Incidence Rate of Nosocomial Infection in Gynecology Ward of Imam Reza Hospital in Kermanshah during 2012 and 2013

Alisha Akya, Keyghobad Ghadiri, Lida khodadadi, Lealy Nategh*, Maryam Amighi, Amin Jalilian

ABSTRACT

Background and Objective: Nosocomial infections are infections that develop 48 or 72 hours after the patient’s admission to the hospital or during the specified period of 10 to 30 days after discharge. These infections should be non-existent at the time of the patient’s admission and should not be at their incubation period either. The present study was conducted with the purpose of investigating the incidence rate of nosocomial infections and the associated factors at the Gynecology ward of Imam Reza Hospital of Kermanshah in 2012-13.

Methods: The present cross-sectional study was conducted on cases of nosocomial infection in the gynecology ward of Imam Reza Hospital of Kermanshah in 2012-13. Data regarding the patients’ demographic information, the type of bacteria isolated from the culture and the antibiotics taken were collected using a questionnaire designed based on the National Monitoring System of Nosocomial Infections and according to the Diagnosis Algorithm for Nosocomial Infections provided in the National Nosocomial Infections Surveillance System's guidelines. Data were then analyzed using SPSS-19.

Results: In 2012, 6244 women, and in 2013, 6855 women were admitted to the hospital, making a total of 13099 cases. In 2012, 0.44%, and in 2013, 0.99% of the admitted patients developed nosocomial infections, making the incidence of nosocomial infections in 2012 and 2013 at estimated rates of 44.8 and 99.1 in every 10,000 patients, in respective order; and the majority of patients were over the age of 20 (P<0.05). The most common nosocomial infections were included the surgical wound, urinary, blood and pulmonary secretion infections. The most commonly isolated organisms included Staphylococcus aureus, Candida albicans and Citrobacter. The antibiotics used included ampicillin, cefixime, gentamicin and metronidazole.

Conclusion: Due to the increasing rate of nosocomial infections in gynecology ward and given their devastating effects on women health, hospitals should take extra care to report these cases, and as surgical site infections are more prevalent, pre and post operative care should be provided with the highest degree of precision.

Keywords: Antibiotic, Culture, