



Original Research Article

## Knowledge Regarding Infection Control Practices among Nurses in Rural Public Health Settings: An Emerging Public Health Concern in India

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### ABSTRACT

**Background:** The nurses have a key role to ensure that infection control procedures and practices are being implemented in an effective way in a hospital to prevent patients from acquiring an infection. In developing countries, their lack of knowledge in these practices leads to high rate of healthcare associated infections, long stay of patients and unnecessary economic burden on the patients.

**Aim and Objective:** To assess the baseline knowledge of nurses regarding infection control practices in developing countries.

**Methods:** This cross sectional study was conducted in an apex tertiary care public institution in northern region of India. All the nurses in the 14 wards of different specialties were interviewed using a structured validated self administered questionnaire.

**Results:** Out of total 102 nurses of varied experience level included in this study, knowledge regarding biomedical waste management (76%) could be labelled as good knowledge. The area which was least familiar to the nurses was hospital acquired infection (26.2%). Overall there was moderate knowledge about hand hygiene (47.1%), sterilization and disinfection techniques (44.9%) and infection control practices in the ward (46.6%).

**Conclusion:** The healthcare providers in any healthcare settings should be well aware of utility of infection control measures. The poor knowledge of nurses in present study indicates a strong need of trainings of on job healthcare providers (nurses) of developed countries in infection control practices.

**Keywords:** Hospital acquired, Infection control, Knowledge, Nurses, Healthcare

### INTRODUCTION

The nurses have a key role to ensure that infection control procedures and

practices in order to prevent patients from acquiring an infection and to protect healthcare staff from healthcare-associated

infection (HCAI) .It is well documented by the World Health Organization and other international health groups that healthcare-associated infection (HCAI) in developing countries is a major issue for patient safety. [1,2] The infection rates are three times higher in these countries when compared to the other developed nations. [3] Increased HCAI contribute to prolonged hospital stays, long-term disability, increased resistance of antimicrobial agents, additional financial burden to the management, and excess mortality [3] The issue of HCAI is uncommonly addressed in low income countries as these healthcare systems are often inundated with poor infrastructure, understaffing, overcrowding, insufficient equipment and lack of local and national evidence-based practice guidelines. [4,5] One factor which might increase the risk of HCAI in these countries is low adherence to infection control practices by the nursing staff. The incidence of high HCAI in low and middle income countries like India is high due to limited knowledge and training of staff, low adherence to Universal Precautions and poor waste management practices, poor knowledge of hospital, lack of standard operating procedures(SOP's) in ward management, poor compliance to hand hygiene.

Nursing staff often have limited knowledge and training of infection Control practices in their implementation during daily patient care. [6] Poor knowledge has been associated with poor attitude and poor practices of infection control in hospital settings. The study aims to assess the baseline knowledge of nursing staff regarding infection control practices in developing country like India.

## **MATERIALS AND METHODS**

The present cross sectional descriptive study was conducted in a tertiary care medical institution located in a rural

area of northern India. The institute caters to approximately 0.5 million outpatients and 0.008 million indoor patients every year. The study was carried over a period of 3 months (Oct 2013 till December 2013) for in various patient care areas of the institute. The Nursing staffs (Deputy nursing superintendent, Assistant Nursing Superintendent, Sister Grade-I and Grade-II) of all 14 specialties of all areas of institute were enrolled in the study who were directly involved in direct patient care and in administrative services of the area were also enrolled. A structured questionnaire consisting of 20 questions for Nurses was designed and pretested in 15 respondents of two clinical areas, not a part of the study. The content and consensus validity of the questionnaire was increased by extensive literature search and inviting suggestions by circulating it among experts of the field. A total of 102 nurses were involved in the study as participants Prior consent for conducting of study was obtained from the participants after briefing them the objectives of the study. The self administered questionnaire was distributed to them and filled questionnaire was collected from them at pre-arranged timings. A descriptive statistical analysis was done by calculating means, percentages.

