



Occupational Health Hazards and its consequences among healthcare personnel working in Operation Theatre

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Abstract:

Introduction: In the healthcare industry, operation theatre employees play an important role in the organizational workings. They are serving others, so it is important that they must be away from any work-related injury or illness. Occupational health is a vital part of the health care personnel. Any work place injury can deteriorate their productivity and efficiency.

Aim: This study aimed to understand various occupational hazards and its consequences faced by the health care workers working in the operation theatre.

Methodology: The study used secondary data sources related to occupational health hazards among operating room staff. This study executed different kind of hazards which affects the working pattern of the employees which are surgeons, anesthetist, staff nurses, assistants and other supporting staff.

Findings: Occupational hazards prevention is a crucial act to gain the productivity and employee health. There are numerous health hazards found in the premises of an operation theatre, categorized as- accidental, physical, chemical, biological, psychosocial and many other. The employee faces risk ranges from needle stick injury, exposure to harmful chemicals, odd posture, exposure to body fluids, stress and also violence.

Conclusion: Operation theatre staff comes in contact with the harmful agents quite often. So proper prevention and if exposed, early reporting and management is necessary to promote health and well-being of the employees and increased productivity.

Keywords: Occupational health, occupational hazards, stress, needle stick injury, risk factors

1. Introduction

Occupational health is a field of public health to promote and maintain highest degree of physical, mental and social well-being of workers in all occupations.

Occupational health care is the service that assist the employers or their representatives to ensure that the workplace is safe and healthy according to accepted occupational health and safety guidelines and requirements.

The main focus of the occupational health is to prevent the workplace and employees from the hazards at its origin. Any work-related harm or accidents to get prevented on early stage. The main importance of it is to improve efficiency and productivity by less missing of employees from illness or injuries.

In the healthcare sector, it is very crucial for the workers to maintain their occupational health. Healthcare professionals face many occupational risks while performing their duties. Where they are surrounded by numerous risk factors, especially the employees working in the operating room. The workplace hazards they facing are of various in nature. They are psychological, ergonomic, chemical

and also physical hazards. Psychological health is triggered by work stress, shift work, violence etc. employee health is also threatened by the chemical hazards like, exposure to blood and body fluids, which is quite prominent in the health care workers in the operating room. There are other risk factors related to ergonomic factor which includes the heavy lifting, uncomfortable position of hand or foot and may be prolonged standings. Operating room staff may experience the physical hazards of sharp object injuries, slipping, infection due to close body contact with open wounds and many others.

As it is considered that the duty of a healthcare worker is always patient centric but the health of the health care provider is also equally important. So, the priority should also be given to the promotion of health of the health care providers.

The objective of the study is to explore various occupational health hazards experienced by the operation theatre staff and its consequences.

2. Methodology

The data is collected using secondary data sources on occupational health and hazards including work related injuries, musculoskeletal disorders and others like sharp injuries etc. Data is also collected with concern to the workplace environment, relationship between employees and employers and the quality of work. Various journals are also referred related to the topic such as National Library of Medicine, Journal of Public Health, International Journal of Nursing Research and Practice, Journal of Nursing and Health Science, Springer Publication and website like Google Scholar.

The main focus of the study is on the hazards faced by the operating staff and their immediate and later consequences during their duty in the operation theatre. The material referred for this research are in English language and key words used to search the data are occupational health, hazards, blood borne disease, exposure to body fluids and musculoskeletal disorders. Study included the healthcare workers working in the operation theatre are Anesthetist, surgeon, nurses helping in the surgery and any other staff who helps in the operation.

3. Findings

Occupational health and safety issue is quite an important indicator of quality and risk management. And to ensure that safety, prevention of the hazards is an important task to be done with the concern to have the efficiency and good productivity.

There are various internal factors which affect the occupational health other than external factors, they are age, gender, shift length, understaffing and many others.

There are plenty of hazards that are faced by the health workers working in the operating room. To categorize them, they are accident hazards, physical hazards, chemical hazards, biological hazards and psychosocial factors.

A. Accident Hazards

Accidental hazards are more often occurs during any surgical procedure. The injuries may occur due to any slips and falls on the wet floor at the time of any emergency situation. Injuries also happen if any instrument fall on the legs or toes. An operation theatre also includes the sterilization section, so there may cause burns by the hot sterilized equipment. Needle prick and cut by blade is a quite common injury at the time of any surgical procedure, which can occur at the time of passing any sharp object to the fellow health care worker. Electrical instruments are also being used in the surgery like cautery. So, if the faulty installation is there, then there are chances of electrical shock.

There are several precautionary actions that can be taken to avoid such accidents. Provision for anti-slip shoes should be done for the operative staff including nurses, anesthetist, surgeons, assistants and other workers. Sharp objects are handled with a great care and use of safety receptacles should be done to handle the sharp objects. Electrical equipment is get checked periodically with the help of a qualified electrician and get the faulty circuits repaired immediately especially during the rainy season.

