A Comparative Study of Nurses' Perception on Safety and injury at Work in Delta State, Nigeria

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Abstract

Considering the nature of the work of nurses in the hospitals and other health-related facilities, it is pertinent to discuss workplace-induced injuries and illnesses encountered while caring for the patients and how the patients themselves are exposed to such risks while receiving treatment in the health care facilities. Needless to mention that so many workplace stressors that are capable of causing diseases and injuries are ubiquitous in the work environments. Nurses are often stressed up physically and psychologically, in addition to their constant exposure to a harsh workplace safety climate.

A cross-sectional research design was used and questionnaires were distributed for data collection. The study showed that, injuries are most sustained by the nurses in the government-owned hospitals with a score of 43.5%, followed by the private hospitals maintaining her second position with a score of 31.7%, while the mission hospitals scored 24.8%. It was also found that unsafe acts are most common in general hospitals, followed by private hospitals, and with the lowest score in Mission Hospitals, because the Mission hospitals were found to be more safety conscious among the three groups of hospitals under review. In Delta State, 98% of nurses run shift in the hospital, out of which 60% admitted having some health problems whenever subjected to shift work and long work hours. 2% of nurses do straight morning duty. Mission Hospitals have the greatest challenges of managing and coping with injuries and illnesses at work (35.6%), most probably due to their lean financial resources. This study also showed that the professional nurses are significantly aware of the ways to prevent or mitigate injuries and illnesses at work. However, majority of them experience these problems because of their non-adherence to safety rules and their constant tendencies to follow short cuts

Introduction

The awareness of safety and injury at work is an important factor that needs adequate attention in the health care delivery system. This generally involves all members of the health team. However, this article is centered on Nurses. According to the report by the institute of medicine (IOM) in 1999, it is estimated that 70% of safety errors are preventable. However, if a safety error occurs, it is considered to be the fault of the individual's healthcare professional. On the other hand, it should be blamed on the healthcare system. Punishment is not the solution for safety errors.

Now, it is more focused on improving the safety environment at a hospital, creating an open organizational culture, and improving the health care delivery system (Abbott, 2003). Thus, in developed countries they are trying to improve the awareness on nurses safety so that they could be more educated on work place safety. In order to create nurses safety culture in the hospital, there has to be adequate communication, appropriate staffing, procedure compliance, environmentalsafety and security, culture, leadership, orientation and training, and open communication on safety errors (Joint Commission Resources: 2007). Many researchers thought that safety errors occurred in the incomplete system, and thus focused on preventing safety errors (Bates and Gawande: 2000, Institute of Medicine: 2001). As a way of ensuring consistent and increasing safety culture in the healthcare industry, some private hospitals in Nigeria are already working towards acceditation. This is a welcome development that all government-owned healthcare institutions must embrace.

In recent years, since the implementation of the healthcare accreditation, the interest in nurses safety increased. However, much is still left to be desired in terms of safety awareness in the healthcare settings in Delta State.

In view of the above challenges in nurse's safety at work, the author is stimulated to explore the safety awareness levels of professional nurses while at work, so as to be more safety-conscious in order to mitigate incidents and accidents as much as possible.

Background of study

Health and safety are twin sisters that depend on each other to protect and sustain life. In the absence of safety, injury, accident and near-miss knock at the door of health. If no timely action is taken to mitigate such incidents, especially in the healthcare industry, injuries which may range from mild to severe, and even lead to fatality, may result.

To properly work on this survey, some hospitals where nurses carry out various procedures that require safety measures were selected. This helped the author to make his comparative studies, where appropriate, on the nurses' perception on safety and injury at work.

A Hospital is an institution devoted to the care of the individuals who have physical, mental and/or social challenges. In other words, an Hospital is the center for promotion of health, prevention of illness, restoration of health, rehabilitation and research. The hospitals in Delta state from where this study was carried out are hospitals approved by the ministry of health and commissioned to care for the sick and to promote health.

Statement of the problem

The author discovered from the literatures studied that most injuries sustained in the hospitals are almost always attributed to nurses' negligence. Therefore, it is pertinent to ascertain the nurses' awareness level of safety and injury at work. The challenges facing the professional health team members and the need for the individuals themselves to take ownership of maintaining and sustaining safety culture in and around the hospital motivated the author to embark on this study.

Purpose/aim of study

- To measure the level of perception of nurses on safety and injury at work in Delta State of Nigeria.
- To examine their general attitudes towards injury and safety.
- To make a comparative study on the potential problems of safety hazards, near misses and at-risk behaviour among practicing nurses.
- To explore the various forms of safety awareness in the hospitals and offer useful recommendations.

Broad objective of the study

To understand the concept of safety and injury in clinical practice among professional nurses in Delta state, in order to bring useful recommendations aimed at reducing injury at work and increasing safety awareness.

Specific objectives of the study

- To understand the various causes of injury and illnesses at work.
- To explore the potential dangers of at-risk behaviours during nursing procedures..
- To understand the safety issues surrounding the use of hazardous substances in the healthcare industry and make useful recommendations.
- To serve as a guide to the nurses-in-training who wish to further research on the subject.
- To create adequate awareness among nurses on the importance of safe work practices and procedures through health educational programs.

Significance of the study

- This article will serve as an eye opener to the health professionals on the attitudes of nurses towards safety at work in the hospitals.
- The study will also enlighten the nurses further on the subject and to make the best decisions while performing their duties.

- The study will also provide a quick reference guide for trained nurses on maintenance of safety throughout their duty periods in the hospital.

Research questions

1. What safety hazards are nurses exposed to in your health facility?
2. Which behaviours are associated with injury/illness in the work place?
3. What injuries or illnesses do nurses usually encounter at work?
4. How are such situations managed in your work place?
5. What are your challenges in dealing with such situations?
6. How can such challenges be overcome?
7. How can these situations be prevented?

Scope and limitations of the study

The research project would have been extended to all hospitals in Delta state, in order to obtain more accurate data for better comparative studies. However, due to logistic problems and other unforeseen circumstances encountered in the process, the researcher unavoidably decided to limit his study to a few hospitals (including mission, private and government-owned hospitals) in the three senatorial districts of the state

Review of literature

The importance of safety at work cannot be over-emphasized, especially in the healthcare settings. This study is aimed at focusing on the perception of professional nurses towards safety and injury at work. This, no doubt, will bring nurses to the realities of following safe work practices and procedures and the potential dangers of non-compliance There is nothing as good as going to work safely and coming back safely. Therefore, this study is not only going to be helpful to the professional nurses, it is equally important to all patients and the entire work force in the healthcare industry. Meanwhile, much emphasis will be laid on the professional Nurses.

There are so many areas of concern in terms of safety at work, but due to time limits, this article is limited to three major areas. These include:
- Work Hours
- Nurses' Injuries and illnesses at work and
- Mental Health Effects Of Nursing

Work hours

Shift work and long work hours

The relationship between work schedules and health and safety is complex and is influenced by characteristics of the work schedule (time of shift, direction and speed of rotation, pattern of days off, shift length, rest breaks), as well as characteristics of the job, the worker, and the work environment(Barton, 1995).

While the focus is on potential negative aspects, some workers experience benefits from shift work and prefer it (e.g., incentive pay, reduced volume of activities and personnel when compared with day shift). Researchers theorize that shift work exerts adverse effects by disturbing circadian rhythms, sleep, and family and social life (Barton *et al* 1995; Monk *et al.,* 2000).

Risks associated with shift work

a. Sleep, sleepiness, performance, safety

Drake and coworkers indicated that 32 percent of night workers (majority of shift hours between 9 p.m. and 8 a.m.) and 26 percent of rotating shift workers (shifts that change periodically from days to evenings or nights) experienced long-term insomnia and excessive sleepiness and were unable to adapt their sleep adequately on these shifts. Lack of sleep at the right time usually makes people look fatigued, sleepier and less safety-conscious. Their level of performance also decreases to an unacceptable level.

b. Social and familial disruptions

Due to frequent periods of working at night more than the periods spent on day, most nurses are deprived of family and social activities in the day time. Thus adequate and sufficient interpersonal relationships with family members, among nurses and between nurses and members of other social classes become a scarce commodity. To make the situation worse, many nurses also prefer to sell out their public holidays weekends, and annual vacations for money in place of adequate rest and sleep. The extent to which such disruptions occur depends both on the worker's schedule, type of family, gender, presence of children, and the degree of flexibility in the worker's social contacts and leisure pursuits (Walker 1985; Colligan et al, 1990; Presser HB 2003). For families, shift work often conflicts with school activities and the times when formal child care services are available, making arrangements for the care of children more challenging (Presser HB 2003), affecting both the worker and the family's social adjustments.

c. Long-term effects and vulnerable groups

Although the specific contribution of shift work to other illnesses is not clear, several diseases have been associated with these work schedules. Gastrointestinal (GI) complaints are common in shift workers and could be due to changes in circadian rhythms of GI function, sleep deprivation leading to stress response and changes in immune function, or the types of foods that are available during these shifts (Knutsson. 2003; Caruso, 2004).

