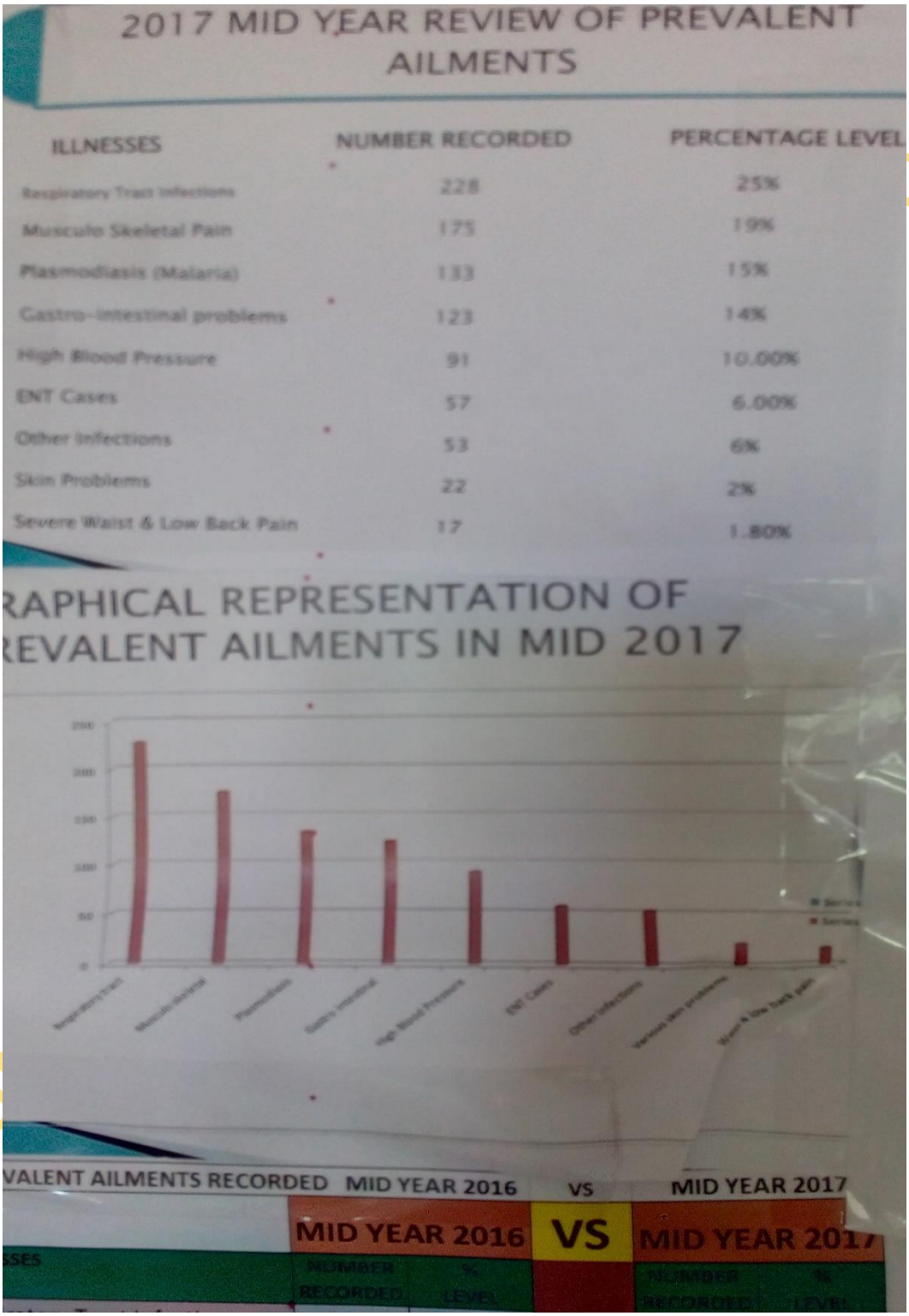
SESSION 8/WEEK 8

Conclusion

Lessons learnt and suggestions

Posttest administration.