B. Physical Hazards

Physical hazards involve any kind of musculoskeletal injuries to the bone or to the muscles. Prolonged standing position causes the pain in the back and legs to the healthcare personnel. There are quite some of the diseases related to this situation, which includes varicose vein, that is measured to be one of the condition causes by prolonged standing. Head injury is the other physical hazard faced by the OT staff. As the lights are adjustable to ease the overall procedure but there are possibilities to get injured by that if it is not properly placed. Operating room is prone to get caught easily by fire because the OT contains all the essential elements that heat up the fire. Those elements are the combustible material like swabs, drapes, plastic materials etc., then a high energy ignition source such as lasers and another element are the oxygen enriched environment because the operating room has the oxygen cylinders and also it uses Nitrous oxide for anesthesia, which is also supports oxygen in fire.

Preventive measures for the fire issue are must in every operation theatre, which can be achieved by keeping the supportive elements apart from each other means fuel, oxygen and ignition sources. Other measures for prevention of fire are- to be make sure that the alcoholic skin preparation liquid gets dry properly from the skin because it burns invisibly at 840°C and cause injury to the skin. During prepping and draping, adequate ventilation should be kept to prevent accumulation of the oxygen under it. Adequate training is necessary regarding the use of fire extinguisher to all the health care personnel, with timely checking and filling of the extinguishers. Significant health risk to health care workers is related to ergonomic factors, which includes injury due to manual handling requiring force to pull, push or lift the patients. Most of the health care workers consider this kind of injury as a part of their job and never thinking of reporting them. The American Nurses Association Health and Safety Survey 2011 published that 62% of nurses had reported disabling musculoskeletal injury and 56% had experienced musculoskeletal pain, which was worsened due to the nature of their job.

C. Chemical Hazards

The most common chemical hazards that are found in the operating room are nitrous oxide, halothane, isoflurane, which are to be used for anesthesia. For preventive measures against anesthetic gases, periodically monitoring is important for gas concentration and exposure as well as turning off gas when breathing system is disconnected from patient. Other chemicals are formaldehyde, glutaraldehyde, peracetic acid, isolyzer, chemotherapy, betadine, alcohol and benzoin.

Formaldehyde:

Formaldehyde (CH₂O) is used in the operation theater as a preservative for specimens removed from the body during surgical procedure and also for the sterilization of the instruments. Exposure to it can irritate the skin, throat, lungs and eyes. Repeated exposure to formaldehyde may possibly lead to cancer. The recommended exposure limit for formaldehyde is lower than 0.016 ppm calculated as an 8-hour time- weighted average as per the National Institute for Occupational Safety and Health (NIOSH).

Glutaraldehyde:

Glutaraldehyde, C₅H₈O₂ or OCH(CH₂)₂CHO is a transparent oily liquid with a pungent odor. Excess exposure to glutaraldehyde may cause skin and eye irritation, headache, nasal irritation, sneezing, throat and lung irritation, conjunctivitis and asthma like symptoms. It is used to disinfect the surgical instruments and also in the preparation of grafts and bio prosthesis.

Anesthetic gases:

Anesthetic gases include nitrous oxide and halogenated anesthetics such as halothane, enflurane, isoflurane, desflurane, sevoflurane and methoxyflurane. Exposure to these gases may cause symptoms

like drowsiness or nausea while long term exposure may eventually result in reproductive problems and cancer. Other symptoms include headache, problem with judgement, depression, fatigue and lack of coordination.

Latex:

Latex gloves are proven extremely effective against transmission of infection in many diseases to health care personnel but some of them experience allergic reaction after prolonged exposure to latex. It can cause urticarial.

Others:

Isopropyl alcohol, like hydrogen peroxide is a common hospital cleaner, which is highly flammable in the operation theatre environment. However, it has minimal toxicity, its ingestion may cause central nervous system, respiratory, renal and cardiovascular toxicity. Other chemicals include soaps, detergents, disinfectants that may cause irritation or dermatosis.

As preventive measures for the chemical hazards, installation of air conditioning and effective ventilation is mandatory, that can remove odors, gases and vapors. For any eye irritants, eye wash fountains or bottles must be there. Non latex gloves are provided to them who have latex sensitivity.

D. Biological Hazards

The health care workers working in the operation theatre, are mostly prone to get exposed to blood and body fluids. Which make them vulnerable to acquire any minor skin irritation to communicable disease such as HIV (Human Immunodeficiency Virus), M. Tuberculosis, Hepatitis B and C, Covid- 19 and others. There are mainly three modes of transmission- Airborne, Blood borne and Contact. It is found out that 1 in every 10-health care worker get a needle stick injury contaminated with hepatitis B or C virus. While working with the patients, health care personnel should make it clear if the patient is not suffering with any life-threatening communicable disease. In that case more protection is to be taken during the operating procedure.