The authors hypothesized that exposure to light at night reduces melatonin levels, increasing risks for cancer

Shift work also may exacerbate preexisting chronic diseases, making it difficult to control symptoms and disease progression. Shift work interferes with treatment regimens that involve regular sleep times, avoiding sleep deprivation, controlling amounts and times of meals and exercise, or careful timing of medications that have circadian variations in effectiveness. Sood (2003). suggests several conditions that may be exacerbated by shift work: unstable angina or history of myocardial infarction, hypertension, insulin-dependent diabetes, asthma, psychiatric illnesses, substance abuse, GI diseases, sleep disorders, and epilepsy requiring medication. Costa(2003) adds to this list chronic renal impairment, thyroid and suprarenal pathologies, malignant tumors, and pregnancy. Aging is also associated with less tolerance of shift work, which may be due to age-related changes in sleep that may make it more difficult for older people to initiate and maintain sleep at different times of the day (Duffy, 2003). These sleep changes may begin as early as the 30s and 40s, so some workers who initially adapted well to shift work during their younger years may show more symptoms as they grow older.

Risks associated with long work hours

The number of studies examining long work hours is less extensive, but a growing number of findings suggest possible adverse effects. **A meta-analysisby Sparks** et al, 1997. reports that overtime was associated with small but significant increases in adverse physical and psychological outcomes. **A review by Spurgeon** et al (1997) concluded that the adverse overtime effects were associated with greater than 50 hours of work per week, but little data are available about schedules with fewer than 50 hours. **An integrative review by Caruso** et al 2004 reported that overtime was associated with poorer perceived general health, increased injury rates, more illnesses, or increased mortality in 16 of 22 recently published studies. **Dembe *et al* 2005**, examining data from the National Longitudinal Survey of Youth, found a dose-response relationship, such that as the number of work hours increased, injury rates increased correspondingly. **Trinkoff et al (2006and 2007)** found that long work hours were related to the incidence of musculoskeletal injuries and needlesticks in nurses. In a summary, these studies indicate that caution is needed in implementing schedules with extended work hours. Determining the number of work hours critically associated with risk for a specific job would require examining how extended hours interact with other factors contributing to fatigue, such as work load, competing responsibilities, and opportunities for rest and recovery.

Nurses' injury at work

Musculoskeletal injuries

Definitions for MSD vary, though most include pain in the affected body region (e.g., back or neck) for a specified duration or frequency (Bernard et al 1997). Researchers are careful to rule out nonwork-related Musculoskeletal Disorders (MSD) from their studies.

Health care workers are at extremely high risk of MSD, especially for back injuries. Health care workers are also overrepresented for upper extremity MSDs among workers' compensation (WC) claims(Silverstein 2002). In 2001, U.S. registered nurses (RNs) had 108,000 work-related MSDs involving lost work time, a rate similar to construction workers. In 2003, the incidence rate for nonfatal occupational injuries, many of which were MSDs, was 7.9 per 100 full time equivalents (FTEs) for hospital workers(Bureau of Labor and Statistics 2004). Tasks requiring heavy lifting, bending and twisting, and other manual handling have been implicated in health care worker back injuries (Smedley, *et al* 1995); (Trinkoff, *et al* 2003; Kant, de Jong, *et al* 1992; Trinkoff, Storr et al 2001). In one study, nurses were found to be at particular risk of back injury during patient transfers, which require sudden movements in nonneutral postures (Collins, *et al* 1996; Engkvist, et al, 1998). Patient transfers also require flexion and rotation, increasing the injury risk due to a combination of compression, rotation, and shear forces (Forde, et al 2002; Hoozemans et al 1998; Marras et al 1999).

As physical/postural demands on the job increased for nurses, the likelihood of inadequate sleep also significantly increased. Workers on schedules requiring frequent shift rotation and long hours may also be at higher risk for MSD. In a survey of 1,428 RNs, more than one-third had extended work schedules, and such schedules were associated with an increased likelihood of MSD (Lipscomb, 2002). A later study found that long work hours were related to incident musculoskeletal injuries in nurses (Trinkoff et al 2006).

Work schedules and MSD

The work schedule can affect the sleep–wake cycle, and working extended hours, such as 12+ hour shifts, can lead to MSD due to extended exposure to physical/postural risk factors and insufficient recovery time (Waersted 1991; Larese et al 1994). As physical/postural demands on the job increased for nurses, the likelihood of inadequate sleep also significantly increased. Workers on schedules requiring frequent shift rotation and long hours may also be at higher risk for MSD. In a survey of 1,428 RNs, more than one-third had extended work schedules, and such schedules were associated with an increased likelihood of MSD (Lipscomb, 2002). A later study found that long work hours were related to incident musculoskeletal injuries in nurses (Trinkoff et al 2006; www.ahrq.gov)).

In workers with employment-related myalgia, symptoms increased with each successive workday, and remitted only by the second day off (Lundberg et al 1999). These workers had shorter periods of muscle rest, suggesting that continuous muscle tension was associated with musculoskeletal symptoms. In a British study of doctors-in-training, the fewer hours they slept and the more hours they worked, the more somatic symptoms, including MSD, they reported (Baldwin 1997; www.ahrq.gov).

Schedule components significantly related to MSD include long work hours, mandatory overtime, working while sick or on days off, and having fewer than 10 hours between shifts (Trinkoff 2006). The new Institute of Medicine report, *Keeping Patients Safe: Transforming the Work Environment of Nurses (2004),* incorporated Wave 1 findings on nurse scheduling. More than one-third of staff nurses typically worked 12 or more hours per day. Among those working 12 hours or more, 37 percent rotated shifts. On-call requirements were also very common (41 percent of the sample). Despite the long hours, few nurses took breaks; two-thirds typically took one or no breaks during their shift (www.ahrq.gov)

A. Coping strategies during shift work

Application of coping strategies during shift work is an accepted practice in some Asian countries. More research is needed to determine the optimum length and timing of the nap and a practical environment at work to take a nap. Empirical evaluations and applications of the other techniques

have begun and will be useful for some workers, but more research is needed to develop strategies that can be easily applied by workers in a wide range of demanding work schedule situations. Another type of strategy are work hour limits such as the recent Institute of Medicine recommendation, 2004 (p. 13) that work hours for nurses be limited to 60 hours per 7-day period and 12 hours per day.

B. Mitigating msd risks

Although two decades of research have demonstrated the work-relatedness of MSD, use of single-approach intervention methods to reduce MSD exposures (e.g., engineering controls, administrative changes, or worker training only) has shown inconsistent outcomes (Silverstein et al 2004). This is likely due to the combination of factors related to MSD and the need for broad organizational involvement to mitigate MSD problems (Warren 2001). Despite these concerns, important evidence-based successes have been demonstrated in reducing MSD, especially during patient lifting and transfer (Collins et al, 2005; Nelson, et al 2005). Interventions incorporating participatory ergonomics have been found to improve upon previous approaches by allowing for extensive worker input into the design and adoption of preventive practices. In a participatory ergonomics approach, employees participate in the identification of ergonomic risk factors, brainstorm alternatives and solutions, handle implementation of controls, and assess control effectiveness along with symptom identification, ultimately becoming champions for ergonomics change. Participatory ergonomics also has the potential for changing the culture of health care organizations, as employees begin to use ergonomic principles to improve jobs and the workplace. Because participatory interventions incorporate both management commitments to reducing injuries, along with workers who are involved in developing solutions, positive and effective workplace changes can occur (Anema JR et al 2003).

C. Interventions for MSD

Three common interventions used to prevent work-related musculoskeletal injuries associated with patient handling are (1) classes in body mechanics, (2) training in safe lifting techniques, and (3) back belts. Despite their wide spread use, these strategies are based on tradition rather than scientific evidence; there is in fact strong evidence these strategies are not effective. Recently there has been a major paradigm shift away from these approaches toward the following evidence-based practices: (1) patient handling equipment/devices, (2) no-lift policies, (3) training on proper use of patient handling equipment/devices, and (4) patient lift teams.

Given the complexity of this high-risk, high-volume, high-cost problem, multifaceted programs are more likely to be effective than any single intervention, indicating the need to build a culture/climate of safety into the organization and employ more than one evidence-based approach. A culture of safety in terms of worker injury prevention is defined somewhat differently from patient safety culture, though there is some overlap between the terms. Safety culture is considered to be the product of multiple goal-directed actions to improve safety in an organization (Cooper. 2000). Nonetheless, empirical data supporting the impact of culture alone on reducing worker injuries are limited.

