

Perspective Of Occupational Health Hazards For The Healthcare Workers In Hospitals Of Agra City- A Case Study

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Abstract: India, a growing economy and world's largest democracy, has population exceeding 1.2 billion. Out of this huge number, 63.6% form working age group. More than 90% work in the informal economy, mainly agriculture and services. Less than 10% work in the organized sector; mainly industry, mining and some services. The occupational safety and health (OSH) scenario in India is complex. Unprecedented growth and progress go hand in hand with challenges such as huge workforce in unorganized sector, availability of cheap labor, meager public spending on health, inadequate implementation of existing legislation, lack of reliable OSH data, shortage of OSH professionals, multiplicity of statutory controls, apathy of stakeholders and infrastructure problems. This study will carry out among the HCWs (both males and females) of 40 hospitals of Agra city, Uttar Pradesh, India. The study group consisted of various HCWs including senior residents, junior residents, interns, undergraduate medical students, staff and student nurses and staff and student laboratory technicians. The study will be carried out with participation from 400 HCWs. A hospital-based cross-sectional study will be undertaken in a tertiary private hospital in Agra, Uttar Pradesh, India. Data will be collected using a pretested and predesigned proforma from 400 respondents (Doctors, nurses and laboratory technicians). Therefore, this study was undertaken to study the awareness of standard occupational safety measures such as universal precautions and compliance in daily practice among paramedical workers. The main objectives of this study are:

- ▶ To find out the main hazardous sectors in hospitals and its impact on the health workers.
- ▶ To assess the current status of occupational health safety among health workers in hospitals of Agra city
- ▶ To give suggestion to reduced risk factors among the health workers.
- ▶ To formulate of safety guidelines in the hospitals.

Keyword: Occupational health services (OHS); Medical Hazards,

I. Introduction

India has a working age population of approximately 500 million, the majority of whom work in the unorganized sector, with less than 10% of the working population covered by Health and Safety legislation. The media frequently reports on accidents at work resulting in numerous fatalities, for example construction workers killed when the building they were working on collapsed, workers dying from a leak of liquid ammonia, nurses and a patient dying of smoke inhalation following a fire at a hospital and a dock worker drowning after falling into deep water. The above cases all took place within a one week period in Andhra Pradesh. For the whole of India, the expected annual number of occupational fatalities is 36,700. This figure is based on estimates using the Malaysian average reported fatality rate (11.0 per 100,000) as there is serious under-reporting of workplace accidents and deaths and a paucity of reliable data from India. Further estimates set the number of occupational injuries per year at 18,300,000 and the number of occupational diseases 1,850,000 per year for the whole of India. Occupational health services (OHS) is a programme that has been designed to perform basic preventive functions and is responsible for advising employers, workers and their representatives on how to carry out the requirements for establishing and maintaining a safe and healthy working environment in order to facilitate optimal physical and mental health in relation to work. The OHS has two main components, occupational health and occupational safety (WHO, 1995). The Ministry of Health and Social Services (MOHSS) (2006) views OHS as a multidisciplinary branch of preventive medicine which is concerned with the wellbeing of the employees in the work environment. OHS is aimed at launching and upholding a healthy and safe environment, maintaining a well performing and motivated workforce, providing a safe workplace, and performing surveillance on work environment factors and work practices that affect the health of the workers.

II. Historical Background

Occupational Health Services focus on employees' participation in the programme, which is essential to improve their working practices through the testing and treatment of earlier diagnoses of diseases (WHO, 2002). Safe practices can be ensured by creating awareness among employees about work-related risk as well as promoting safety on the job (Hammer & Price, 2004). A study conducted by Abdullah, Spickett, Rumchev, and

Dhaliwal (2009) revealed that objective perceptions among health workers bring about harmony in the organisation and workers were found to be important in mediating the relationship between early responses to workplace injury. This finding is supported by Granzow and Theberge (2009), who recommended that the dynamics in the workplace and the involvement of workers in participatory initiatives regarding occupational health and safety bring about harmony and job satisfaction. According to the ILO (2004), there are more than two million work-related fatalities in the world every year. These accidents and injuries occur because of a lack of proper occupational health services, which are needed to minimise occupational health hazards. The Occupational Health and Safety Forum (2011) stated that approximately half of the world's population spends most of its time at work. Bilia and Manyele (2003) mention that the challenges facing the environment and OHS in Tanzania, such as globalisation, interconnectedness and industrialisation, are growing quickly as a result of the many chemical compounds that are being used to facilitate human activities and the many chemicals that are used for commercial purposes. This rapid increase in the number of chemicals in the workplace has endangered workers and created public and environmental hazards. According to Kotze (1994), this exposure puts them at risk of acquiring diseases, and psychological hazards such as stress, which have a negative effect on the human body and can lead to mental illness, absenteeism and job dissatisfaction. In view of all these risks and occupational hazards, for Onandjokwe Hospital to fully harness the potential of its employees, a comprehensive health and safety programme for all employees is mandatory. Work Cover (2002) states that an occupational health and safety policy is needed in the workplace as part of a comprehensive programme which aims to minimise injury. The programme should indicate management goals, objectives and policy implementation, as well as responsibility and accountability. Pingle (2005) attempted to address the question 'Do occupational health services (OHS) really exist in India?' It also gives an overview of the prevailing situation of OHS in India. Allegranzi *et al.* (2010) assessed a project of the feasibility and effectiveness of the World Health Organization hand hygiene improvement strategy in a low-income African country. The intervention consisted of introducing a locally produced, alcohol-based handrub; monitoring hand hygiene compliance; providing performance feedback; educating staff; posting reminders in the workplace; and promoting an institutional safety climate according to the World Health Organization multimodal hand hygiene improvement strategy. Brecker (2010) reported on the occupational health and safety in Andhra Pradesh with recommendations for priority actions. Occupational Health and Safety issues in India, as was not uncommon, encompass a large scale. Carlson (2010) stated that transmission of hepatitis B and C from health care workers to patients remains rare in developed medical care systems but may be more common in systems that are still developing. Pingle (2012) studied about occupational safety and health in India. Author told that India had huge young population, was an important country not only in Asia but in the whole world. It had been slow to adopt the high standards of occupational health and safety. Phukan (2014) researched on compliance to occupational safety measures among the paramedical workers in a tertiary hospital in Karnataka, South India.

III. Methodology

The World Health Organisation/ILO defines Occupational Health as being "to promote and maintain the physical, mental and social well-being of all workers and not merely the absence of disease". As such, Occupational Health deals with the impact of work on health and health on work. Since 1999 it has become necessary to develop guidelines for the provision of Occupational Health services in the Department of Health as part of health service responsibilities for Public Health Services, including its own personnel. Key strategy for OH service delivery for the Department of H is through OH units attached to Provincial Health facilities.

A. Occupational health service (OHS)

A service established in or near a place of employment for the purpose of:

- Protecting the workers against any health hazards which may arise out of the work, or the conditions in which it is carried on;
- Contributing towards the workers physical and mental adjustment, in particular by the adaptation of the work to the workers and their assignments to jobs for which they are suited; and
- Contributing to the establishment and maintenance of the highest possible degree of physical and mental well being of the workers."

The establishment of an occupational health service will depend upon the policy of the organization/institution; the size and composition of the work force; and the needs of the organization.

A comprehensive Occupational Health service should include:

- a) **Promotion of wellness:** This will enable the organization to conduct employee medical/health surveillance, and encourage personal responsibility for health care, as well as contributing to reducing sickness absenteeism.
- b) **Prevention of occupational injuries and diseases:** To monitor risks in the work place, and contribute to reducing occupational injuries and diseases,

