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# AN ANALYTICAL CROSS-SECTIONAL STUDY TO MEASURE THE PREVALENCE AND EXPOSURE OF OCCUPATIONAL HAZARDS AMONG STAFF NURSES OF SELECTED HOSPITAL, LUDHIANA

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***Abstract***

*Proper use of safety measures means to prevent or reduce a variety of occupational health hazards which may occur during work in workplace. There is lack of knowledge about hazards and use of personal protective equipment's among staff nurses. To enhance the knowledge, nurses needs to update with the fast changing and advancing knowledge.*

*A cross sectional study was conducted on staff nurses working in selected hospital of Ludhiana, Punjab. 80 Staff nurses were selected by convenient sampling technique. Data was collected by semi structured questionnaire and check list. Data was analysed by descriptive statistics, inferential statistics, prevalence ratio, odd ratio and presented through tables and graph.*

*Findings revealed that majority 71% of staff nurses were in the age group of 22 – 31 years. As per gender, majority 90% of staff nurses were female. As per professional qualification, 43% of staff nurses were BSC Nursing. Maximum 54% of staff nurses were unmarried. Majority of 61% of staff nurses were working on temporary basis. Majority of 76% of staff nurses were belong to Sikh religion. Maximum 67% of staff nurses were with work experience of 1 – 5 years. Majority of 67% of staff nurses were posted in general ward. Majority of 38% of staff nurses had average knowledge regarding occupational hazards. There was significant relationship between knowledge of occupational hazards with professional qualification, type of employment and religion. As per prevalence, biological hazards were more with 63.17% followed by psychosocial hazards with 30% , chemical hazards with 27.5% and least percentage 6.2% of physical hazards among staff nurses.*

*A similar study can be conducted on large sample and by selecting experimental and control group for study. A comparative study can be conducted to compare knowledge of staff nurses in government and private hospitals.*

***Keywords:*** *Occupational hazards, Prevalence, Psychosocial*

## INTRODUCTION

**The Key To SAFETY Is In Your Hands….Eleanor Everet**

Occupational hazards are conditions surrounding a work environment that increase the probability of death, disability, or illness to a worker. Occupational hazards refer to work environment activities, material, substance, process or condition that have the potential to increase the risk of injury or ill health. They are classified as biological and non-biological hazards. In other words, occupational hazard can be defined as a risk to a person arising from one's employment. An occupational hazard is a hazard experienced in the workplace. It can encompass many type of hazards including chemical, biological, psychological and physical hazards. Nurses

are an integral part of clinical services and have primary responsibility for a significant profession of patient care in most health care settings. As such nurses are confronted with a variety of hazards during the course of performing their duties the level of occupational safety factors in preventing adverse outcomes from the occupational safety and health hazards nurses are exposed to a daily basis.[1]

Nursing is associated with lot of hazards, especially in hospitals, nursing care facilities and clinics where nurses may care for individuals with infectious diseases. In view of this, nurses must observe rigid standardized guidelines to prevent diseases and other dangers such as those opposed by radiation, accidental needle stick injury, chemical used. In addition, they are vulnerable to back injury when moving patients, shock from electrical equipment and hazards posed compressed gases. Men and women in nursing jobs are responsible for providing quality care through their working environment such as hospitals, clinics and laboratories, their responsibilities and duties put them in the frontline of numerous occupational hazards.[2]
The multiply effects of occupational injuries and diseases among providers of health care include economic loss, physical loss and psychological disorders such as depression and stress. Consequently, these have negative effect on the employee, their families such as depression and stress. Occupational health and safety is an important issue because of increased incidence of morbidity and mortality of exposed employees. Occupational safety is the control of hazards in the workplace to achieve an acceptable level of risk while workplace safety refers to process of protecting the health and safety of staff while on the job, irrespective of vocation. An estimated 100,000 people die from occupational illnesses while about 400,000 new cases of occupational diseases are diagnosed every year.[8]