Common injuries and safety at work

a. Needlesticks

The exposure of nurses to needle stick injuries in the health care settings as become a serious concern, considering the grave health effects it has on the health care professionals, subjecting them to serious complications. Besides several studies carried out on disease transmission through needle stick injuries, many nurses are still nonchalant, over compliance with safety measures while at work. This is further placing the nurses at higher risk of developing blood-borne diseases. An estimated 600,000 to 800,000 needlestick injuries occur annually (EPINet 2004; Henry 1995), about half of which go unreported.

As such, it is imperative that all health care workers, not only those working in the acute care setting or those who traditionally handle needles on a regular basis, receive every available protection from occupational exposure to blood and body fluids.

The passage of the Federal Needlestick Safety and Prevention Act in 2000 has begun to afford health care workers better protection from this unnecessary and deadly hazard in the United States. Not only does the act amend the 1991 BBP standard to require that safer needles be made available, it also requires employers to solicit the input of front-line health care workers when making safe needle purchasing decisions (www.ahrq.gov). However, in the present day health care facilities, many employers, despite their high safety awareness levels, decide to procure medical equipment, including needles, that are below standard in an attempt to save costs and acquire much gain. This is especially unprofessional and unsafe act capable of ruining the lives of the people. In various hospitals within Delta state, I have also seen and witnessed nurses still recapping needles after injection. Further inquiries showed non-compliance with safety measures rather than lack of awareness.

b. Chemical occupational exposures

There are thousands of chemicals and other toxic substances to which nurses are exposed in practice. Hazardous chemical exposures can occur in a variety of forms—including aerosols, gases, and skin contaminants—from medications used in practice. Exposures can occur on an acute basis, up to chronic long-term exposures, depending upon practice sites and compounds administered; primary exposure routes are pulmonary and dermal (www.ahrq.gov) While caring for patients, nurses have also been observed reacting to certain aerosols and gases used for one procedure or the other on the ward. For example, Anti-neoplastic medications, when nurses are exposed to them, are capable of causing skin irritations, respiratory symptoms, etc.

c. Volatile organic compounds

Volatile organic compounds (VOCs) are chemicals that readily evaporate at room temperature, thus allowing the chemicals to be easily inhaled. Formaldehyde and artificial fragrances are two such sources that have a ubiquitous presence in hospitals. A study of occupational exposure to artificial fragrances found that health care workers had the highest rate of allergic sensitivity (Buckley. et al 2002). It is also important to note that the rate at which individuals react to chemical exposures varies from person to person, due to certain biochemical factors and genetic make-up of individuals. Certain chemicals used to fumigate the hospitals also fall under this category. This was especially observed among the health care workers in some of the hospitals I visited in Delta State.

d. Sterilants

As an example, ethylene oxide (EtO) and glutaraldehyde are commonly used in medical settings for sterilization. Nurses and other medical staff are exposed while cleaning equipment and work surfaces. Although both of these chemicals are powerful and effective, they are associated with serious human health risks. Glutaraldehyde is associated with respiratory irritation including asthma, skin irritation and dermatitis, and eye irritation and conjunctivitis (Takigawa et al, 2006). Although, there are no such recorded health effects of EtO on nurses exposed to it in some of the hospitals visited, one case was reported in two hospitals under review.

e. Medications

Many medications and compounds in use in personal care products have known toxic effects. These have been comprehensively reviewed with a detailed summary of the evidence of environmental and personal hazards associated with these compounds by Daughton and Ternes (Buckley, Rycroft 2002). Although many medications can be hazardous to workers, those most commonly identified as hazardous to health care workers include antineoplastics and anesthesia. Anesthetic gases have been identified as particularly problematic, as gases escape into the air and can be inhaled by workers. There are also data to support the deleterious effects of exposure to antineoplastic drugs, especially an increased risk of spontaneous abortions among health care workers (Dranitsaris et al 2005; www.ahrq.gov).

One very noticeable problem here is also adherence to the medication guidelines to avoid its adverse effects during exposure. It is one thing to understand the guidelines, it is another thing to

comply with the rules. This is where the problem also lies with the nurses who are involved in the administration.

f. Pesticides

Pesticide use, both inside and outside of hospitals and health facilities, is another cause for concern. Because of the special vulnerabilities of children and pregnant women to pesticide exposures, control of pesticide use in health care settings is particularly important. In a survey conducted by Health Care Without Harm, all hospitals surveyed reported some regular applications of pesticides inside the hospital building, outside on the grounds, or both (Owens et al 2003). This report, *Healthy Hospitals: Controlling Pests Without Harmful Pesticides,* offers guidance on reducing pesticides and implementing safer integrated pest management techniques. Integrated pest management is a comprehensive approach to pest management that employs nontoxic and least-toxic products and processes to control pests. Beyond Pesticides, a 25-year-old organization that has been working with Health Care Without Harm on pesticide issues in the United States, is currently orchestrating several hospital-based pilot programs in Maryland (Beyond Pesticides 2007; www.ncbi.nlm.nih.gov).

g. Latex exposure

Latex allergy due to exposure to natural proteins in rubber latex is also a serious problem in health care workers. Diepgen, et al (1999) estimated that the annual incidence rate among all workers is 0.5 to 1.9 cases per 1,000 full-time workers per year. Symptoms may start with contact dermatitis located in the glove area, and symptoms can become more severe, such as asthma or anaphylaxis. The course of latex allergy as described by Amr and Bollinger (2004) involves progressive impairment of nurses from continued exposure to latex, leading to an inability to continue working as nurses. In fact, the hazard from aerosolizing of latex particles attached to powder in latex gloves or from latex balloons bursting is of great concern, as these exposures can lead to occupational asthma (Kujala, et al 2002). The American Nurses Association has issued a position statement to suggest actions to protect patients and nurses from latex allergy in all health care settings. These include use of low-allergen powder-free gloves and removal of latex-containing products from the worksite throughout the facility to reduce the exposure at that institution. Hospital environments that have gone latex-free need to ensure that they are not allowing balloons into the facility. As balloons break they can contribute latex into the air that remains for up to 5 hours (Kelly 1996; www.ahrq.gov). There is presently no way to escape using gloves during nursing procedures requiring medical or surgical asepsis if contact with the patient cannot be avoided. Therefore research into the problems and prospects of latex exposure is very timely, as done above.

Mental health effects of nursing work

Working in nursing increases the risk of experiencing both minor and major psychiatric morbidity (Wieclaw et al 2005; Chen, et al 2005),with job strain contributing to this outcome (*Student Paper, Universiti Technologi, MARA*). Minor psychiatric morbidities include feelings of tension, anger, anxiety, depressed mood, mental fatigue, and sleep disturbance.(Van der Klink, et al 2001; Student Paper, Australian Catholic University)); these are classified variously as burnout, subthreshold depression, or adjustment disorders. Mental disorders such as major depression, anxiety disorders, and psychotic disorders are less common, but they can be induced or exacerbated by work stress. A variety of exposure types are associated with psychiatric morbidity.

Allostatic load is a theoretical concept whereby excessive demands and a persistent sympathetic (adrenergic) load on the body produce changes in neuronal, immune, and cardiovascular system structure and function, thus having a detrimental impact on bodily processes. Changes in neuronal function are associated with anxiety and depression. Several types of psychosocial risk factors can contribute to this overall allostatic burden. High physical demands, fast-paced work, adverse work schedules, role stressors, career insecurity, difficult interpersonal relationships, nonstimulating jobs, and lack of autonomy have been associated with symptoms of anxiety and depression, several psychoses, and with substance use disorders. Some studies have even provided longitudinal evidence linking job demands, lack of autonomy, and monotony at work to affective and substance use

disorders(Muntaner et al 1998; Muntaner, et al 1991; Muntaner C 2015). Mental disorders in the workplace—depression in particular—have important consequences for quality of life, the costs and utilization of health care, safety, and productivity(www.ahrq.gov).

Extended work schedules have been associated with a variety of mental health indicators in nursing and in other occupations where these schedules are common. Proctor and colleagues (1996) found that both the number of overtime hours and the number of cumulative days worked by automotive workers were associated with changes in mood States such as depression and tension (www.ahrq.gov)

It is a well-established fact that prolonged stress at work over a considerable length of time predisposes an individual to mental health challenges. This is particularly common among the nurses in Delta state due to increased workload per nurse in the hospital. This is worsened when the salaries are not commensurate with the assigned jobs. More so, other stress-induced factors, causing the nurse to work under tension, often subject her to develop mental health challenges as well, which could range from minor to severe mental health disorders.

Interventions to reduce mental changes

Interventions to reduce work-related mental changes have focused on either changing the organization of work to reduce the stressors, or changing the workers' ability to cope with stress by providing cognitive-behavioral interventions, relaxation techniques of various types, or multimodal strategies (Mimura, et al 2003; *Student Paper, Australian Catholic University*). Although several nationwide initiatives on the prevention of mental disorders have emphasized the importance of addressing work organization factors, only a small number of studies have evaluated this approach, and results have not shown an overall strong relationship (McEwen et al 2003). In nursing, Mimura and Griffiths (2003) conducted a systematic review of interventions for nurses to reduce their work stress. Two of the reviewed studies used organizational interventions (changing to individualized nursing care and primary nursing), and only one of the two was deemed "potentially effective." Seven studies of strategies to help nurses manage their stress were presented; music, relaxation, exercise, humor, role-playing assertiveness, social support education, and cognitive techniques were among the stress-reducing strategies studied. The authors stated that no recommendations on the most effective approach were possible due to the small number of studies (www.ahrq.gov).

Violence

From 1993 to1999, 1.7 million incidents of workplace violence occurred annually in the United States, with 12 percent of all victims reporting physical injuries (Duhart et al 2001). Six percent of the workplace crimes resulted in injury that required medical treatment. Yet, only about half (46 percent) of all incidents were reported to the police. The health care sector leads all other industries, with 45 percent of all nonfatal assaults against workers resulting in lost workdays in the United States, according to the U.S. Bureau of Labor Statistics (BLS). The BLS rate of nonfatal assaults to workers in "nursing and personal care facilities" was 31.1 per 10,000, vs. only 2.8 per 10,000 in the private sector as a whole. (Arnetz et al 2000; www.ahrq.gov).

Emergency department personnel also face a significant risk of injuries from assaults by patients or their families. Those carrying weapons in emergency departments create the opportunity for severe or fatal injuries. California and Washington State have enacted standards requiring safeguards for emergency department workers. Although mental health and emergency departments have been the focus of attention and research on the subject, no department within a health care setting is immune from workplace violence. Consequently, violence prevention programs would be useful for all departments.

The first report to the Nation on workplace violence underscores the lack of systematic national data collection on workplace assaults, the paucity of data evaluating violence prevention strategies, and the methodological flaws in published intervention research to date. As background to this report, Runyan and colleagues (2000) reviewed the violence prevention intervention literature and found five studies that evaluated violence prevention training interventions,(Carmel etal 1990; Parkes, 1996; www.ncbi.nlm.nih.gov) two that examined postincident psychological debriefing programs,(Lipscomb et al, 2009; Flannery etal, 1998; Matthews, 1998) and two that evaluated

administrative controls to prevent violence(Drummond etal, 1989; Hunter et al, 1996) Findings from the studies were mixed, with six reporting a positive impact and three reporting no or a negative impact. All were quasi-experimental and without a formal control group. Runyan and colleagues criticized the design of published violence prevention interventions to date because of their lack of systematic rigor in the evaluation. She calls for greater reliance on conceptual and theoretical models to guide research as well as stronger evaluation designs. She further suggests that studies must evaluate "process, impact and outcome measures." (Runyan etal, 2000)

There is no Federal standard that requires workplace violence protections. California and Washington State both have legislation addressing workplace violence in health care settings. In 1996, OSHA published *Guidelines for Preventing Workplace Violence for Health Care and Social Service Workers.* The 1996 Federal guidelines provide a framework for addressing the problem of workplace violence and include the basic elements of any proactive health and safety program: management commitment and employee involvement, worksite analysis, hazard prevention and control, and training and education. The OSHA guidelines provide an outline for developing a violence prevention program, but since they are "performance based," the challenge of developing a specific process for implementing the guidelines in a manner that will yield results is left to the employer.

Between 2000 and 2004, Lipscomb and colleagues (Lipscomb etal, 2006) conducted an intervention effectiveness study to describe a comprehensive process for implementing the OSHA Violence Prevention Guidelines and evaluate its impact in the mental health setting. Program impact was evaluated by a combination of quantitative and qualitative assessments. A comparison of pre- and postintervention survey data indicated an improvement in staff perception of the quality of the facility's violence prevention program as defined by the OSHA elements in both intervention and comparison facilities over the course of the project. Results of the comparison of the change in staff-reported physical assaults were equivocal.

Many psychiatric settings now require that all patient care providers receive annual training in the management of aggressive patients, but few studies have examined the effectiveness of such training. Those investigators that have done so have generally found improvement in nurses' knowledge, confidence, and safety after taking an aggressive behavior management program. However, implementation of comprehensive violence prevention programs that go beyond staff training will improve safety of the health care workplace for all workers. These advanced programs include the use of currently available engineering and administrative controls such as security alarm systems, adequate staffing, and training (www.ncbi.nlm.nih.gov).

Results and data analysis

Data analysis

This section describes the presentation, findings, analysis and interpretations of the study. A comparative study on Nurses' perception on safety and injury among professional nurses was gathered among respondents from Private, Government-owned and Mission hospitals in Delta State to make up a total of one hundred (100) participants. The data were organized in a MYSTAT Statistical Package and summarized, using the formula F/T x 100, where F = Frequency of variables and T = total number of variables.

Analysis of variance (ANOVA) tests were also carried out between and within samples using SPSS version 20.

Results presentations, findings and discussion

Table 1. Demographic Data

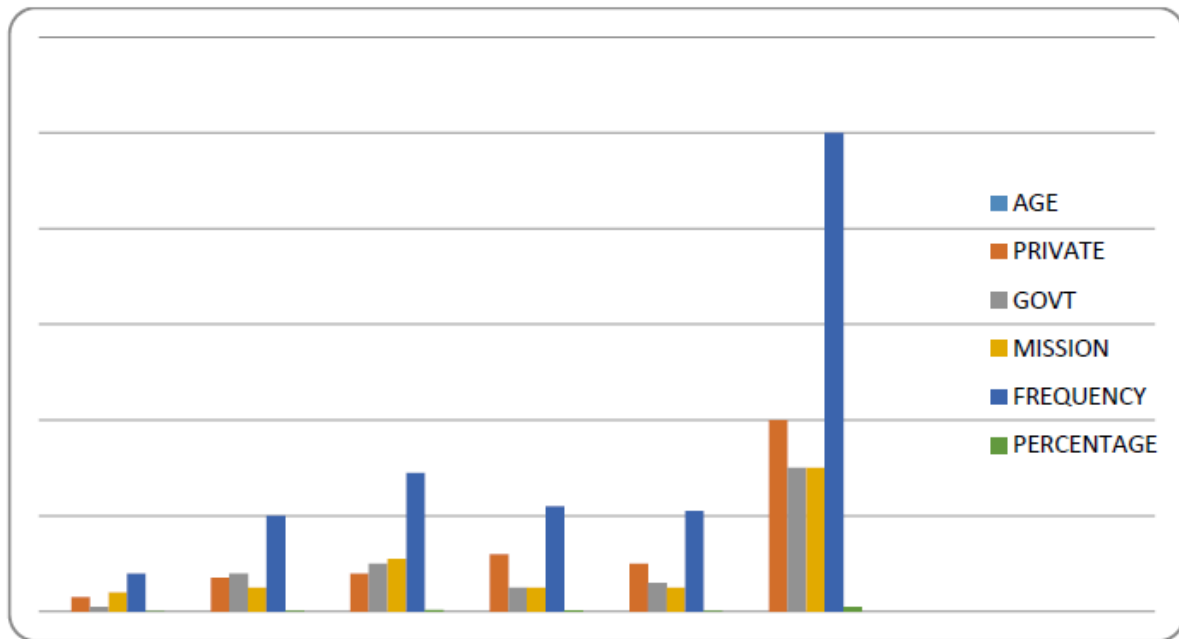| AGE	PRIVATE	GOVT	MISSION	FREQUENCY	PERCENTAGE
20-25YRS	3	1	4	8	8%
26-30 YRS	7	8	5	20	20%
31-40 YRS	8	10	11	29	29%
41-50 YRS	12	5	5	22	22%
51 YRS +	10	6	5	21	21%
TOTAL	40	30	30	100	100%

Figure 1. Statistical Representation

From Table 1 above, The dermographical datarepresent the study population, stating their age brackets, and comparative analysis of the various participants across the private, government-owned and mission hospitals in the state. Only 8% of nurses within the 20 – 25 yrs age group participated in the research. 26 – 30 years age group that took part in this exercise form 20% of the population, while 29% of the 31-40 year age bracket participated. 41 – 50 years age group constitute 22% of the population, while 51 years and above made up 21% of the sample population. A total of one hundred (100) nurses participated in this exercise as stated above.

Common safety hazards nurses and patients are exposed to at work

Table 2. Common Safety Hazards Nurses and patients are Exposed to at work

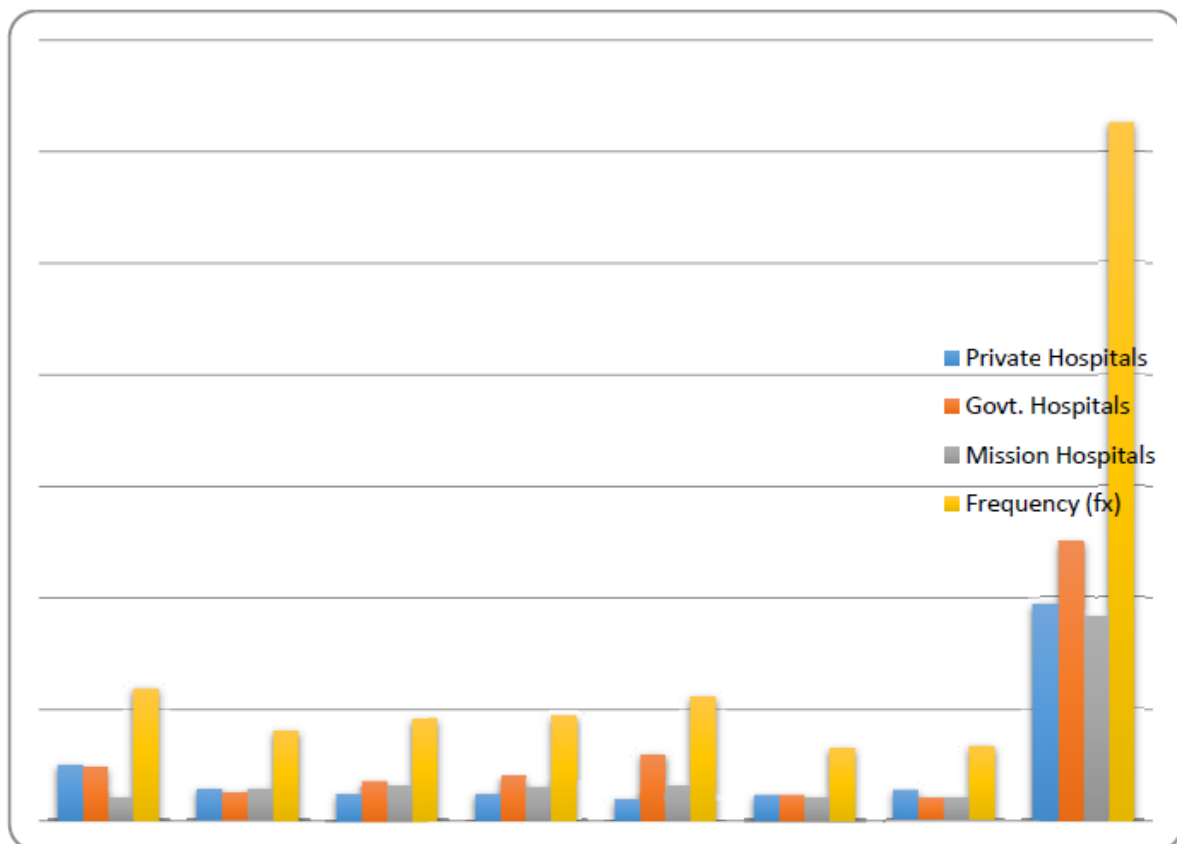| S/N	Variables (x)	Private Hospitals	Govt. Hospitals	Mission Hospitals	Frequency (fx)
a	Slippery Walking Surfaces	25 (42.4%)	24 (40.7%)	10 (16.9%)	**59**
b	Poor Housekeeping	14 (35%)	12 (30%)	14 (35%)	**40**
c	Poor Illumination or Lighting System	12 (26.1%)	18 (39.1%)	16 (34.7%)	**46**
d	Lack of, or non-functional Smoke Detectors	12 (25.5%)	20 (42.6%)	15 (31.9%)	**47**
e	Nursing unconscious and/or elderly patients on high beds without side rails	10 (17.9%)	30 (53.6%)	16 (28.6)	**56**
f	Flammable Liquids	11 (34.4%)	11 (34.4%)	10 (31.3%)	**32**
g	Radiation Energy	13 (39.4%)	10 (30.3%)	10 (30.3%)	**33**
	TOTAL	**97 (31.0%)**	**125 (40.0%)**	**91 (29.1%)**	**313**

Figure 2. Statistical Representation

From Table 2 above, 59% of the sample population saw slippery walking surfaces as safety hazards in the work place. 56% believed Nursing unconscious and elderly patients on a high bed without side rails as unsafe as well. The least common safety hazard identified was exposure to flammable liquid with 32%.

Behaviours associated with injury or illness in the workplace

Table 3. Behaviours Associated With Injury or Illness in the Workplace

| S/N	Variables (x)	Private Hospitals	Govt. Hospitals	Mission Hospitals	Frequency (fx)
a	Re-capping Injection Needles after use	18 (30.0%)	25 (41.7%)	17 (28.3%)	60
b	Doing Procedures Without Appropriate PPE's	17 (34.7%)	22 (44.9%)	10 (20.4%)	49
c	Giving Medications without following the seven (7) "Rights"	16 (35.6%)	18 (40.0 %)	10 (22.2%)	45
d	Not Maintining appropriate Lifting Techniques	16 (38.1%)	16 (38.1%)	10 (23.8%)	42
E	Assuming an Awkward Posture During Nursing Care	18 (36.0%)	20 (40.0%	12 (24.0%)	50
f	Inappropriate Disposal of Sharps or Biomedical Wastes	15 (35.7%)	16 (38.2%)	11(26.2%)	42
g	Walking Past an Unsafe Act without Correcting it				
	TOTAL	110 (34.3%)	131 (40.8%)	80 (24.9%)	321
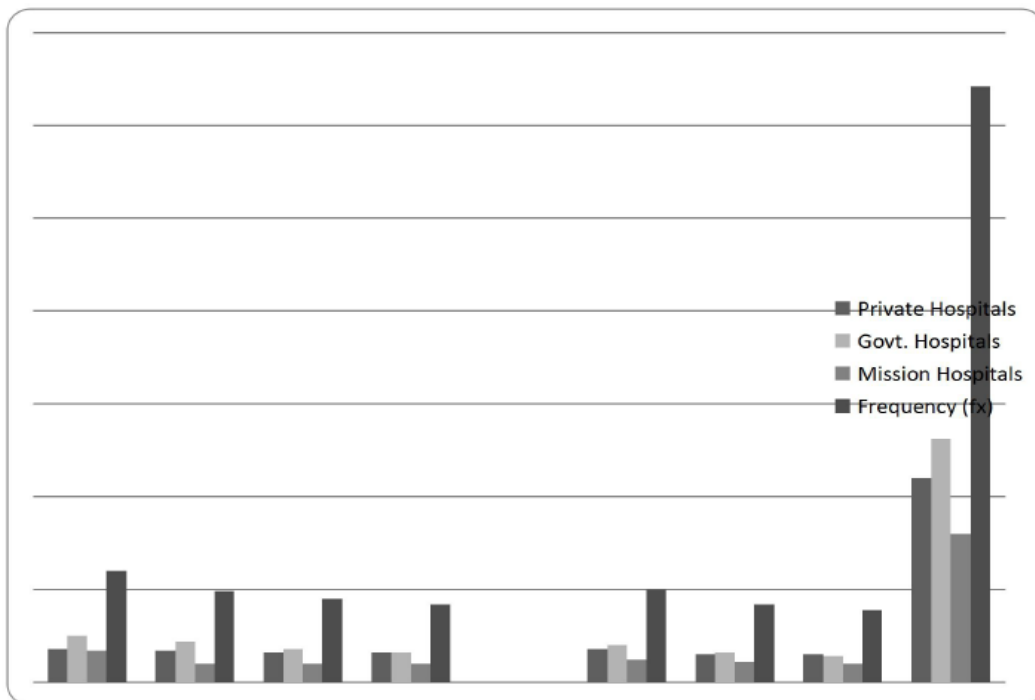
Figure 3. Statistical Representation

From table 3 above

- Re-capping injection needles after use was most identified as an unsafe act common among practicing nurses, which commonly exposes nurses to the risk of injury at work and subsequent disease transmission. It is also sad to note that majority of these incidents were not reported appropriately for fear of being punished, whereas, reporting it would have helped to prevent potential spread of any implicating blood-borne diseases.
- Giving Medications without following the seven (7) "Rights" was also identified as an unsafe act, scoring 45% of the total sample population.
- Assuming an Awkward Posture during Nursing Care was also found as the second leading unsafe act among nurses at work, bringing about musculoskeletal disorders (MSD).

Injuries or illnesses usually encountered by the nurses at work

Table 4. Injuries or Illnesses Usually Encountered by the Nurses at work

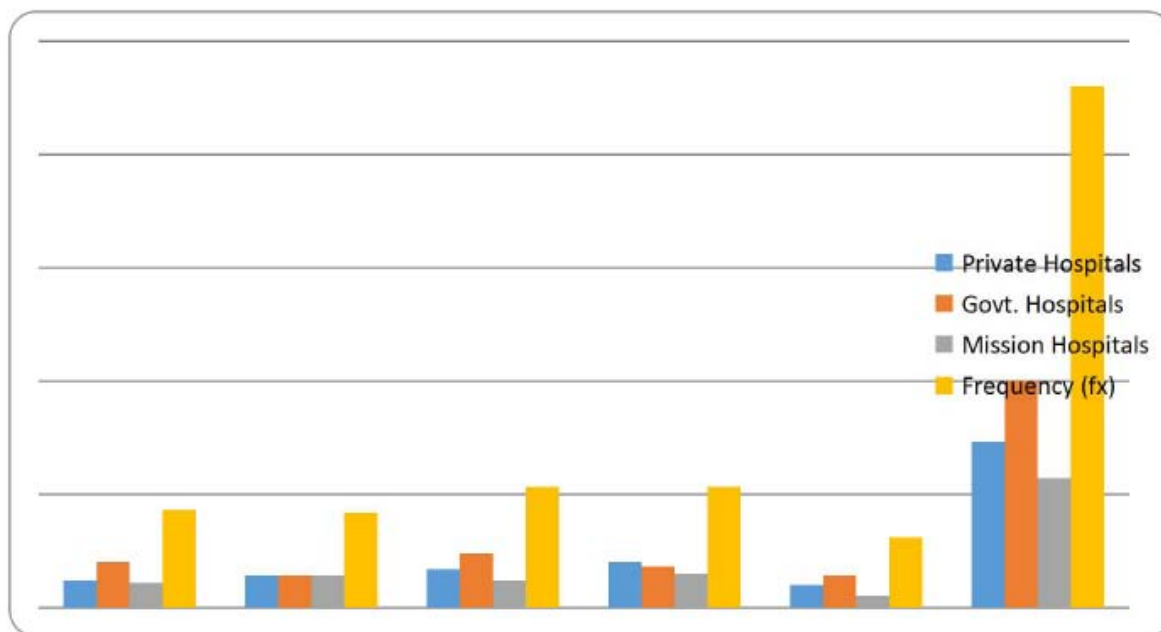| S/N	Variables (x)	Private Hospitals	Govt. Hospitals	Mission Hospitals	Frequency (fx)
a	Needle Stick Injury	12 (27.9%)	20 (46.5%)	11 (25.6%)	43
	Slip, Trip and Fall Injury	14 (33.3%)	14 (33.3%)	14 (33.3)	42
B	Allergic Reactions/Contact Dermatitis, etc	17 (32.1%)	24 (45.3%)	12 (22.6%)	53
C	Repetitive Stress Injury (RSI)	20 (37.7%)	18 (34.0%)	15 (28.3%)	53
D	Burns From Explosives	10 (32.3%)	14 (45.2%)	5 (17.2%)	29
E	TOTAL	17 (32.1%)	100 (43.5%)	57 (24.8%)	230

Figure 4. Statistical Representation

Using the analysis of Injuries or Illnesses Usually Encountered by the Nurse While or after Performing Her Duty

- Allergic reactions and Repetitive Stress Injury are both identified as most prevailing injuries encountered by nurses in the course of delivering their duties in the hospitals, with both scoring 53% each among other injuries sustained by the nurses.

- From the overall rating, however, injuries are most sustained by the nurses in the government owned hospitals with a score of 43.5%, followed by the private hospitals maintaining her second position with a score of 31.7%, while the mission hospitals scored 24.8%.

How such injuries/illnesses are managed in the health facilities

Table 5. How Such Injuries/Illnesses are managed in the health facilities?

| S/N	Variables (x)	Private Hospitals	Govt. Hospitals	Mission Hospitals	Frequency (fx)
a	Strictly Observe Med-Surgical Asepsis	15 (28.3%)	18 (34.0%)	20 (37.7%)	53
b	Do not Re-cap Needles	16 (29.6%)	23 (42.6%)	15 (27.8%)	54
c	Maintain Good Housekeeping	19 (40.4%)	14 (29.8%)	14 (29.8%)	47
d	Always keep the floors and Walk ways clean and dry	20 (37.7%)	17 (32.1%)	16 (30.2%)	53
e	Discourage use of smooth tiles to make floors and walk ways	15 (32.7%)	14 (30.4%)	17 (37.0%)	46
f	Wear appropriate PPE's before handling corrosives or any procedure	20 (40.0%)	16 (32.0%)	14 (28%)	50
g	Taking Short Cuts saves time, money and energy	20 (29.4%)	25 (36.8)	23 (33.8%)	68
h	Following the tenets of operational excellence in all you do	17 (30.4%)	22 (39.3%)	17 (30.4%)	56
	TOTAL	142 (33.3%)	149 (34.9%)	136 (31.9%)	427
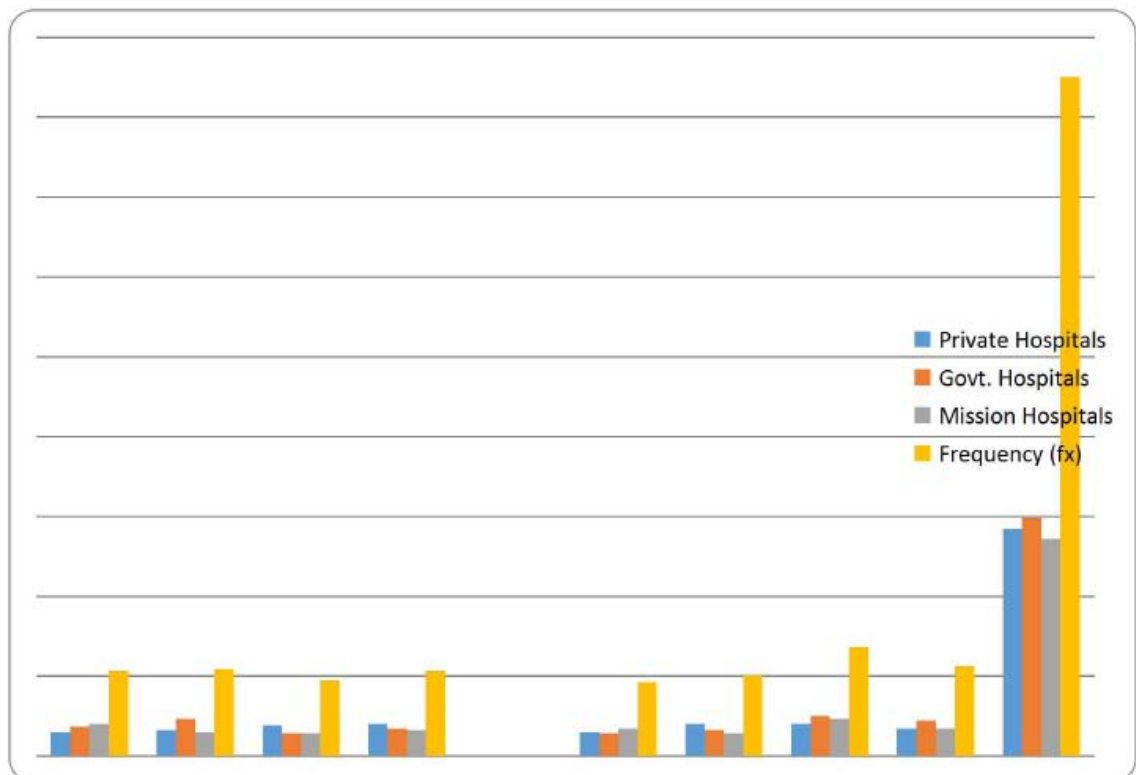
Figure 5. Statistical Representation

Reviewing How Such Injuries/Illnesses are managed in the health facilities

- Strictly observing Med-Surgical Asepsis (53%), always keeping the floors and Walk ways clean and dry (53%) and following all the tenets of operational excellence in all you do (56%) were highly emphasized.
- Much emphasis is being laid on refusing to take short cuts with a score of 68%, which has been identified to have had the potential to cut lives short.
- From the overall rating too, the government-owned hospitals are also doing much more to manage these incidents by 34.9%. This is a reactive rather than proactive measure.