## **RESULTS**

Out of total 102 nurses (Table 1) included in our study it was observed (Table 2) that only knowledge regarding biomedical waste management (76%) could be labelled as good knowledge. The area which was least familiar to the nurses was hospital acquired infection (26.2%). Overall there was moderate knowledge about hand hygiene (47.1%), sterilization and disinfection techniques (44.9%) and infection control practices in the ward (46.6%). Further analysis of results showed few interesting facts related to nurses place

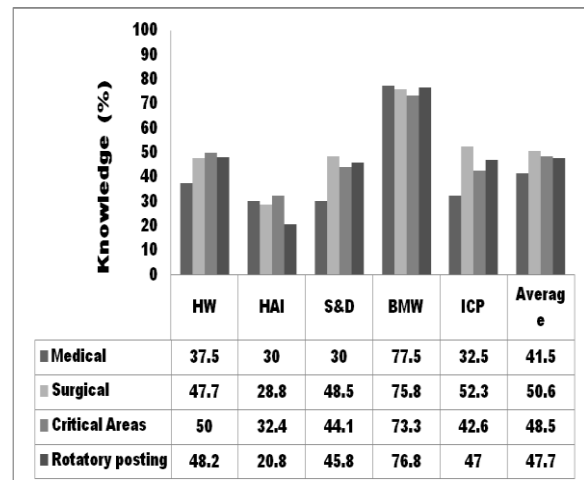
of work (Fig 1). Knowledge of Nurses posted in critical areas of hospital (ICU, PICU, NICU, CCU, burn and trauma wards) was just marginally more than other nurses. Critical care nurses are dealing with the patients who are at high risk and suffering from life threatening life problems. They work in an area which requires complex assessments, quick and correct intervention and continuous nursing vigilance. We expected that their knowledge should be far ahead of other nurses posted in non critical areas, but to our surprise they were just ahead of their counterparts. Contrary to the expectation, knowledge of nurses working in various medical wards was poor regarding sterilization and disinfection techniques (30%) and infection control practices in the ward (32.5%). Nurses working in these areas should be well versed in these aspects.

According to the experience of work it was observed (Figure 2) that all new and old nurses have equal level of understanding in all aspects. This again highlight that the experienced nurses should be trained and retrained as aggressively as newer recruits in nursing care.

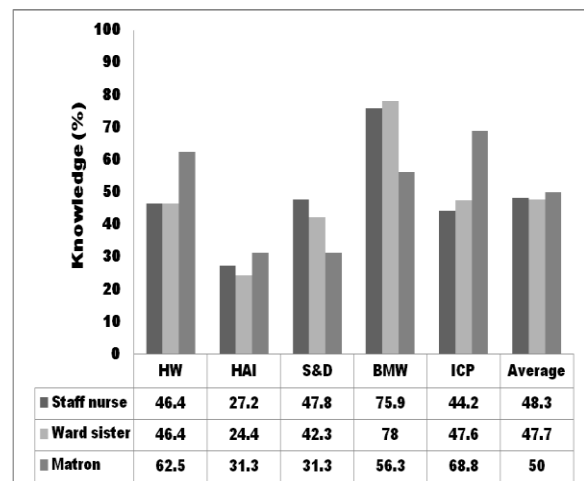
It is taken for granted that persons occupying the higher positions should have best knowledge regarding their subject due the vast experience they have gained over the year. Similarly in our study (Figure 3) we expected the matron to have adequate understanding related to above study parameters. The senior nurses (matrons) had a poor knowledge regarding HAI (31.3%) and surprisingly to sterilization and disinfection technique (31.3%). Also they had inadequate information about biomedical waste management (56.3%). This has a huge impact because they are the one who are guiding, teaching and supervising staff nurses and ward sisters. So this is another category in which stress regarding education and improvement has to be laid upon.

**Table 1: Sociodemographic profile of participants**

| Participants Profile          | Variables        | n=102 (%)  |
|-------------------------------|------------------|------------|
| Age in years                  | 20-35            | 49 (48)    |
|                               | 36-50            | 38(37.3)   |
|                               | >50              | 15(14.7)   |
| Area of work                  | Medical          | 10 (9.8)   |
|                               | Surgical         | 33 (32.4)  |
|                               | Critical Areas   | 17 (16.7)  |
|                               | Rotatory posting | 42 (41.1)  |
| Educational Level             | Diploma          | 82 (80.5)  |
|                               | Graduate         | 18 (17.6)  |
|                               | Post Graduate    | 2 (1.9)    |
| Type of Educational Institute | Government       | 87 (85.3)  |
|                               | Private          | 15 (14.7)  |
| Designation                   | Staff nurse      | 56 ( 54.9) |
|                               | Ward sister      | 42 (41.2)  |
|                               | Matron           | 4 (3.9)    |
| Experience in years           | <10              | 46 (45.1)  |
|                               | 11-20            | 20 (19.6)  |
|                               | >20              | 36 (35.3)  |



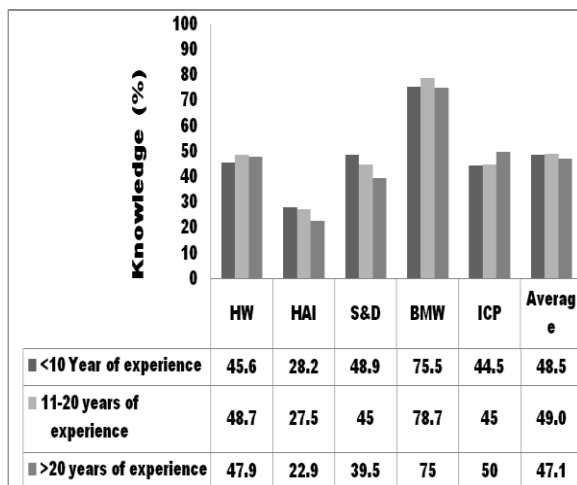
**Figure 1: Knowledge level regarding infection control practices of nurses in various clinical of the hospital.**



**Figure 2: Knowledge level regarding infection control practices in different designations of nurses.**

**Table 2: Study Questionnaire And Responses Of Nurses Towards Various Infection Control Practices.**

| S. No.   | Questions regarding knowledge and attitude   | Response    |               |                  |
|--|--|-------------|---------------|------------------|
|  |  | Correct (%) | Incorrect (%) | Not answered (%) |
| <b>Hand washing</b>                              |  |             |               |                  |
| 1  | According to WHO, how many hand washing moments are there?   | 30.4        | 59.8          | 9.8              |
| 2  | How many steps are there in hand washing?  | 67.6        | 29.4          | 2.9              |
| 3  | Which is the simplest and most effective way to reduce hospital acquired Infection?                    | 76.5        | 16.7          | 6.9              |
| 4  | How many times you should wash your hands when providing nursing care to 3 patients in a 6 hours duty? | 13.7        | 67.6          | 18.6             |
| <b>Total</b>                                     |  | <b>47.1</b> | <b>43.4</b>   | <b>9.5</b>       |
| <b>Hospital acquired infection</b>               |  |             |               |                  |
| 5  | Which is the most frequently acquired HAI?   | 18.6        | 68.6          | 12.7             |
| 6  | Which is of the following is included in the Standard precautions?                                     | 51          | 44.1          | 4.9              |
| 7  | Restricted entry area are all except.  | 10.8        | 76.5          | 12.7             |
| 8  | Duties of infection control nurse includes   | 24.5        | 58.8          | 16.7             |
| <b>Total</b>                                     |  | <b>26.2</b> | <b>62</b>     | <b>11.8</b>      |
| <b>Sterilization and disinfection techniques</b> |  |             |               |                  |
| 9  | Full form of CSSD is   | 42.2        | 54.9          | 2.9              |
| 10   | Endoscopes are sterilized by   | 28.4        | 50            | 21.6             |
| 11   | What is the temperature required for autoclaving?  | 41.2        | 23.5          | 35.3             |
| 12   | What is the frequency of disinfection of OT Tables?  | 67.6        | 21.6          | 10.8             |
| <b>Total</b>                                     |  | <b>44.9</b> | <b>37.5</b>   | <b>17.6</b>      |
| <b>Biomedical waste management</b>               |  |             |               |                  |
| 13   | In which bag plastic waste is discarded?   | 92.2        | 4.9           | 2.9              |
| 14   | In which bag plain papers are discarded?   | 92.2        | 5.9           | 2                |
| 15   | In which bag placenta is discarded?  | 69.6        | 27.5          | 2.9              |
| 16   | Which of the following is correct method of bleach solution preparation?                               | 50          | 48            | 2.4              |
| <b>Total</b>                                     |  | <b>76</b>   | <b>21.6</b>   | <b>2.4</b>       |
| <b>Infection control practices in the wards</b>  |  |             |               |                  |
| 17   | For how many days linen sealed packs can be stored?  | 59.8        | 25.5          | 14.7             |
| 18   | In adult, intravenous cannula is changed after how much time?  | 23.5        | 70.6          | 5.9              |
| 19   | According to BMW rule 1998, who is responsible for segregation of waste at source?                     | 73.5        | 14.7          | 11.8             |
| 20   | What is full form of PPE?  | 29.4        | 44.1          | 26.5             |
| <b>Total</b>                                     |  | <b>46.6</b> | <b>38.7</b>   | <b>14.7</b>      |