APPENDIX 1V



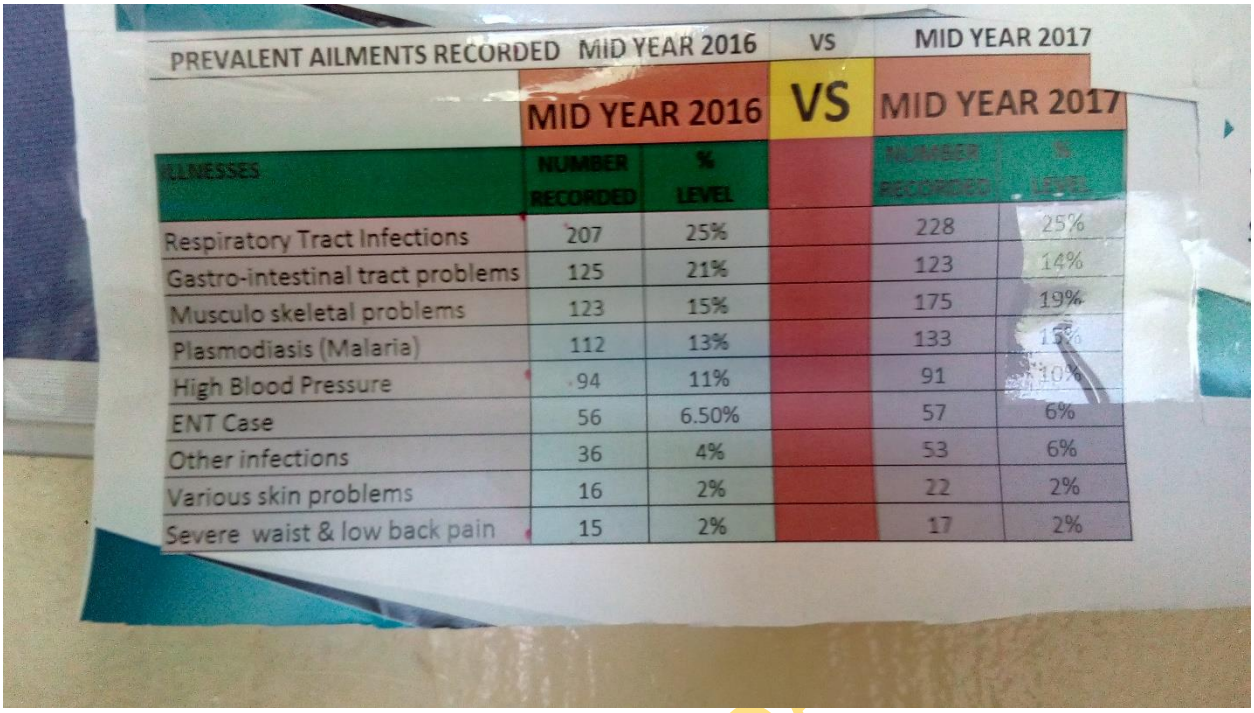
2017 MID YEAR REVIEW OF PREVALENT AILMENTS

ILLNESSES	NUMBER RECORDED	PERCENTAGE LEVEL
Respiratory Tract Infections	228	25%
Musculo Skeletal Pain	175	19%
Plasmodiasis (Malaria)	133	15%
Gastro-intestinal problems	123	14%
High Blood Pressure	91	10.00%
ENT Cases	57	6.00%
Other Infections	53	6%
Skin Problems	22	2%
Severe Waist & Low Back Pain	17	1.80%

RAPHICAL REPRESENTATION OF
REVALENT AILMENTS IN MID 2017

VALENT AILMENTS RECORDED MID YEAR 2016 VS MID YEAR 2017

MID YEAR 2016 VS MID YEAR 2017



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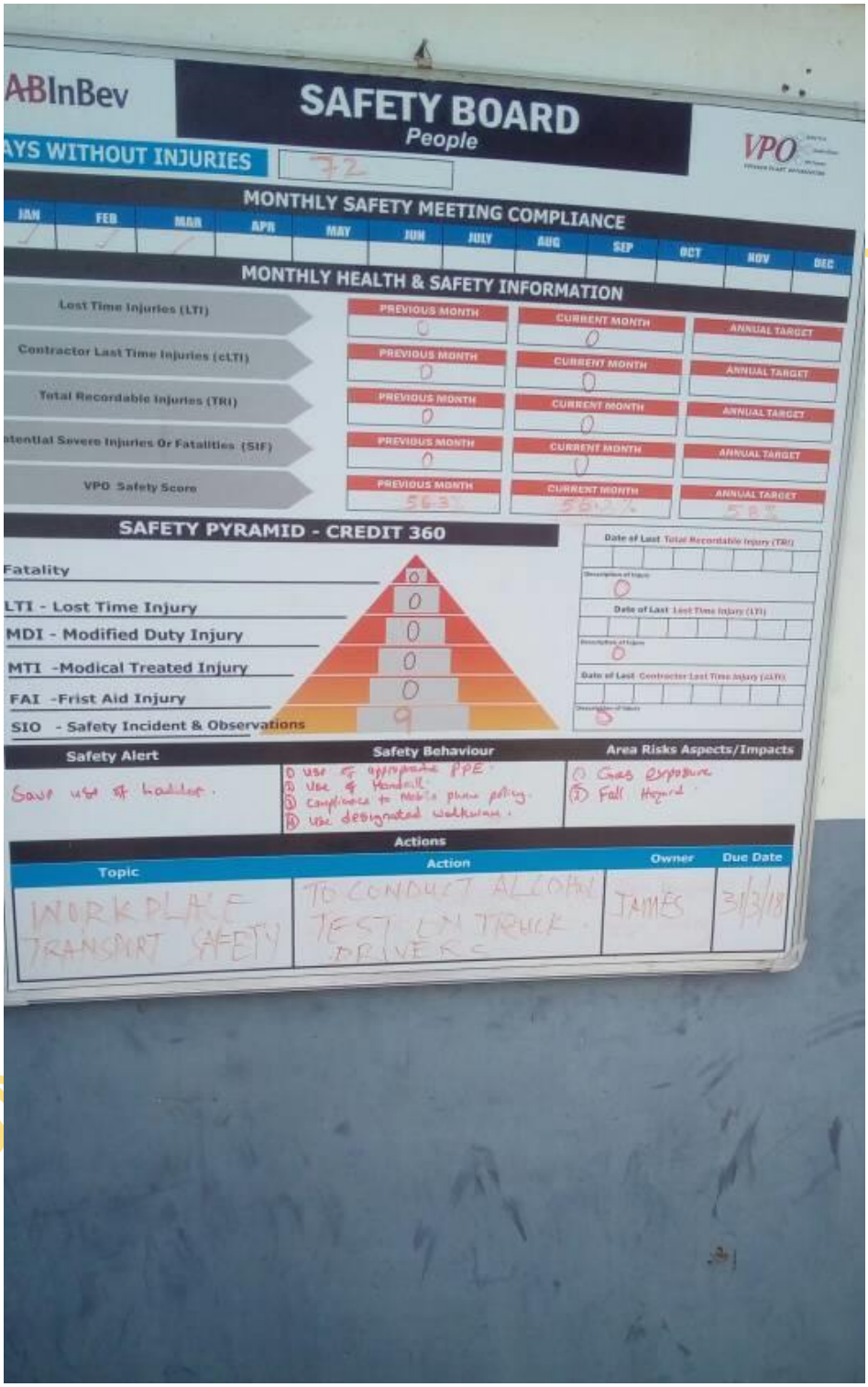
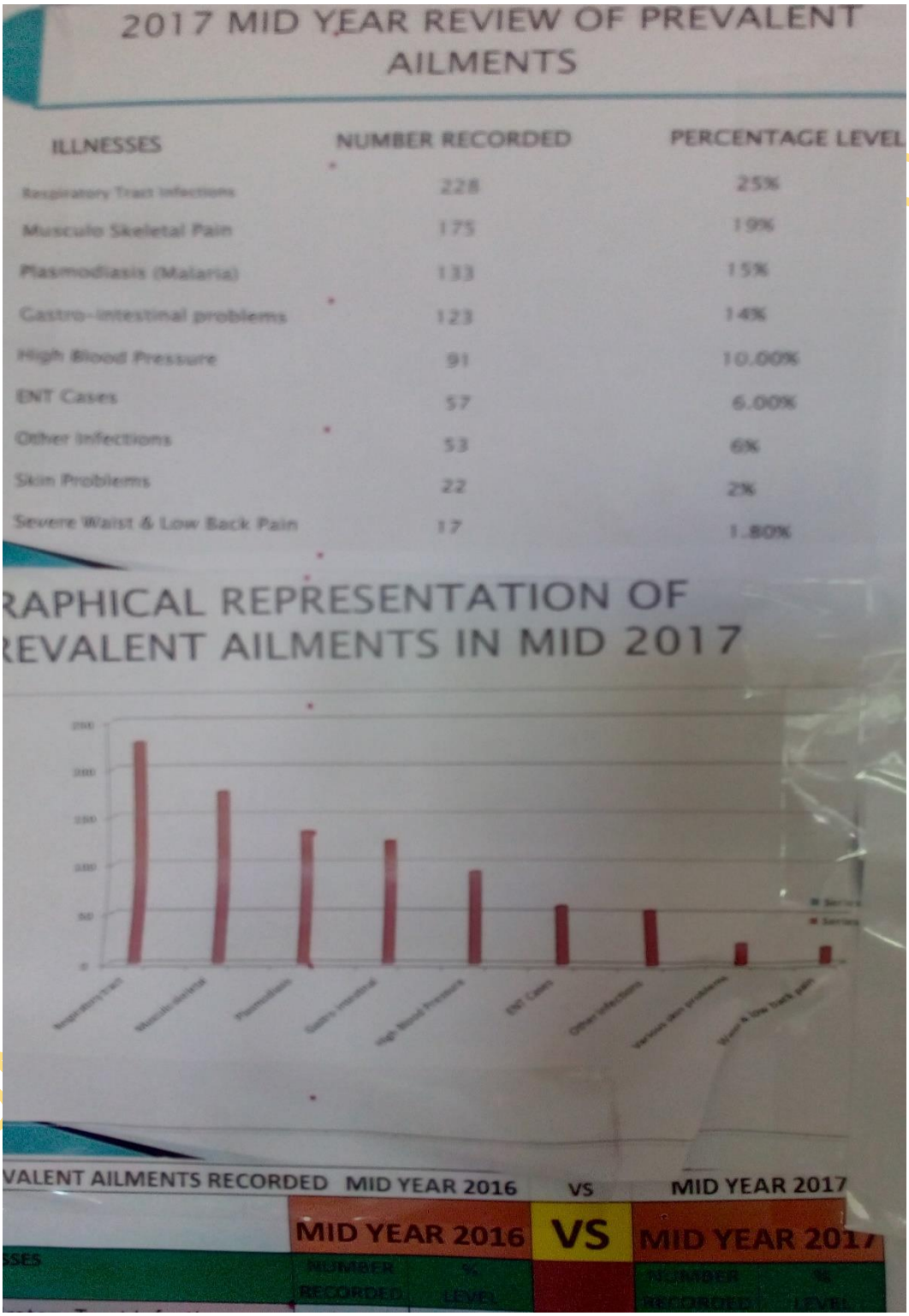
Plasmodiasis (Malaria)	112	13%		133	15%
High Blood Pressure	94	11%		91	10%
ENT Case	56	6.50%		57	6%
Other infections	36	4%		53	6%
Various skin problems	16	2%		22	2%
Severe waist & low back pain	15	2%		17	2%