Health care workers (HCWs) are at risk of occupational health hazards (OHH) at workplace like other workers in large facility operations and maintenance, including heavy metals, and solvents as well as those hazards that are unique to caring for ill patients. The likelihood of exposure to these hazardous agents by the health care workers depends on the job category and the work environment. A cross-sectional study of health care workers in a south western Nigerian teaching hospital found work-related stress (83.3%), needle- stick injuries (76%), blood strains on skin (73.1%), sleep disturbances and hepatitis (8.9%) to be some of the commonly encountered OHH. The resultant morbidity and mortality among health care workers often impact adversely on their productivity. Thus, protecting the health and safety of HCWs cannot be the overemphasized. However, despite the knowledge of the enormity of these problems by management, occupational health and safety of health care workers is patchy and in some instances totally neglected.[3]

According to International Labour Organization (ILO), 4% of the world's annual Gross Domestic Profit (GDP) is a lost as a result of occupational hazards as employers are faced with loss of skilled staff, absenteeism, migration, early retirement and high insurance premium due to exposure from occupational accidents and diseases.[5]
An occupational hazards are mostly under reported, it has also revealed a lot of occupational diseases or injuries in Sub-Saharan Africa and Asia with developing countries lacking the necessary expertise and resources to manage it. So, health personal need training to reduce the possibility of hazards from their spread. A study showed that 161 responders had high knowledge while 123 had low knowledge on occupational hazards through professional training while only 6% responders acquire it through pre-employment orientation on work ethics.[6]

Nurses continue to report high levels of job related injury and illness. Working environment, responsibilities and duties of nurses put them in the frontline of numerous occupational hazards. The main causes of occupational accidents are noise, too hot and cold environment, old or poorly maintained machines and lack of training or carelessness of employees. Occupational health hazards in developing countries are largely blamed on health care workers not practicing universal safety precautions such as hand-washing, wearing of gloves and the usage of Personal Protective Equipment (PPE).[9]

**REVIEW OF LITERATURE**

Mahadeo Shinde, SharvariSadare, Nutan Potdar conducted a descriptive survey to assess the awareness of occupational hazards among the staff nurses at tertiary study hospital. The results revealed that 19.0% of the respondents were male, 81.0% were female of which 56.2% were single 42.9% were married. Among respondents 79% were between 20-30year of age 6.7% between 31-40year, 5%between 41_50 year while remaining 4.8% were aged 51year or above The results showed that in biological hazards the majority samples 83.8% strongly agreed that nurses should be fully immunised against hepatitis B,22.9% sample disagree that is they are unaware about dermatitis because of using latex gloves. In non biological hazards the majority of sample that is 67.6%. Strongly agreed that nurses have stress due to lack of rest which indicates that they are aware about the stress due to lack of rest and 31.4% of sample disagree that they were unaware.[10]

Prajwal M.S et al. Conducted a prospective study on a pilot basis. A total of 170 nursing staff sample were selected and questionnaires were distributed among them. It was found that most of the nurses get exposed to ergonomic hazards. 73.3% nursing staff has awareness on all components of occupational health and safety. 22.6% were aware, 3.3% moderate aware and less than 1% were slightly aware about the same. The result demonstrated prevalence of occupational safety climate with in hospital yet identified minor gaps for improvement.[7]

The major areas in which nurses perform hazardous tasks were injections, cleaning, patient care, bed making, cleaning and dressing of wounds, medication administration and performing operations. During performing theses activities, health care providers are exposed to many types of hazards including physical, chemical, mechanical hazards[4].

Shakhawan Ahmed Azad, Omor Shareef Hussein conducted a quantitative descriptive study to assess occupational health and safety measures knowledge and experienced types of hazards among nursing staff. Probability sampling technique was used to select sample of 50 staff nurses. Data was collected by using the questionnaire that included socio-demographic variables and questions related to occupational hazards, occupational health and safety measures. Result showed that staff nurses had 48% physical hazards, 28% psychological hazards, 12% mechanical hazards, and 10% biological hazards. There was highly significant relationship between year of experiences and level of education of nurses with their overall knowledge on occupational health and safety measures.[11]

During clinical practice, nursing and midwifery students are exposing to occupational hazards during performing skills such as assisting and delivering baby, administering and handling various types of fluids and medications and many nursing skills including wound dressing.[10]

**OBJECTIVES**

- To assess the knowledge regarding occupational hazards among staff nurses

- To find out the relationship between knowledge of occupational hazards with demographic variables like age, gender, religion, qualification, marital status, type of employment, professional experience and area of working
- To measure the prevalence of occupational hazards among staff nurses
- To measure the association between exposure and prevalence of different occupation hazards.

