Knowledge and Prevention of Nosocomial Infection among ward nurses at Federal Medical Centre, Umuahia

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Abstract
This research work was carried out to estimate the knowledge and prevention of nosocomial infection among ward nurses at Federal Medical Centre, Umuahia Abia state. Four objectives were set and four questions formulated. A descriptive survey research method was used for the study. A sample size of one hundred and fifty (150) nurses was drawn from eight wards, (Medical and Surgical), at Federal Medical Centre Umuahia. A self-developed questionnaire with seventeen (17) structured questions was the instrument of data collection. Data were collected, analyzed and presented in tables, pie chart, bar chart, histogram, and percentages. The results revealed that nurses were well knowledgeable about nosocomial infection, though little deficiencies exist in the area of infection control practice and compliance, such as hand washing frequency. This study therefore recommends continuing education/seminar/workshop for all health care givers, to sensitize them with the knowledge and practice of nosocomial infection.

Keywords: Nosocomial, Infection, Nurses, Wards.

Introduction
Infection in the hospital is as old as disease itself. Often times, patients present with disease other than their primary complaints, if that happens during hospitalization, it is termed Nosocomial/ Hospital acquired or health care associated infection [1]. According to Rick, nosocomial is an infection manifested by patients 72 hours after the patient’s visit/admission to the hospital for hospital care [2]. The infection must have neither been there nor incubating prior to the patient’s visit/admission to the hospital. Ducel and Benson, extended it to 14 days after discharge [3]. Nosocomial infection is defined in various ways by authors but all have common elements. Common sites of the infection are urinary, respiratory and gastro intestinal tract; others are surgical wound, blood and skin [4].

Common pathogens are bacteria, fungi, viruses, some of which are highly pathogenic/virulent, others not (normal flora) expect when out of their normal habitats in the body. Transmission to susceptible hosts is by direct or indirect contact [5].

Predisposing factors are broken skin and mucus membranes (wound), immune suppression, extremes of age, many sick patients in one room, breach of infection control practice and procedures, abuse of antibiotics and invasive procedures [6].

Patients with Nosocomial infection are liable to prolong hospitalization, increased cost and inconveniences. Nosocomial infection is a global problem and among the leading causes of death in developed and developing countries [7].

Ward Nurses therefore should practice measures to prevent infection spread, hence this research work on the knowledge and prevention of Nosocomial infection among ward nurses at Federal Medical Centre.

Methodology
Study Design
The descriptive survey method was used according to Ige, is the finding out of or researching into something through question and observation in various ways so as to get a solution to the problem under study [8]. The method was chosen for its allowance for orderly collection, easy analysis, interpretation and report of patient’s acts to the subject under study. This design, the descriptive survey involves observing and describing the subject's behavior without influencing it.
**Study Population**

This consists of nurses in medical and surgical wards of Federal Medical Centre, Umuahia.

**Table 1: Distribution of population of study**

| Wards                          | Nurses | %  |
|-------------------------------|--------|----|
| Female medical ward           | 20     | 6.56 |
| Male medical ward             | 20     | 6.56 |
| Pediatric medical ward        | 15     | 4.92 |
| Pediatric surgical ward       | 16     | 4.92 |
| Obstetrics/Gynecology ward    | 16     | 5.25 |
| Private ward                  | 10     | 2.30 |
| Male surgical ward            | 13     | 4.26 |
| Female surgical ward          | 20     | 6.55 |
| Female orthopedic ward        | 20     | 6.56 |
| Male orthopedic ward          | 15     | 4.92 |
| Intensive care Unit           | 15     | 4.92 |
| Eye ward                      | 13     | 3.93 |
| New born special care unit    | 20     | 6.56 |
| Post-natal ward               | 20     | 6.56 |
| Ante-natal ward               | 20     | 6.56 |
| Community health ward         | 16     | 5.25 |
| ENT ward                      | 7      | 5.25 |
| Labour ward                   | 20     | 6.56 |
| Total                         | 305    | 100% |

**Table 1**: A total of 305 nurses in surgical and medical wards of Federal Medical Centre, Umuahia was the population under study.

**Sample/Sampling Technique**

The technique used for the study was stratified random sampling. The wards to be studied were selected by simple random sampling. Pieces of paper written "Yes" or "No" with the ward, were used to pick the wards to be used i.e. the "Yes". This was done to give all the population under study equal chance. Eight (8) wards with yes were chosen for the study.