POST TREATMENT SAFETY BOARD BETWEEN JANUARY-MARCH 2018



RESEARCHER



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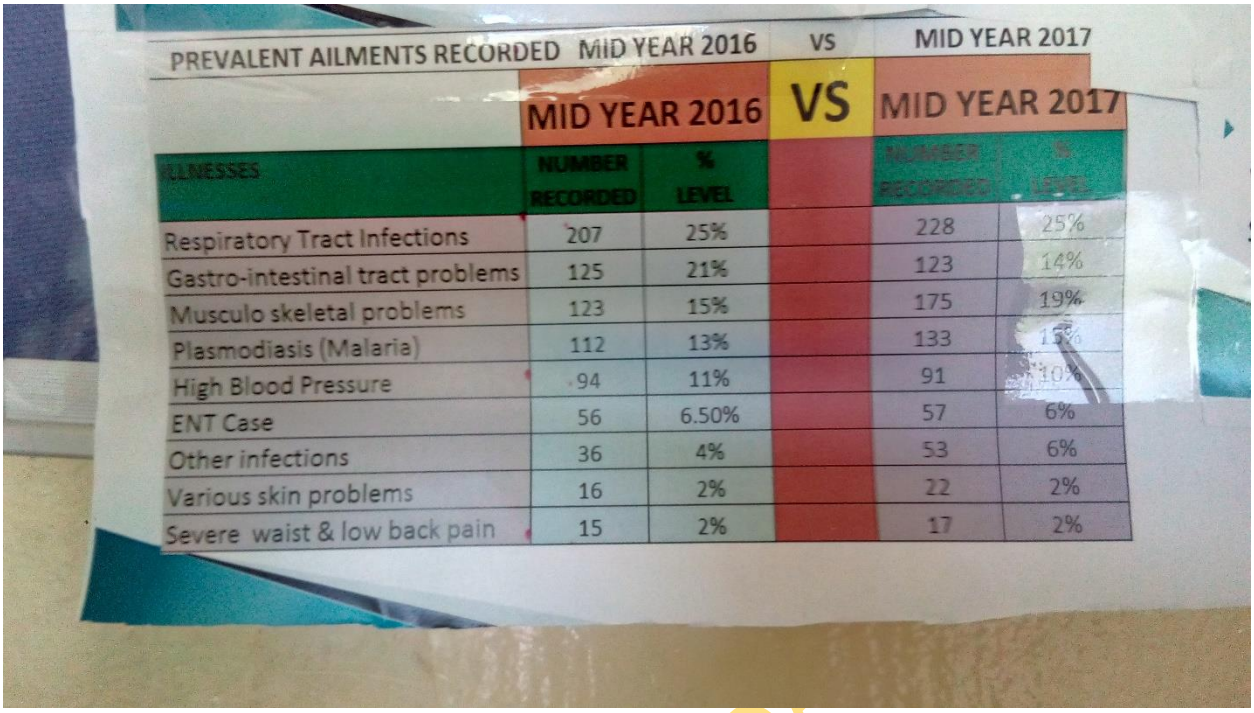
MID YEAR 2016 VS MID YEAR 2017