## MATERIALS AND METHOD

**Research approach:-**

A Quantitative approach

**Research design:-**

An Analytical Cross-sectional design was used.

**Research setting:-**

The study was conducted in civil hospital, Ludhiana, Punjab.

**Sample size**

80 Staff nurses of civil hospital, Ludhiana, Punjab were selected.

**Sampling technique:-**

Convenient sampling technique was used to select sample from staff nurses of civil hospital working in areas such as emergency ward, trauma ward, antenatal ward, postnatal ward, medicine ward, surgical ward and burn ward.

**Inclusion criteria:**

It included staff nurses

- who were working in different areas of selected Hospitals, Ludhiana, Punjab.
- who were willing to participate in the study.

## DESCRIPTION OF TOOL

- **Part 1**: Demographic variables
- **Part 2**: Semi Structured Questionnaire to assess the knowledge regarding Occupational hazards
- **Part 3:** check list to measure the prevalence and exposure of occupational hazards

## ETHICAL CONSIDERATIONS

A written permission was taken from senior medical officer before starting the study and after explaining the purposes and objective of research. Before starting study:-

- Informed verbal consent taken from subjects.
- Confidentiality of subjects maintained throughout the study.

## DATA COLLECTION PROCEDURE

The data was collected by using semi structured questionnaire and checklist from staff nurses of civil hospital in areas like emergency ward, trauma ward, antenatal ward, postnatal ward, medicine ward, surgical ward and burn ward. It was carried in month of December, 2019.

Convenient sampling technique was used to collect sample of 80 staff nurses.

**PLAN FOR DATA ANALYSIS**

The data was analysed by using descriptive statistics and inferential statistics , i.e. calculating mean, percentage, mean percentage , standard deviation, karl pearson's coefficient of coorelation, Z test, Anova, prevalence ratio and odd ratio . Calculation has been done manually with calculator. The findings were depicted with help of tables, bar diagrams.

**ANALYSIS OF DATA**

**SECTION – I SAMPLE CHARACTERISTICS**

**TABLE – 1: Frequency and percentage distribution of sample characteristics**

**N = 80**

| Sample Characterstics | N | % |
|---|---|---|
| **Age in Years** | | |
| 22-31 | 57 | 71 |
| 32-41 | 20 | 25 |
| 42-51 | 3 | 4 |
| >51 | 0 | 0 |
| **Gender** | | |
| Male | 8 | 10 |
| Female | 72 | 90 |
| **Professional Qualification** | | |
| GNM | 32 | 40 |
| ANM | 1 | 1 |
| BSC Nursing | 34 | 43 |
| Post BSC Nursing | 13 | 16 |
| **Marital Status** | | |
| Married | 37 | 46 |
| Unmarried | 43 | 54 |
| Divorced | 0 | 0 |
| Seperated | 0 | 0 |
| **Type of Employement** | | |
| Temporary | 49 | 61 |
| Permanent | 31 | 31 |
| **Religion** | | |
| Sikh | 61 | 76 |
| Hindu | 11 | 14 |
| Muslim | 1 | 1 |
| Christian | 7 | 9 |
| **Experience(in Years)** | | |
| <1 | 15 | 19 |
| 1-5 | 54 | 67 |
| 6-10 | 8 | 10 |
| >10 | 3 | 4 |
| **Unit/Ward** | | |
| General | 54 | 67 |
| Specific | 26 | 33 |

**SECTION-II**

**Objective 1: To assess the knowledge regarding occupational hazards among staff nurses.**

**Table 2(a): Mean knowledge score of staff nurses regarding occupational hazards.**

**N=80**

| Group | n | Mean | SD |
|---|---|---|---|
| **Staff Nurses** | 80 | 18.4 | 5.4 |

**Table -2(b): Percentage Distribution of Staff Nurses according to Level of Knowledge regarding Occupational Hazards.**

**N=80**

| Level of Knowledge | % | Score | N | % |
|---|---|---|---|---|
| **Excellent** | 100% | 25-30 | 15 | 19 |
| **Good** | 80% | 19-24 | 22 | 27 |
| **Average** | 60% | 13-18 | 30 | 38 |
| **Poor** | 40% | 7-12 | 13 | 16 |
| **Very Poor** | 20% | 0-6 | 0 | 0 |

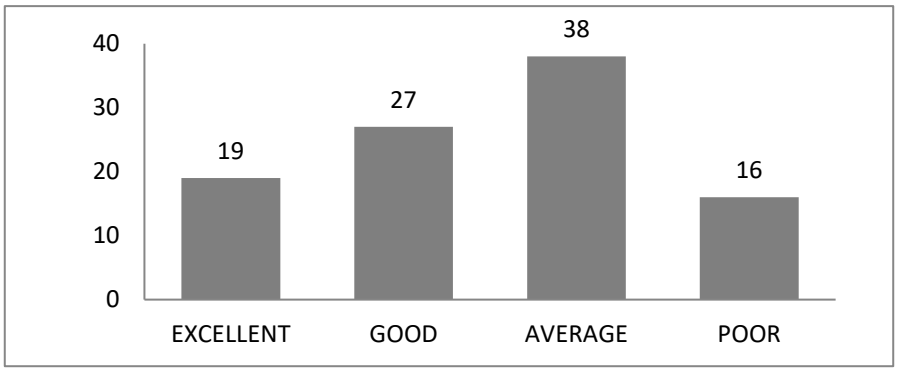


**Fig. 1 percentage distribution of staff nurses according to level of knowledge regarding occupational hazards.**

**SECTION-III**

**Objective 2: To find out the relationship between knowledge of occupational hazards with demographic variables like age, gender, professional qualification, marital status, employment, religion, year of experience, and working unit.**

**Table -3(a): Mean and mean percentage of knowledge score of staff nurses regarding occupational hazards according to area of Age.**

**N=80**

| Age in Years | n | Mean | SD | df | F |
|---|---|---|---|---|---|
| **22-31** | 57 | 18.91 | 5.78 | 2/77 | $0.916^{NS}$ |
| **32-41** | 20 | 17 | 4.20 | | |
| **42-51** | 3 | 18 | 5.34 | | |

Maximum score=30
Minimum score=0

Non Significant at<0.05

**Table-3(b): Mean knowledge score of staff nurses regarding occupational hazards according to Gender.**

**Mean knowledge score**

| Gender | n | Mean | SD | Z |
|---|---|---|---|---|
| Male | 8 | 17 | 2.82 | 1.29$^{NS}$ |
| Female | 72 | 18.55 | 5.61 | |

Maximum score=30 Non Significant at p<0.05

Minimum score=0

**Table 3(c): Mean knowledge score of staff nurses regarding occupational hazards according to professional qualification.**

**N=80**

| Professional Qualification | n | Mean | SD | df | F |
|---|---|---|---|---|---|
| GNM | 32 | 16.4 | 5.01 | 3/76 | 3.08 |
| ANM | 1 | 15 | 1 | | |
| BSC Nursing | 34 | 20.23 | 5.54 | | |
| Post Basic BSC Nursing | 13 | 18.76 | 3.92 | | |

Maximum score=30 *Significant at p<0.05

Minimum score=0

**Table-3(d): Mean knowledge score of staff nurses regarding occupational hazards according to Marital status.**

**N=80**

| Marital Status | n | Mean | SD | Z |
|---|---|---|---|---|
| Married | 37 | 18.37 | 5.40 | 0.03$^{NS}$ |
| Unmarried | 43 | 18.41 | 5.43 | |

Maximum score=30 Non Significant at p<0.05

Minimum score=0

**Table-3(e): Mean knowledge score of staff nurses regarding occupational hazards according to Type of employment.**

**N=80**

| Type of Employment | n | Mean | SD | Z |
|---|---|---|---|---|
| Temporary | 49 | 16.81 | 4.72 | 3.42 |
| Permanent | 31 | 20.90 | 5.49 | |