**Table 2: Distribution of the chosen population**

| Chosen wards          | Nurses | %  |
|-----------------------|--------|----|
| Female medical ward   | 20     | 13.13% |
| Male medical ward     | 20     | 13.13% |
| Male surgical ward    | 20     | 13.13% |
| Female orthopedic ward| 20     | 13.13% |
| Intensive care unit   | 15     | 10%  |
| Pediatric surgical ward| 15    | 10%  |
| Post-natal ward       | 20     | 13.13% |
| Ante-natal ward       | 20     | 13.13% |
| Total                 | 150    | 100% |

**Table 2**: A total of 150 nurses were selected from the eight randomly selected surgical and medical wards.

**Instrument for Data Collection Procedure**

Questionnaire was the instrument used for data collection. A list of structured questionnaire in relation to the reviewed literature and stated objectives were used to obtain data from the subjects. The questionnaires were structured and unstructured.

**Validity/Reliability of the Instrument**

The questionnaire was constructed and assessed for content and face validity, then approved by Michael Okpara University of Agriculture Ethical and Research Committee. Eight copies were given out for pilot study and was later compared and found to be consistent and the instrument deemed reliable.

**Procedure for Data Collection**

The research team visited Federal Medical Centre, Umuahia wards and distributed the questionnaire in person. A total of one hundred and fifty (150) copies of questionnaire were distributed to trained staff nurses in the wards. The filled questionnaires were collected by hand few hours later and on the following day, the return was 100%.

**Method of Data Analysis**

The questionnaire were sorted and edited for completeness. The responses were summed up in tables and charts.

**Ethical Considerations**

Permission was taken from the nursing services department and wards. Explanatory note was attached to each questionnaire for respondents. All data gathered were used for academic purpose only and the respondent’s privacy and anonymity maintained.

**Results**

A total of one hundred and fifty (150) questionnaires were distributed each containing seventeen (17) questions. This represents a hundred percent of the sample population. The data were analyzed and the results presented in tables, pies, bar charts, histogram and percentage.

**SECTION A: DEMOGRAPHIC**

**Table 3**: Professional Qualifications of the Respondents

| Qualification            | Respondents | %  |
|--------------------------|-------------|----|
| Registered Nurses(RN)    | 10          | 6.67% |
| Registered Midwives(RM)  | -           | -   |
| RN/RM                    | 110         | 73.33% |
| Bachelors’ Degree(BSc.)  | 30          | 20% |
| TOTAL                    | 150         | 100% |

**Table 3**: above shows that the greater percentage of the respondents are those who have RN/RM-110% (73.33% followed by BS.c-30 (20%), RN-10 (6.67%).
Table 4: Status of Study Population

| Status                      | Respondents | Percentage |
|-----------------------------|-------------|------------|
| Chief Nursing Officer (CNO) | 27          | 18%        |
| Assistant Chief Nursing Officer (ACNO) | 20    | 13.33%     |
| Principal Nursing Officer (PNO) | 20      | 13.33%     |
| Senior Nursing Officer (SNO) | 25          | 16.6%      |
| Nursing Officer I (NOI)    | 28          | 18.67%     |
| Nursing Officer II (NOII)  | 30          | 20%        |
| **TOTAL**                  | **150**     | **100%**   |

Table 4: above shows NOII as the highest respondents-30 (20%); NOI 28 (18.67%); CNO-27 (18%) SNO-25 (16.67%); PNO and ACNO-20 (13.33%) each

Figure 1: Years of service of Studied Population

The pie chart shows that respondents from 1-4 years of service are the highest 58 (38.66%), 5-9 years has 25 (16.66%); 10-14 years-20 (13.33%) 15-19 years-20 (13.33%); 20 years and above-27 (18%).

Section B

Figure 2: Knowledge of Respondent about Nosocomial Infection before now

Figure 3: The bar chart above shows that all the nurses have heard of nosocomial infection before now.

The bar chart above shows that majority of the respondents got their information about nosocomial infection from lecturers and seminars-89 (53.33%); followed by reading books-35 (23.33%); through hospital workers 20 (13.33%) and through radio and television-15 (10%).

Table 5: Understanding of Nosocomial Infection

| Understanding                  | Respondent | Percentage |
|-------------------------------|------------|------------|
| Developed outside hospital    | -          | -          |
| Contacted sexually            | -          | -          |
| Developed during admission    | 150        | 100%       |
| No definite cause             | -          | -          |
| **Total**                     | **150**    | **100%**   |

Table 5: above shows that all the respondents know that nosocomial infection is developed during admission in health care facilities-150 (100%).