Challenges in managing injuries and illnesses at work

Table 6. Challenges in Managing Injuries and Illnesses at work

| S/N	Variables (x)	Private Hospitals	Govt. Hospitals	Mission Hospitals	Frequency (fx)
a	Non-availability of right materials for use	12 (24.0%)	20 (40.0%)	18 (36.0%)	50
b	Limited supply of right materials for use	10 (21.7%)	20 (43.5%)	16 (34.8%)	46
c	Too much work load and little or no time to rest.	17 (30.4%)	19 (33.9%)	20 (35.7%)	56
d	Too expensive to maintain safety	10 (31.3%)	11 (34.4%)	11 (34.4%)	32
e	Non-compliance with all applicable rules and regulations	14 (25.9%)	16 (29.6%)	24 (44.4%)	54
f	Not following micro pause and work pace breaks on PCs	21 (39.6)	11 (20.8%)	11 (20.8%)	53
	TOTAL	84 (29.9%)	97 (34.5%)	100 (35.6%)	281
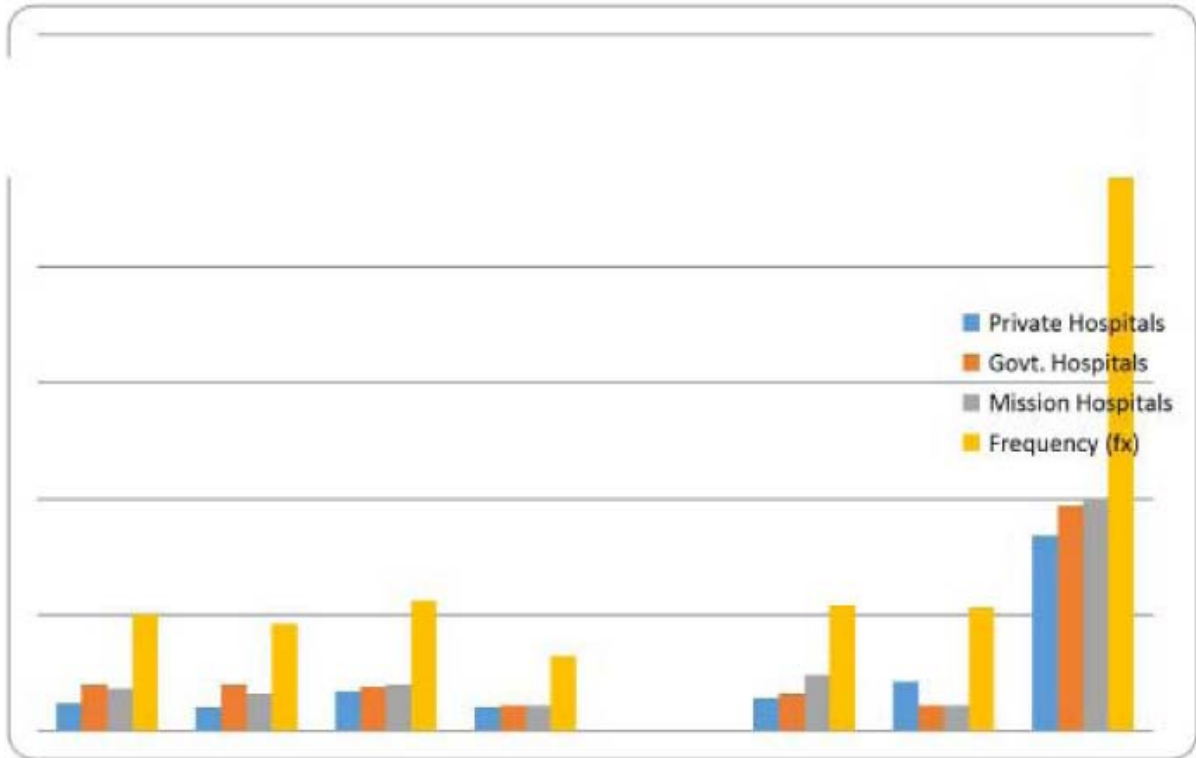
Figure 6. Statistical Representation

As touching the Challenges in Managing Injuries and Illnesses at work

- The following challenges facing the professional nurses are quite obvious. Meanwhile, the greatest challenge identified by the respondents is "Too much work load and little or no time to rest (56%). Others "Non-compliance with all applicable rules and regulations (54%)" and "Not following Micro pause and Work Pace breaks (54%)" amongst others.
- From the overall rating, Mission Hospitals have the greatest challenges of managing and coping with injuries and illnesses at work (35.6%).
- 32% of the total sample population also complained that safety is too expensive to maintain.

Overcoming such challenges

Table 7. Overcoming Such Challenges

| S/N	Variables (x)	Private Hospitals	Govt. Hospitals	Mission Hospitals	Frequency (fx)
a	Staff Training	19 (31.7%)	23 (38.3%)	18 (30%)	60
b	Observe Break Times to Rest	21 (40.4%)	17 (32.7%)	14 (26.9%)	52
c	Adequate Supply of the right Materials to use	18 (28.1%)	25 (39.1%)	21 (32.8%)	64
d	Compliance With Safe Work Practices and Procedures	18 (31.6%)	22 (38.6%)	17 (29.8%)	57
e	Avoid taking Short Cuts	15 (28.9%)	17 (32.7%)	20 (38.5%)	52
f	Always Address Abnormal Condition	24 (46.2%)	14 (26.9%)	14 (26.9%)	52
	TOTAL	115 (34.1%)	118 (35.0%)	104 (30.9%)	337
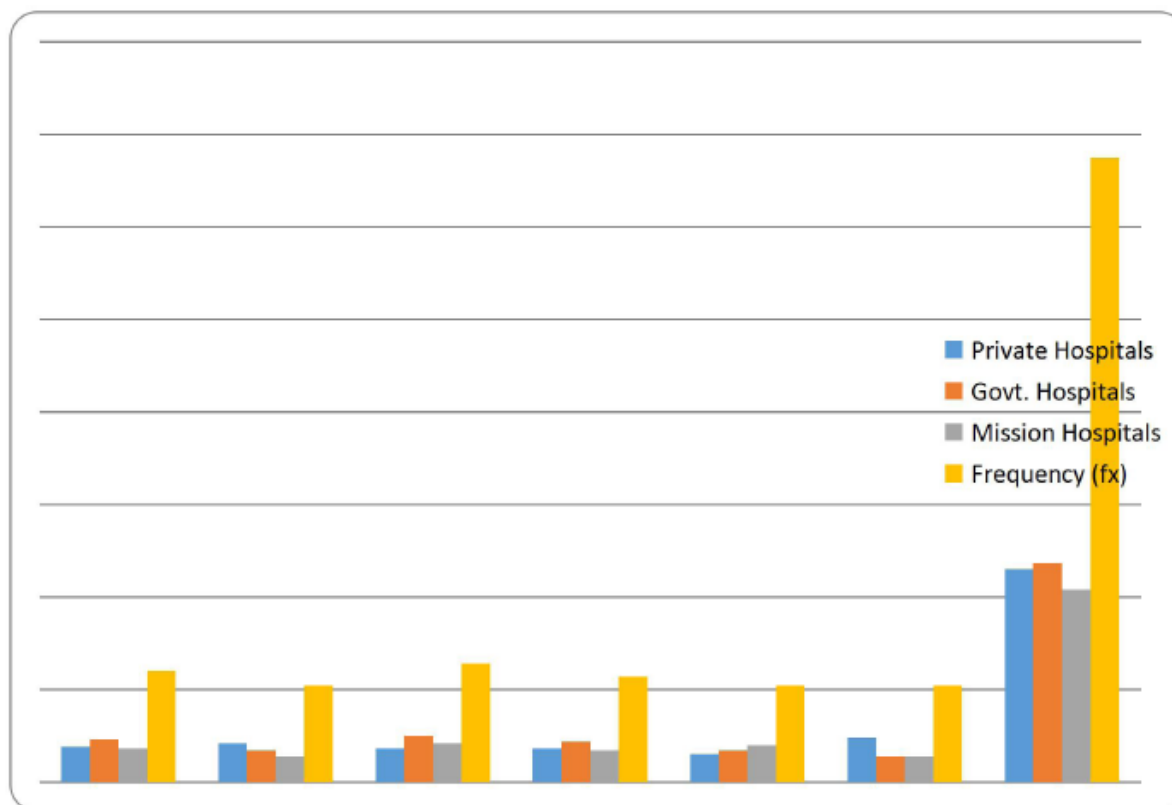
Figure 7. Statistical Representation

Looking at Overcoming Such Challenges

- Much emphasis is placed on adequate supply of the right materials to be made readily available for use (64%) and Staff training to be instituted as soon as possible. (60%).
- From the overall rating, the Mission hospitals are also on the downward trend in terms of meeting up with the ways to overcome the challenges facing them (30.9%). ☐60% of the total sample population advocate for regular staff training.