Maximum score=30 * Significant at p<0.05

Minimum score=0

**Table -3(f): Mean and mean percentage of knowledge of staff nurses regarding occupational hazards according to area of Religion.**

**N=80**

| Religion | n | Mean | SD | df | F |
|---|---|---|---|---|---|
| Sikh | 61 | 19.31 | 5.82 | 3/76 | 3.05 * |
| Hindu | 11 | 14.27 | 3.13 | | |
| Muslim | 1 | 16 | 1 | | |
| Christian | 7 | 17.28 | 5.08 | | |

Maximum score=30 * Significant at p < 0.05

Minimum score=0

**Table -3(g): Mean and mean percentage of knowledge of staff nurses regarding occupational hazards according to area of Experience (in years).**

**N=80**

| Experience in Years | n | Mean | SD | df | F |
|---|---|---|---|---|---|
| **<1** | 15 | 17.4 | 5.02 | 3/76 | $0.52^{NS}$ |
| **1-5** | 54 | 18.85 | 5.58 | | |
| **6-10** | 8 | 16.87 | 4.37 | | |
| **>15** | 3 | 19.33 | 5.24 | | |

Maximum score=30 Non Significant at $p < 0.05$
Minimum score=0

**Table -3(h)**
**Mean and mean percentage of knowledge of staff nurses regarding occupational hazards according to area of unit/ward.**

**N=80**

| Unit/Ward | n | Mean | SD | Z |
|---|---|---|---|---|
| **General** | 54 | 18.31 | 5.96 | 0.22 |
| **Specific** | 26 | 18.57 | 4.09 | |

Maximum score=30 Non Significant at $p < 0.05$
Minimum score=0

**SECTION-IV**

**Objective I11: To measure the prevalence of occupational hazards among staff nurses.**

**Table 4 ( a ) Measure the Prevalence of Physical hazards**

| **Physical Hazards →**<br>**Exposure ↓** | Yes | No |
|---|---|---|
| Yes | 4 ( a ) | 54 ( b ) |
| No | 1 ( c ) | 21 ( d ) |

**Prevalence of Physical hazards** $= \frac{a+c}{a+b+c+d}$

$= \frac{4+1}{4+1+54+21}$

$= \frac{5}{80}$

$= 0.06\ \%$

**Prevalence of Physical hazards among exposure**

$= \frac{a}{a+b}$

$$= \frac{4}{4+51}$$

$$= 0.06\%$$

**Prevalence of Physical hazards among non exposure**

$$= \frac{c}{c+d}$$

$$= \frac{1}{1+21}$$

$$= 0.04\%$$

**Table 4 ( b ) Measure the Prevalence of Chemical hazards**

| **Chemical Hazards** → <br> **Exposure** ↓ | Yes | No |
|---|---|---|
| Yes | 20 ( a ) | 21 ( b ) |
| No | 2 ( c ) | 37 ( d ) |

**Prevalence of Chemical hazards** $= \frac{a+c}{a+b+c+d}$

$$= \frac{20+2}{20+21+2+37}$$

$$= \frac{22}{80}$$

$$= 0.48\ \%$$

**Prevalence of Chemical hazards among exposure**

$$= \frac{a}{a+b}$$

$$= \frac{20}{20+21}$$

$$= 0.48\%$$

**Prevalence of Chemical hazards among non exposure**

$$= \frac{c}{c+d}$$

$$= \frac{2}{2+37}$$

= 0.05%

**Table 4( c ) Measure the prevalence of Biological hazards**

| **Biological Hazards →<br>Exposure ↓** | Yes | No |
|---|---|---|
| Yes | 50 ( a ) | 18 ( b ) |
| No | 1 ( c ) | 11 ( d ) |

**Prevalence of Biological hazards** = $\frac{a+c}{a+b+c+d}$

= $\frac{50+1}{50+18+1+11}$

= $\frac{51}{80}$

= 0.63 %

**Prevalence of Biological hazards among exposure**

= $\frac{a}{a+b}$

= $\frac{50}{50+18}$

= 0.73%

**Prevalence of Biological hazards among non exposure**

= $\frac{c}{c+d}$

= $\frac{1}{1+11}$

= 0.08%

**Table 4 ( d ) Measure the prevalence of Psychosocial hazards**

| **Psychosocial Hazards →<br>Exposure ↓** | Yes | No |
|---|---|---|
| Yes | 22 ( a ) | 37 ( b ) |
| No | 2 ( c ) | 19 ( d ) |