Table 6: Showing the commonest site of nosocomial infection

| Site                  | Respondent | Percentage |
|-----------------------|------------|------------|
| Urinary tract         | 35         | 23.33%     |
| Surgical wound        | 30         | 20%        |
| Respiratory tract     | 30         | 20%        |
| Skin                  | 30         | 20%        |
| Blood                 | 25         | 16.66%     |
| **Total**             | **150**    | **100%**   |

Table 6: above shows that urinary tract is the highest 35 (23.33%), followed by surgical wound, respiratory tract, skin 30 (20%) each and blood 25.

SECTION C: PRACTICE OF ASEPTIC TECHNIQUE

Figure 4: Showing practice of aseptic technique

Figure IV. The pie chart above shows that all the respondents are for strict practice of aseptic technique-150 (100%).

Table 7: Showing technique in aseptic technique

| Technique                  | Respondent | Percentage |
|----------------------------|------------|------------|
| Use of glove and mask      | 5          | 3.33%      |
| Use of sterile materials   | 20         | 13.33%     |
| Avoid wetting of sterile field | 5       | 3.33%      |
| Use of clean materials     | -          | -          |
| Application of a, b, and c | 120        | 80%        |
| **Total**                  | **150**    | **100%**   |

In the above table, the respondents with application of a, b, and c above have 120 (80%), use of sterile materials-20 (13.33%); use of gloves and mask (3.33%), use of clean materials-Nil. Table VII
above shows urinary tract as the highest respondent-34 (23.33%), followed by surgical wound and respiratory tract-30 (20%) each; gastro-intestinal tract and blood-20 (13.33%) and skin-15 (10%).

SECTION D: PRACTICE OF BARRIER NURSING

Figure 5: Showing nosocomial infection main mode of spread.

The figure above shows that all the above with the highest respondents-80 (53.33%); followed by person to person-35 (23.33%), airborne-20 (13.33%) and the lowest urinary tract-15 (10%).

SECTION E: PRACTICE OF STANDARD PRECAUTION

Table 8: Methods of barrier nursing

| Practice                          | Respondents | Percentage |
|-----------------------------------|-------------|------------|
| Use of screen                     | 10          | 6.67%      |
| Adequate ventilation              | 10          | 6.67%      |
| Sterilization of re-usable equipment | 10          | 6.67%      |
| All of the above                  | 120         | 80%        |
| Total                             | 150         | 100%       |

In Table IX above, hand washing for 10 - 15 seconds (3.33%); 15 - 30 seconds-80 (53.33%); 30 - 60 seconds as the highest 80 (33.33%) and 60 - 120 seconds-15 (10%).

Table 10: Frequency of hand washing

| Frequency                          | Respondents | Percentage |
|------------------------------------|-------------|------------|
| On arrival at work                 | 5           | 3.33%      |
| In-between patients procedure      | 50          | 33.33%     |
| After glove removal                | 15          | 10%        |
| All of the above                   | 80          | 53.33%     |
| Total                              | 150         | 100%       |

Table X shows nurses who wash their hands on arrival at work (3.33%), In-between patient procedure 50 (33.3%), after glove removal 15 (10%) and (53.33%) wash their hands after a, b, and c.

Table 11: Other standard Precaution Practices

| Practice                          | Respondents | Percentage |
|-----------------------------------|-------------|------------|
| Use of personal protective equipment | 20          | 13.33%     |
| Injection safety practice         | 35          | 23.33%     |
| Placement of patients             | 10          | 6.67%      |
| All of the above                  | 75          | 6.67%      |
| Total                             | 150         | 100%       |

Table XI above shows 75 (50%) responded to all the above, followed by 35 (23.33%) for injection safety, 20 (13.33%) for personal protective equipment; 10 (6.67%) for placement of patients and central of patients environment each.

Table 12: Showing who is to practice standard precaution

| Staff                              | Respondent | Percentage |
|------------------------------------|------------|------------|
| Nurses only                        | 10         | 6.67%      |
| Doctors only                       | 10         | 6.67%      |
| All health care providers          | 120        | 80%        |
| A and B only                       | 10         | 6.67%      |
| Total                              | 150        | 100%       |

Table XII shows 120 (80%) of respondents agreeing to all health workers practically standard precaution while 10 (6.67%) responded to nurses only, doctors only, nurse and doctors only, each.