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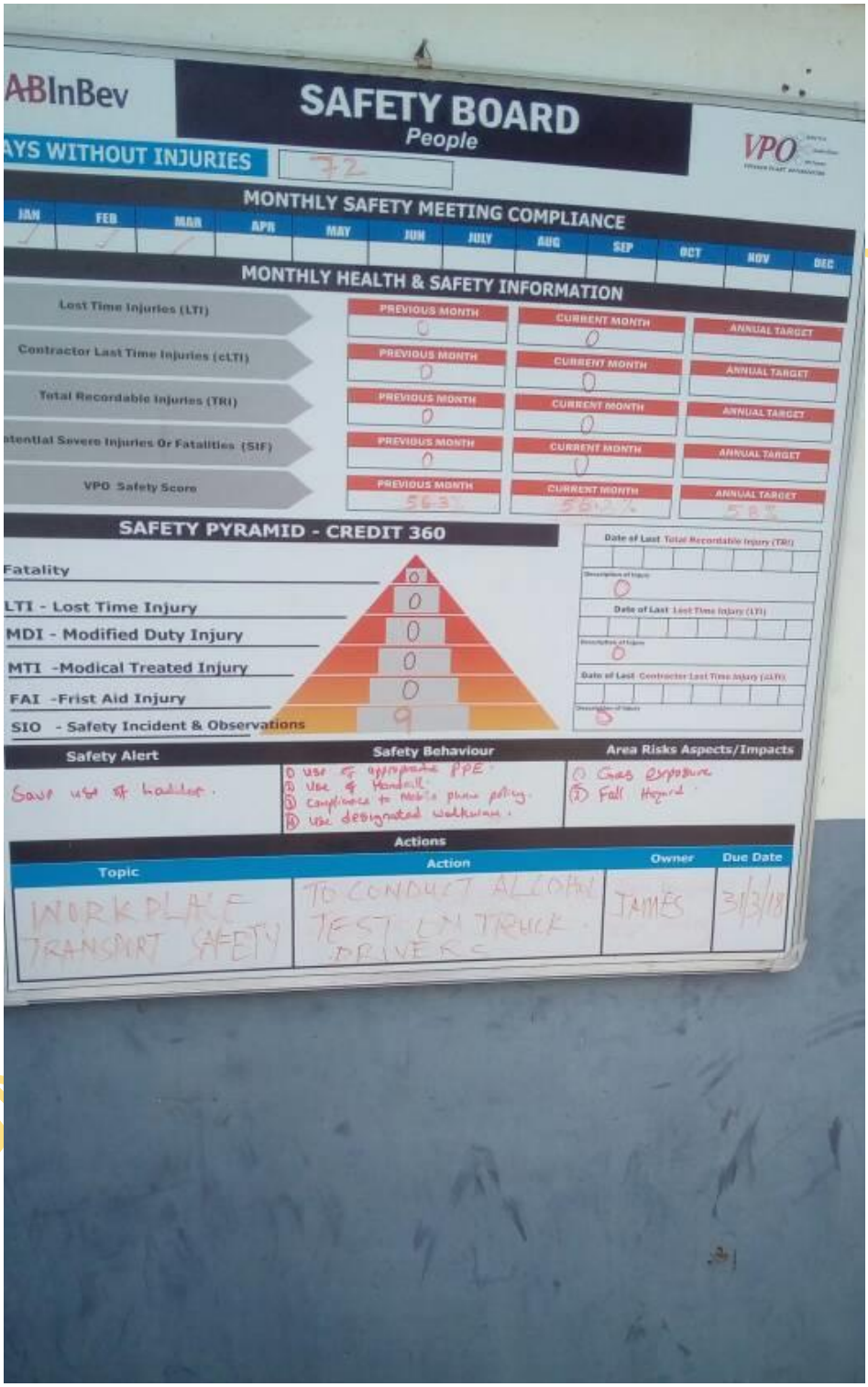

RESEARCHER