**Prevalence of psychosocial hazards** = $\frac{a+c}{a+b+c+d}$

$$= \frac{22+19}{22+ 37+ 2+ 19}$$

$$= \frac{41}{80}$$

$$= 0.51\ \%$$

**Prevalence of psychosocial hazards among exposure**

$$= \frac{a}{a+ b}$$

$$= \frac{22}{22+ 37}$$

$$= 0.37\%$$

**Prevalence of psychosocial hazards among non exposure**

$$= \frac{c}{c+ d}$$

$$= \frac{2}{2+ 19}$$

$$= 0.09\%$$

**SECTION-V**

**Objective IV: To measure the association between exposure and prevalence of occupational hazards**

**PHYSICAL HAZARDS**

**Prevalence Ratio / Rate Ratio**

$$= \frac{\text{prevalence of hazards among exposed}}{\text{Prevalence of hazards among non exposed}}$$

$$= \frac{a}{a+ b} \Big/ \frac{c}{c+ d}$$

$$= \frac{4}{4+ 54} \Big/ \frac{1}{1+ 2}$$

$$= \frac{0.06}{0.04}$$

$$= 1.5$$

**Odd ratio association between exposed and has hazards**

$$= \frac{a\,d}{Bc}$$

$$= \frac{84}{54}$$

$$= 1.55$$

**RESULT: Hence, odd of physical hazards 1.55 fold more among exposed.**

**CHEMICAL HAZARDS**

**1 Prevalence Ratio / Rate Ratio**

$$= \frac{\text{prevalence of hazards among exposed}}{\text{Prevalence of hazards among non exposed}}$$

$$= \frac{a}{a+b} \Big/ \frac{c}{c+d}$$

$$= \frac{20}{20+21} \Big/ \frac{2}{2+37}$$

$$= \frac{0.48}{0.05}$$

$$= 9.6$$

**Odd ratio association between exposed and has hazards**

$$= \frac{a\,d}{Bc}$$

$$= \frac{740}{42}$$

$$= 17.6$$

**RESULT: Hence, odd of chemical hazards 17.6 fold more among exposed.**

**BIOLOGICAL HAZARDS**

**1 Prevalence Ratio / Rate Ratio**

$$= \frac{\text{prevalence of hazards among exposed}}{\text{Prevalence of hazards among non exposed}}$$

$$= \frac{a}{a+b} \Big/ \frac{c}{c+d}$$

$$= \frac{50}{50+18} \Big/ \frac{1}{1+11}$$

$$= \frac{0.73}{0.08}$$

$$= 9.12$$

**Odd ratio association between exposed and has hazards**

$$= \frac{a\,d}{Bc}$$

$$= \frac{550}{18}$$

$$= 30.55$$

**RESULT: Hence, odd of biological hazards 30.55 fold more among exposed.**

**PSYCOSOCIAL HAZARDS**

**Prevalence Ratio / Rate Ratio**

$$= \frac{\text{prevalence of hazards among exposed}}{\text{Prevalence of hazards among non exposed}}$$

$$= \frac{\mathbf{a}}{\mathbf{a+ b}} \Big/ \frac{\mathbf{c}}{\mathbf{c+ d}}$$

$$= \frac{22}{22+ 37} \Big/ \frac{2}{2+ 19}$$

$$= \frac{0.37}{0.09}$$

$$= 4.11$$

**Odd ratio association between exposed and has hazards**

$$= \frac{a\,d}{Bc}$$

$$= \frac{418}{74}$$

$$= 5.64$$

**RESULT: Hence, odd of psychosocial hazards 5.64 fold more among exposed.**

**RECOMMENDATIONS**

- A similar study can be conducted to compare knowledge of private hospitals and Government hospital nurses.
- A similar study can also be replicated on large sample..
- A study can be conducted by selecting experimental and control group for study.

- A study can be conducted to observe significant changes in practice of nurses after providing them with adequate knowledge regarding occupational hazards.

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