- c) A clinical service should offer emergency or urgent Primary Health Care, as well as emergency medical care and monitoring of chronic conditions.
- d) Occupational Hygiene will identify and recognize workplace hazards, (including chemical, physical, psychosocial, biological, mechanical, and ergonomic). The practitioner will also make recommendations, for control, monitoring and evaluation of risks.
- e) **Consultation Services.** The OH service acts as consultants on OH matters to persons in the workplace, e.g. management, labour, unions; and to persons outside the workplace, e.g. N.G.O's, C.B.O's, referral centers and other health institutions.
- f) Administration includes developing and maintaining an information management system, as well as statutory records and reports.
- g) **Research:** It is necessary for Occupational Health services to become involved in relevant research in order to evaluate the effectiveness of the services, and the developments of new trends in Occupational Health.
- h) **Special Programmes.** From time to time certain health needs may arise among the workforce. These needs will be addressed in special programmes e.g. for vulnerable groups as well as HIV/AIDS, and the chronic diseases of lifestyle.
- i) Employee Assistance Programme

B. Need of Occupational Health service for health care workers

The employees of the health service is its most valuable asset, so it is only sensible to make sure that everything possible is done to help them provide the highest quality of care. If health care workers are troubled by their own ill-health, or other stressful circumstances, then they will not be able to give their full attention to this demanding task that is health service to others. In addition, apart from being good employment practice, no hospital or clinic can function effectively if there is a high incidence of ill health among health care workers. A good OHS will help to minimize health and social problems for staff so that they can render high quality services to their clients. Consequently, this will minimize exposure to health hazards not related to their primary illness. Setting up a well- managed OHS makes good economic sense. The reduction in costs due to preventing occupationally related injuries and diseases would more than offset the budget required. In addition, an OHS has a unique potential to generate revenue to be self-sustaining. It is the only health programme with this capability.

C. Main sectors for Establishing Occupational Health Services and Indicators

The following simplified checklist assumes that a new service is to be commenced. Some already established services might also find it helpful.

a) Management leadership and endorsement is obtained:

As with any new initiative, the commitment and support of the Executing and Accounting Authorities, including Executive Managers, Programme Managers, Service Delivery Managers and client acceptance, is invaluable. The endorsement of the Executive and Accounting Authorities will enable this to be achieved and will ensure that there is a wide understanding of the practical value of the OH services.

b) Clear terms of reference are agreed upon by all Executing Authorities.

These should set out the functions of the OH unit and the way it will operate, including lines of accountability and the basis of funding. The terms of reference should be approved by the executing and accounting authorities, managers responsible for the units, as well as by the senior management team. The purpose of this is to ensure that there is a full understanding of the reasons for setting up the OH unit and what is expected of it. It is of critical importance that the lines of accountability are well defined for the service to be effectively provided.

c) A job description is prepared for the post of Programme Coordinator

The responsibilities of the Programme Coordinator/Manager, must be specified in a job description. This should be developmental, specifying the scope of the post and indicating the range of duties to be performed. The job description should make clear that the post-holder must exercise initiative and look actively for ways to develop the effectiveness of the OH services. Reference could also be made to some form of performance agreement which specifies the way the post-holder will be expected to achieve quality in OH services. (See also section 5: Auditing OH services.)

d) Profile of a Programme Coordinator/Manager.

The competencies required by the Programme coordinator include a qualification in OH and other skills including managerial/administrative, interpersonal, clinical and leadership, knowledge of appropriate legislation and relevant experience.

e) The appointment of the Programme Coordinator/Manager.

This will follow Public Service protocols/procedures.

f) A business plan

Using the terms of reference as a starting point, the Programme Manager/Coordinator must draw up a business plan setting out the way the OH service will be developed. This will require a situational analysis to be completed in consultation with a wide cross-section of other professional personnel and labour representatives.

The plan will set out detailed objectives, funding arrangements, accommodation, equipment requirements, human resource requirements, time frames and expected outcomes. The plan will need to be considered and approved by all relevant management echelons. Once approved, it must be communicated for implementation.

g) Business plan implementation

To ensure the buying in and support of management, employees, organized labour and all other relevant stakeholders, a marketing strategy need to be developed and implemented prior to service delivery. A marketing strategy could include but not limited to road shows and presentations illustrating cost benefits and value added of Occupational Health Service. A marketing strategy needs to be commenced, and service delivery will follow.

h) Monitoring and Evaluation

OH services should be evaluated by regular audits, informal visits and spot checks. Set indicators, can measure the impact e.g. reduction in absenteeism, reduction in number of occupational injuries and diseases.

D. advantages of providing a well managed occupational health service

- Reduced staff turnover and the retention of valued staff.
- Reduction of recruitment, training and induction costs.
- Helps to promote job satisfaction and enhances work relationships
- Reduces potential injuries and acquired occupational diseases.
- Increases quality service delivery and productivity
- It promotes employee's loyalty to the organization
- It assists in reducing absenteeism and excessive sick leave
- Reduces temporary or permanent loss of employees
- Assists in rehabilitation of the injured or sick employee into the workplace
- The promotion of employee's morale.
- It assists in the prevention of too much time away from the workplace through utilization of the on-site service.
- On-site care and counseling provides for legal requirements.
- Reducing medical expenses and legal claims.

E. Elements of an OH service

a) Promotion of wellness and prevention of injuries and diseases

- Medical/Health surveillance, including where necessary, biological monitoring
- Monitoring of special vulnerable groups
- Monitoring of personal protection methods including immunization
- Epidemiological surveillance
- Risk assessments in the workplace
- Health promotion and maintenance
- Job placement and rehabilitation
- Impairment assessment and disability management
- Employees Assistance Programme
- Counseling and referral when necessary
- Research
- HIV/AIDS in the work place

b) Clinical

- Emergency Medical care
- Management of occupational injuries and diseases.
- Primary health care
- Continuing health care – monitoring chronic conditions.

c) Occupational Hygiene

- Identification and recognition of hazards (Chemical, physical, psychosocial, biological, mechanical and ergonomic)
- Recommendations and motivation for control
- Evaluation

d) Consultative

- i. **Within the workplace** – the OH medical officer, the employer, workforce, Unions, human resource managers, risk managers, on matters relating to employee re-placements and transfers on medical grounds, and on other OH Participation in Emergency /Disaster Planning (First-Aiders, Fire-fighters)
 - Coordination of First Aid training including responsibility for First Aid boxes.
- ii. **Outside the workplace** – other referral centers/agencies and health institutions for:
 - fostering community relations
 - professional development through Information Systems and research

e) Administrative

- Policies and procedure manual
- Hazards documentation
- Standing medical directives and protocols
- Records (Personal medical, environmental, sickness absenteeism, accidents, medicine control, man-job specifications, risk assessments)
- Statutory records and reports according to relevant legislation (e.g. Radiation medicals, COID documentation)
- Integrated information management systems
- Appropriate research documents

f) Research

Identify priority areas for research in OH, participate in research projects, and implement research recommendations

g) Special Programmes

This refers to programmes that require special attention in a continuous way because of their contribution to morbidity and mortality rate. These may include HIV/AIDS, nutrition, TB, cancers and life related conditions.

F. Main Hazardous Sectors in healthcare workplace

a) Biological Hazards

i. Blood borne Pathogens:

Bloodborne pathogens are microorganisms which transmit disease by contact with blood. Contact may be direct, such as needlesticks or splashes of blood-containing fluids to the mucous membranes or open wounds, or indirect, such as when surfaces contaminated with blood come in contact with someone's mucous membranes or abraded skin. The most common bloodborne risks to HCP are Hepatitis B (HBV), Hepatitis C (HCV), and Human Immunodeficiency Virus (HIV) infections.

Bloodborne Pathogen Standard requires a written exposure control plan (ECP), the use of engineering controls (safe needles, sharps containers, needleless systems), PPE, hepatitis vaccinations, training, and post exposure evaluation and follow-up [28].

Blood and body fluids from all patients must be treated as if they were infectious, whether or not an infection has been confirmed. This practice is called standard precautions, and includes hand hygiene, use of PPE, safe injection practices, safe handling of potentially contaminated equipment or surfaces, and respiratory hygiene (cough etiquette) [29].

Needleless systems should replace sharps, where possible. Decrease injection use and eliminate unnecessary sharps, such as towel clips used in surgery. Where possible, replace the following: hollow bore needles; needle devices that need to be pulled apart by the health care provider; needles that are left exposed on a syringe after use; and needles attached to tubing, such as butterflies, that can be difficult to place in sharps containers.

ii. Latex (Natural Latex Rubber)

Natural latex rubber (NLR) is derived from the white, milky sap of rubber trees that are grown commercially, especially *Hevea brasiliensis*. This NLR contains the so-called pathogenicity-related proteins, such as hevein, chitinase, and b-1,3-glucanase, a number of organelles, and other basic proteins. When NLR goods are manufactured, chemicals, curing agents, and accelerators are added. The allergic response to NLR generally is a reaction to the protein in NLR and/or the chemicals used in the manufacturing process. NLR contains more than 200 identified allergens. NLR gloves are the latex product most commonly used in the healthcare industry. Although their use in preventing exposure to bloodborne pathogens is extremely important, some healthcare workers, patients, and visitors may be allergic to NLR and need to be protected. Pre-powdered gloves are treated with cornstarch and then pass to a vulcanizing oven, at which time much of the allergenic protein in the NLR is absorbed by the cornstarch. The repeated donning and removal of gloves in the healthcare settings can generate an atmosphere heavy with protein-charged cornstarch particles that are the main source of exposure to NLR allergens both via skin contact as well as by inhalation of the airborne particles. These particles can remain airborne for up to 24 hours, even posing danger for people who are not present when the gloves are being used. In addition, particles can travel through the ventilation systems of a facility.

iii. Medical Waste

The definition of medical waste differs across countries. The term "medical waste" is often used to describe waste products generated by hospitals, laboratories, and other medical facilities that are potentially infectious to humans. Medical waste generally includes cultures and stocks of infectious agents (i.e., discarded vaccines and culture dishes), liquid human and animal waste, materials stained with blood or body fluids,

pathological waste (i.e., tissues or organs), used sharps, and waste from animals that have been exposed to agents infectious to humans. Medical waste treatment typically involves four main goals: (1) inactivate or destroy infectious pathogens or microbes; (2) destroy sharps; (3) render waste unrecognizable for ethical and confidentiality considerations; and (4) reduce the volume of waste.

Other waste streams generated by hospitals, such as discarded PPE, excess prescription medication, chemical wastes, and radioactive materials may have adverse effects on both people and the environment, however, they generally do not pose risk of infection. Therefore, these hazardous waste streams are typically separated from infectious waste and do not have to undergo sterilization and disinfection procedures. However, some medical wastes may be classified as radioactive waste and will require additional controls.

iv. Methicillin-Resistant *Staphylococcus aureus* (MRSA)

Staphylococcus aureus (*S. aureus*) is a human pathogen causing a wide range of infections from mild skin and soft tissue infections to severe blood infection. It is also found on the skin and in the nose of healthy individuals. *S. aureus* strains which are resistant to the antibiotic methicillin and other antimicrobials are increasingly prevalent in the hospital environment. MRSA is responsible for increased mortality in hospital inpatients and preventing nosocomial infections is a priority area in various high prevalence settings.

MRSA infections can be prevented by using contact precautions, proper hand hygiene, recognition of previously colonized and infected patients, rapid reports of lab results and training of HCP.

v. Tuberculosis and Other Airborne Diseases

Mycobacterium tuberculosis is a bacterium that infects humans, causing tuberculosis (TB). It flourishes in high oxygen-containing tissues such as lungs. It replicates slowly and can remain in a latent state for a long time. *M. tuberculosis* is transmitted through airborne particles called droplet nuclei which are formed when individuals with pulmonary or laryngeal TB cough, sneeze, shout or sing.