One way to prevent these hazards is to adhere to the universal precautions and properly use personal protective equipment. While disposing off the sharp objects, appropriate procedure should be followed. Proper washing of hands and skin surfaces after getting exposed to any contaminated blood and body fluids.

E. Psychosocial Hazards

The factors that lead to stress to a health care worker are excess workload, shift duties, lack of appreciation, issues with superior surgeons, relationship with colleagues any others. Suffering from

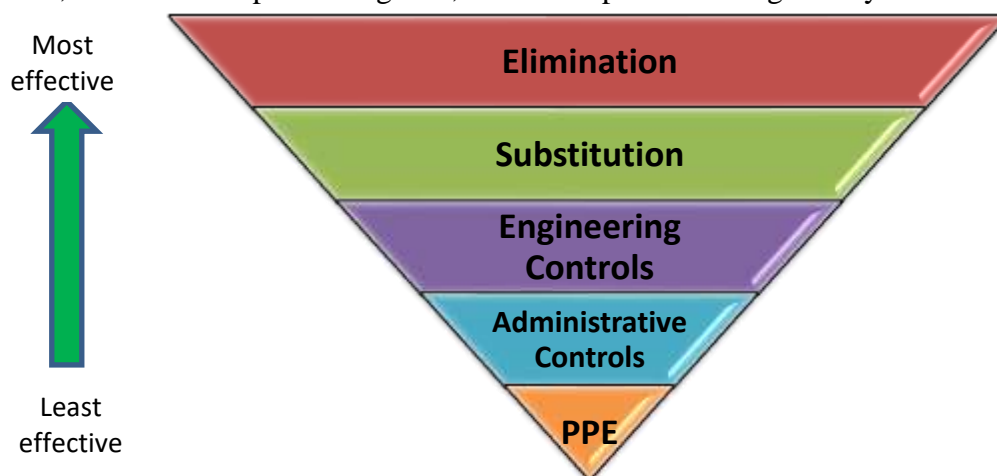


Figure 1: Hierarchy of Controls

Source: The national Institute of Occupational Safety and Health (NIOSH)

fatigue and lower back pain because of handling heavy patients and standing position for a longer period of time is a common problem in operation room staff. Any kind of exposure to severely traumatized patients, victims of a disaster event or a violated patient may cause post-traumatic stress disorder to the health care personnel.

As a preventive measure to the psychosocial hazards, an experienced counselor should be hire for proper counselling and advising.

4. Consequences of Occupational Hazards

For the topic of consequences of hazards in the health care workers, only absenteeism, insurance and compensation like issues are keeping in concentration, but there are a lot more than that. The severity of illness or injury caused at the workplace, directly affect their level of productivity and stress level. For the health care personnel working in operation theatre, back pain is the common morbidity they are suffering often.

Various studies shown that people working in the health care settings are more prone to acquire life threatening illness such as HIV or Hepatitis B or C. It is mainly cause by the sharp injuries or body fluid exposure during the surgical procedure. However, many times the staff is not able to report the incidence to their superiors. In the health care profession concentration and dedication are vital parts. If the person is not psychologically healthy, then it will affect the productivity of the work, failure to respond to work and decreased morale.

Compensation is also one of the reasons which have negative impact on the work pattern of the health care workers, if not provided adequately. In Florida, a study shown that only 10% of employees received a satisfactory compensation from the employers. There are quite a few studies which concentrating the issues related to the health care workers' rights, which surely needs further research and insight.

5. Hierarchy of Controls

The vital act to reduce the illness and injury occurrence in the operating room is to reduce its exposure. A model with five level actions has been prepared which is known as the hierarchy of control. The order of the hierarchy is decided on the basis of its effectiveness.

- 1.Elimination: Removal of any hazards or their sources from the workplace.
- 2.Substitution: Replacing the hazards with any non-hazardous substitute.
- 3.Engineering controls: Keeping the workers away from the hazardous substances.
- 4.Administrative controls: Changing the working pattern of the employees.
- 5.PPE: Providing Personal Protective Equipment in adequate amount.

6. Conclusion

Significant number of Health care personnel are regularly exposed to occupational hazards in India. The overall responsibilities and workload lead the operating room staff to suffer from excess psychological stress and they are broken emotionally as well as financially. The administration of the units should observe, prevent and if exposed, document the incidents of any work-related injuries or illnesses. And also take immediate action, if the situation demands. Vaccination should be mandatory for all the health care workers such as Hepatitis B and C, Covid-19 or any other communicable diseases with adequate documentations.

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