Discussion

On the knowledge of nosocomial infection, figure 2 shows that all nurses at F.M.C wards have heard of nosocomial infection and in table 3, 100% reported that the infection is developed during admission in the health care facilities. In figure 3, varied indications shows that 80 (53.33%) got the information through lectures and seminars, 35 (23.33%) through hospital workers and 15 (10%) via radio and television. This agreed with Bello et al, a research study on the knowledge and information source among clinical health care students in Ghana, and came to the conclusion.
that students simply demonstrated moderate knowledge of formal classroom training [9]. It also agreed with Oni et al. who reported that decrease in surgical wound site nosocomial infection in surgical wards of UCH Ibadan between 1995 and 2004 was traced back to the knowledge gained in the yearly refresher course in surveillance and control of hospital infection, organized by the infection control unit of the department of medical microbiology of the university [10].

Table vii shows compliance to aseptic technique by 80% respondents in all forms of invasive procedure and in wound dressing. This agrees with Kleven et al. who suggested maintenance of aseptic technique in catheterization and in urological procedures [11]. Saka et al. suggested avoidance of catheterization where possible, replacement of damp or loosened catheters under strict aseptic technique [12].

On the findings on table VIII, 80% supported all methods of barrier nursing, which agreed with Paoulette, an article in French that the uses of disposal equipment and adequate safety measures have decreased infection of the respiratory virus, tuberculosis and incision site resulting from multi-resistance bacteria due to poor hospital sanitation [13]. La Poutreau, revealed that nurses have many tools available to create a safe environment that is free of infection [7]. Their full use of barrier principle is of great efficacy in the war against nosocomial infection.

Hand washing as a standard precaution is the most effective control measure against transmission agents. Table IX shows timing of hand washing of FMC ward nurses. Exactly 53.33% respondents washed their hands not less than 15 - 30 seconds, which is in agreement with Blacks, who reported that at least 15 seconds hand scrub helps prevent and control infectious agents [6]. Also, table viii, which shows frequency of hand washing as, 3.33% on arrival to work, 33.33% in between patient's procedure, 10% after glove removal and 53.33% for the application of all of the above. This agreed with La Poutreau, who reported that hand washing is an important component of infection control and isolation precaution which should be routinely practiced by all ward nurses [7].

Nursing, with the primary responsibility of giving the best and quality care to the sick and well through evidence-based practice acquired through skill and knowledge, has a vital role to play in the prevention and spread of infection to patients during hospital admission.

Patients should be seen as people with little or no knowledge of nosocomial infection, and the course of their admission, as predisposing factors.

Every nurse on duty should utilize all the acquired skills and knowledge expected of her/him as a professional, towards managing patients and their environment in order to attain maximum reduction of nosocomial infection and its consequences.

The researcher would wish to suggest that further studies be carried out on this topic to identify contributions of others in the health care field toward prevention of nosocomial infection. Nursing services department should keep proper monitoring of the statistics of patients diagnosis on admission, on discharge and duration in the hospital, as a guide to check nosocomial infection.

Since nosocomial infection is acquired through invasive procedures, wound dressing, contagious/infectious diseases, blood and other body fluid contacts, the standard of aseptic technique should not be compromised; barrier nursing/isolation and standard precaution should not be neglected in the care of our hospitalized patients.

From the findings of this study, the researcher recommends a sensitization seminar and health education on the consequences of nosocomial infection, for staff and for the community as a whole. Nurses should also include nosocomial infection issues in their ward report discussion. Nurses should update their knowledge for efficiency in their performance, through the use of research work, internet and nursing journals.

Conclusion
Nosocomial infection outcome ranges from prolonged hospital stay, increased cost, discomfort/inconveniences to mortality, if not well managed. It has no limit and can get across to all in contact with hospital environment. This study was carried out to determine the knowledge and prevention of nosocomial infection among ward nurses at Federal Medical Centre (FMC), Umuahia. It was found that the nurses have a wealth of knowledge of nosocomial infection but still needed individualized task to the practice as in how and when to practice. Deficiencies were found in the areas of hand washing, mask application, equipment handling and health education of our patients.

Limitations
The research experienced the following limitations during the research work:

a) Time Factor: Enough time was not given to the researcher to carry on this research work.
b) Schedule of Duty: The ward nurses run shift and because of the busy tendency of their shift, the researcher had to pass through the shifts, and wait till they had time to attend to her.

Author Contributions
This study was carried out with contribution from all the authors. Authors DOO and IU designed the study, wrote the protocol, and supervised the work. Authors AOA, DAO, and IU carried out all laboratory work. Author DAO performed the statistical analysis. Authors AOA and TAB managed the analyses of the study. Authors AOA, IU, and DAO wrote the first draft of the manuscript. Authors AOA, DAO, EOO and IU managed the literature searches, and all authors read, edited, and approved the final draft of the manuscript.

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