Administrative measures are critical to reduce the risk of exposure to persons with suspected or confirmed TB or other airborne illness. These measures include a written infection control plan, prompt detection and isolation of suspected cases, training of staff, rapid reporting of diagnostic tests, education of patients and increasing community awareness

b) Chemical Hazards

i. Cleaning Agents

There are a variety of cleaning products used during hospital housekeeping activities (excluding sterilization and disinfection of surgical or medical instruments) on floors, windows, bathrooms, carpets, and other surfaces throughout the hospital and waiting areas. Hospital environmental service workers and housekeeping staff are at highest risk of exposure; however, hospital patients, visitors, and other hospital staff also can be exposed. Accidental exposures to large concentrations can occur through spills or during mixing of incompatible chemicals.

ii. Ethylene Oxide

Ethylene oxide (EtO) is a flammable colorless gas used to sterilize medical equipment that cannot tolerate heat, moisture, and abrasive chemicals such as optical, rubber, and plastic instruments and devices. Workers at risk of exposure are staff working in central supply, who change EtO cylinders, and workers in other areas where sterilization takes place. The principal route of exposure is inhalation. EtO is a known human carcinogen and reproductive toxin. Acute health effects include irritation of the eyes and upper respiratory system, depression of the central nervous system, headache, and nausea. The use of a fully enclosed, automated, single chamber sterilizing machine can reduce airborne concentrations of EtO to well below the PEL and TLV

iii. Formaldehyde

Formaldehyde is primarily used as a tissue preservative in hospital laboratories and autopsy suites. It is usually found in a solution called formalin, which is 37% to 50% formaldehyde in water with a 6-15% alcohol stabilizer. Lab and autopsy suite workers are at risk of exposure to formaldehyde. Inhalation and skin absorption are the main routes of exposure. Localized ventilation systems should be installed where formaldehyde is used and stored. Labs that use formaldehyde should be under negative pressure with a minimum of 10 air changes per hour.

iv. Glutaraldehyde

Glutaraldehyde is used as a cold high level disinfectant for heat sensitive medical equipment, primarily endoscopes. It is typically found in a 2% concentration in liquid disinfectants under the brand names Cidex, Metricide, or Sporidicin. Fully automated and enclosed disinfecting machines with LEV can reduce airborne exposures

v. Mercury

Mercury is primarily used on nursing floors in thermometers and blood pressure machines where it is present as metallic mercury, although many hospitals around the world are phasing out these uses. Mercury is also found in dental clinics; in medical devices used in the digestive tract, and in eye surgery; in laboratory chemicals; in pharmaceutical products; as contaminants of cleaning products formed in the manufacture of certain ingredients; in batteries; in fluorescent, high-intensity-discharge, and ultraviolet lamps; in electrical switches and relays; in gas thermostats; in industrial thermometers and pressure gauges, including barometers; and as waste in plumbing. The nervous system is very sensitive to all forms of mercury. Metallic mercury vapors are more harmful than other forms found in hospitals, because more mercury reaches the brain. The most effective control for mercury is substitution with a safer chemical solution or process.

vi. Methyl Methacrylate and Other Bonding Materials (Glues)

Methyl methacrylate is a clear liquid with a distinctive, sharp, fruity odor. The main exposure to MMA results from breathing the vapors of the monomer liquid. Suppliers and producers of MMA-containing dental, surgical, and cosmetic products should provide more informative MSDS and labels, including complete descriptions of mixture components.

vii. Surgical Smoke

Surgical smoke is an irritant of human mucous membranes (eyes, nose, throat, respiratory tract) consisting of a mixed variety of gases and particulates, which can damage the lungs and respiratory tract. Workers at risk of exposure include operating room staff (e.g., perioperative nurses, surgical technicians, surgeons, anesthesia providers) and personnel in proximity to any procedures generating surgical smoke who are exposed to the uncaptured or unfiltered smoke from the smoke-generating procedure. Engineering control in the form of local exhaust ventilation (LEV), when used properly, is the most effective means to avoid exposure to surgical smoke.

c) Ergonomic Hazards

Ergonomic exposures include the use of excessive force, as in lifting, pushing, or pulling; awkward, constrained postures, such as bending, twisting, working overhead; repetitive motion; and vibration. Transferring patients to the bed, chair, toilet, diagnostic and treatment tables, and stretchers may expose workers to many of these risks. The exposures are often compounded because patients may be moving, resisting, or physically or mentally unstable. Risks may be increased also due to time constraints and inadequate staffing resources. Combative and bariatric patients can exacerbate these exposures. Patient handling exposures can occur in nursing; surgery; intensive care; physical, respiratory, and occupational therapy; imaging; mortuary; and emergency departments. Main sections are given below:

- Health Effects and Regulations Computer Workstations
- Hand Held Devices
- Laboratory
- Laparoscopy
- Patient Handling
- Radiology
- Slips, Trips, and Falls
- Sonography

d) Hazardous Drugs

Different types of the drugs, which are used by health workers for the treatment of the diseases, are very harmful for them if it is exposed to them.