How to prevent injuries and illnesses at work

Table 8. How to Prevent Injuries and Illnesses at Work

S/N	Variables (x)	Private Hospitals	Govt. Hospitals	Mission Hospitals	Frequency (fx)
a	Always avoid use of smooth tiles for floors and walk ways	23 (32.4%)	26 (46.6%)	22 (31.0%)	71
b	Always observe work pace breaks and Micropause to reduce RSI	23 (35.4%)	26 (40.0%)	16 (24.6%)	65
c	Always maintain correct posture during procedures	20 (30.3%)	28 (42.4%)	18 (27.3%)	66
d	Always follow safe work practices and procedures	29 (41.4%)	22 (31.4%)	19 (27.1%)	70
e	Always comply with all applicable Rules and Regulations	30 (37.0%)	26 (32.1%)	25 (30.9%)	81
f	Always ensure safety devices are in place and functioning	27 (33.8%)	28 (35.0%)	25 (31.3%)	80
g	Always work within design and environmental limits	28 (36.4%)	25 (32.5%)	24 (31.2%)	77

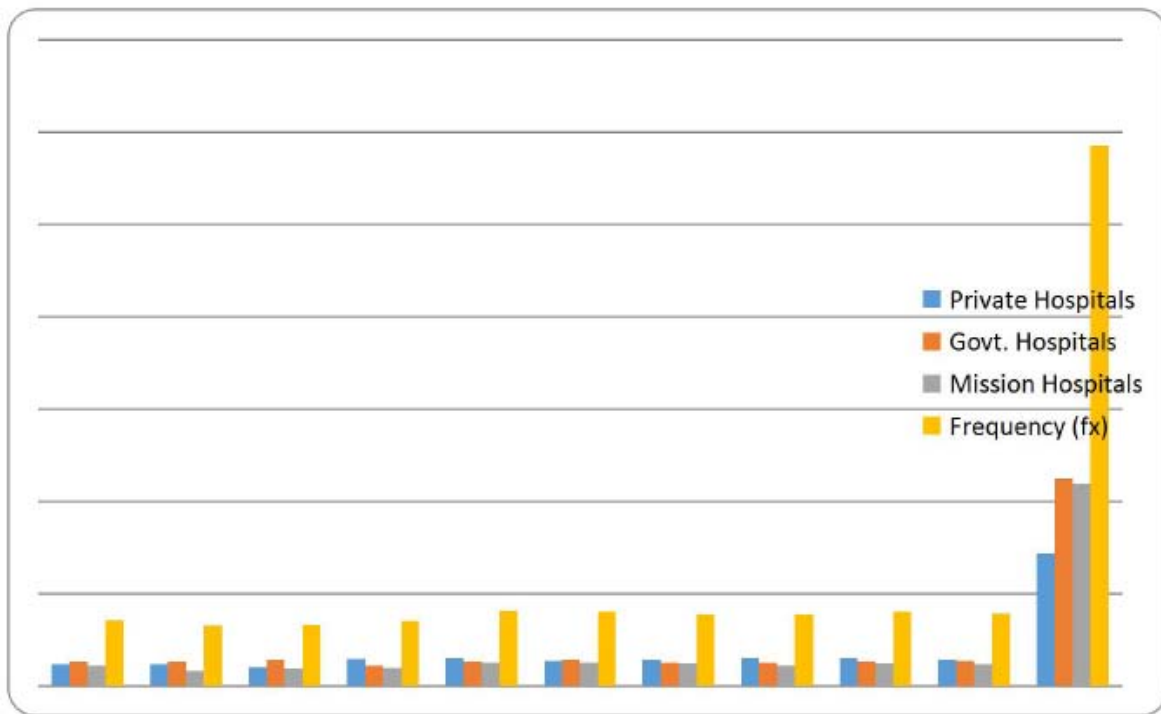|					
h	Always address abnormal condition	30 (39.0%)	25 (32.5%)	22 (28.6%)	77
i	Always follow written procedures for high risk or unusual situations (*EDMC)*	30 (37.5%)	26 (32.5%)	24 (30.0%)	80
j	Always involve the right people in decisions that affect procedures and equipment (*EDMC*)	28 (35.9%)	27 (34.6%)	23 (29.5%)	78
		143 (24.4%)	224 (38.3%)	218 (37.3%)	585

Figure 8. Statistical Representation

Considering how to prevent injuries and illnesses at work

- It is clear that the professional nurses are obviously aware of the ways to prevent or mitigate injuries and illnesses at work, as the various ratings were above average.
- However, the major problem is their inability to deliberately take the decision to always follow all the tenets of operational excellence in all they do, so as to do them in the right way all the time.
- Concerning the areas in which the nurses are not fully knowledgeable, they should make themselves available for training in order to update themselves on the recent trends in safe work practices and procedures.

Summary, implications and recommendations

Introduction

In this chapter, the researcher will reflect back at the entire research process in order to pursue his findings to a logical conclusion, and possibly offer recommendations aimed at assisting the nurses to be more focused on safety at work and to prevent injury as much as possible while carrying out their duties in the hospitals or elsewhere.

From table 2 above

Slippery walking surfaces are most frequently identified as the leading safety hazards in the various hospitals with an overall rating of 59% (fifty-nine out of one hundred respondents); followed by nursing unconscious and/or elderly patients on high beds without side rails, as the second leading safety hazard to the patients rated 56%.

- From the comparative studies among the various hospitals under review, 40.0% of safety hazards were identified in government-owned hospitals, taking the lead, and followed by Private hospitals with a score of 31.0%. However, 29.1% of safety hazards were found in the mission hospitals.

- Meanwhile, failing to identify others well does not mean those hazards are not present in the hospital environments. However, it means more work needs to be done by nurses to identify these hazards adequately through safety training and conscious maintenance of safety culture and health education.

From table 3 above

The researcher also discovered that Re-capping injection needles after use was most identified as an unsafe act common among practicing nurses, which commonly exposes nurses to the risk of injury at work and subsequent disease transmission. It is also sad to note that majority of these incidents were not reported appropriately for fear of being punished, whereas, reporting it would have helped to prevent potential spread of any implicating blood-borne diseases.

From table 4 above

- Allergic reactions and Repetitive Stress Injury are both identified as most prevailing injuries encountered by nurses in the course delivering their duties in the hospitals, with both scoring 53% each among other injuries sustained by the nurses.

- From the overall rating, however, injuries are most sustained by the nurses in the government owned hospitals with a score of 43.5%, followed by the private hospitals maintaining her second position with a score of 31.7%, while the mission hospitals scored 24.8%.

From table 5 above

- Much emphasis is being laid on refusing to take short cuts with a score of 68%, which has been identified to have had the potential to cut lives short.

- From the overall rating too, the government-owned hospitals are also doing much more to manage these incidents by 34.9%. This is a reactive rather than proactive measure.

From table 6 above

The following challenges facing the professional nurses are quite obvious. Meanwhile, the greatest challenge identified by the respondents is "Too much work load and little or no time to rest (56%). Others "Non-compliance with all applicable rules and regulations (54%)" and "Not following Micro pause and Work Pace breaks (54%)" amongst others.

- From the overall rating, Mission Hospitals have the greatest challenges of managing and coping with injuries and illnesses at work (35.6%).

From table 7 above

- Much emphasis is placed on adequate supply of the right materials to be made readily available for use (64%) and Staff training to be instituted as soon as possible. (60%).

- From the overall rating, the Mission hospitals are also on the downward trend in terms of meeting up with the ways to overcome the challenges facing them.

From table 8 above

- Professional nurses are obviously aware of the ways to prevent or mitigate injuries and illnesses at work.

- However, the major problem is their inability to deliberately take the decision to always follow all the tenets of operational excellence in all they do, so as to do them in the right way all the time.
- Concerning the areas in which the nurses are not fully knowledgeable, they should make themselves available to for learning in order to update themselves on the recent trends in safe work practices and procedures.

Summary of findings

In Delta State, 98% of nurses run shift in the hospital, out of which 60% admitted having had one form of health problems or the other. 2% of nurses do straight morning duty. into the main safety challenges facing the professional nurses in Delta state of Nigeria. Thus compromising safety has almost become a norm in some of the facilities in the state. It is a forum for organizing staff training on general safety. This will, no doubt, serve as an eye opener to the professional nurses to acquaint themselves with the recent trends on safety. This will re-direct the minds of the nurses towards following all the tenets of operational excellence, as we cannot afford to continue taking shortcuts.

The comparative studies on Private, Government-owned and Mission hospitals also enabled the researcher to explore successfully the various areas and track each individual variable to ascertain each of their safety implications towards nurses' performance.

Recommendations

The State and local Governments should work together to screen for nurses at high risk of developing work-induced musculos skeletal disorders (MSD).

- The hospital management should step up the standards of their health educational facilities with the view to emphasizing the importance of safety at work. Recreational facilities should be strategically established and made readily available and accessible to the individuals for appropriate forms and levels of exercises aimed at maintaining a healthy weight, thus preventing easy breakdown while at work in the hospitals
- The government should pay adequate attention to the welfare of nurses and provide relevant materials required to maintain safety adequately at work.
- Hospitals should be devoid of slippery materials on the walk ways and floors, as this will continue to pose safety hazards to the nurses at work.
- This research project should serve as a stepping stone for further research on the subject to ensure a more accurate result and more fruitful contributions to Nursing profession.
- The professional nurses also need to follow all the ten tenets of operational excellence as follows:
- Always operate within design and environmental limits
- Always operate in a safe and controlled condition.
- Always ensure safety devices are in place and functioning.
- Always follow safe work practices and procedures
- Always meet or exceed customers' requirements
- Always maintain integrity of dedicated systems
- Always comply with all applicable rules and regulations
- Always address abnormal conditions
- Always follow written procedures for high risk and unusual situations
- Always involve the right people in decisions that affect procedures and equipment.

(Lifted from the Student Paper, University Putra, Malaysia)

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