**Figure 3: Knowledge level regarding infection control practices in different Experience level of nurses.**

## DISCUSSION

Preventing infection in health care facility is crucial and essential especially in the context of increasing incidence of healthcare associated infections (HCAI) in the developing countries. In previous studies, it has been well documented that The level of knowledge of nursing staff in a hospital settings is the direct indicator of the patient care and patient safety component of quality services.<sup>[7]</sup> The infection control measures are important in terms of cost of treatment to the patient,<sup>[8]</sup> any incidence of HCAI in a hospital is leads to unnecessary economic burden to the patient.<sup>[9]</sup> The present study

revealed the poor knowledge on infection control practices of nursing staff. It is highly recommended in previous studies that mere hand washing can avert approximately 40-45% of infections, [5] in hospitals, which is reasonably a high success rate whereas this study revealed very poor knowledge about hand washing practices among nurses staff which is quite concerning both for patient care and for care providers. One of the striking finding of the study is knowledge about biomedical waste management (BMW) among all groups of nurses are good, which is in contrast to the previous findings [10,11] in various studies and general opinion in developing countries. It is also concerning that senior grade nurses have an insufficient knowledge regarding Hospital acquired infections, sterilization techniques and biomedical waste management. So, in order to achieve high compliance in infection control practices, the focus area of any training and workshops should be on senior or midlevel staff of hospital.

## CONCLUSION

It is recommended that healthcare providers in any healthcare settings should be well aware of utility of infection control measures. The poor knowledge of nurses in present study indicates a strong need of trainings of on job healthcare professionals (nurses) of developed countries in infection control practices. Also, it is advocated that mere legal provision of any act is not sufficient whereas, implementation with strong administrative commitment is also important to improve infection control practices in any healthcare institution. It is important for any healthcare institute to conduct continuous orientation and reorientation training and workshops on infection control practices to their patient care staff which will ensure patient safety by averting hospital hazards like HCAI's.

## Limitations

The study was limited to one tertiary institution and single categories of staff were included in it. Other staff categories can be included. The result may vary if it is conducted in different settings of level of healthcare viz primary and secondary level institutions. So, results of this study should be taken as indicative not confirmatory and could not be generalized.

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## Author's contributions

Dr Vikrant Kanwar has made substantial contribution in conceiving idea, designing, acquisition of data, drafting manuscript, analysis and interpretation of the data. Dr Anuradha Sood has contributed with her valuable suggestions and research acumen during the interpretation and analysis of data. Also, she supervised this study during the preliminary stages during data collection. Dr. Puneet Kumar Gupta made a significant contribution in data entry and data analysis, drafting the manuscript and gave her vital inputs in critical interpretations. Dr. Nisha Salaria has contributed in drafting final manuscript and giving vitals scientific inputs during the whole study period.

## Conflict of Interest

The authors declared that they have no conflict and any competing interests.

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