- Aerosolized Medications
- Anesthetic Gases
- Antineoplastic and Other Hazardous Drugs
- Nitric Oxide
- Pentamidine
- Ribavirin

e) Radiation

Radiation control in hospitals generally falls under the supervision of specially trained professionals known as health physicists, medical health physicists, or radiation safety officers. The equipment and facilities are usually regulated by government agencies that are devoted solely to radiation safety.

- Ionizing Radiation and General Controls
- Radio nuclides: Nuclear Medicine and Diagnostic Medical Imaging
- Radio nuclides: Radiation Therapy
- X-Rays
- Non-Ionizing Radiation.

IV. Proposed Research

The proposed investigation “**Study of occupational health risk factors for the healthcare workers in hospitals of Agra city**” will carry out in the different Hospital of the Agra city of Uttar Pradesh State.

A. Case Study

This study will carry out among the HCWs (both males and females) of 40 hospitals of Agra city, Uttar Pradesh, India. The study group consisted of various HCWs including senior residents, junior residents, interns, undergraduate medical students, staff and student nurses and staff and student laboratory technicians. The study will be carried out with participation from 400 HCWs.

Clearance of study protocol will be obtained from the institutional ethics committee before the start of the study. Findings will be analyzed under different headings to uncover various aspects of NSI. The statistical tools employed were ratio, proportion pie charts, histograms and other basic methods of data interpretation.

B. Data Collection

A hospital-based cross-sectional study will be undertaken in a tertiary private hospital in Agra, Uttar Pradesh, India. Data will be collected using a pretested and pre-designed proforma from 400 respondents (Doctors, nurses and laboratory technicians).

Subjects will be fully informed about the design and purpose of the study and a written informed consent will be obtained. The study will be carried out with the help of an anonymous, self-reporting questionnaire structured specifically to obtain both qualitative and quantitative data to identify predictive factors associated with NSIs. Questions relating to awareness regarding preventive measures like HBV immunization, use of safety devices and course of action in the event of a NSI from an unknown source, will also be included.

The study participants will include all Doctors, nurses and laboratory technicians working in the Hospitals. Confidentiality of the participants' identity and response will be ensured. Informed consent will be taken prior to interview from the paramedical workers. An average of 25 minutes will be required to collect data per respondent. Data will be collected through interview with 400 participants.

C. Making of Questionnaire

The assessment tools will be a pretested and pre-designed questionnaire. The questions will be related to the participants' knowledge regarding different hazardous diseases, modes of transmission of them, and methods to prevent these diseases, knowledge about universal precautions including post-exposure prophylaxis (PEP) for HIV and practices of hand washing, disposal of needles and management of spillages of blood and body fluids, use of personal protective equipment at work, and diseases vaccination.

Using a checklist, the participants will also be observed to see if they actually followed the universal precautions. The checklist will be prepared after some modifications considering the study setting, as per approved code of practice of Control of Substances Hazardous to Health Regulations 2002 and Guidelines of WHO for Occupational Health Sector, for assessing practices in disposal of hospital wastes such as syringes, sharps, needles, management of spillage of blood and body fluids, practicing standard precautions, diseases immunization and post-exposure prophylaxis at work in either a laboratory or a health care setting.

V. Conclusion

In this research, we found that the process and guidelines of the occupational health for health workers which will be very useful for the proposed research work. The own health of the health workers is very important for the efficient working of health services. For this purpose we have to select the hospitals in the Agra city and apply the research work at there. After that we should compare all the standard guidelines to the present guidelines of the hospitals and will make a report on it.

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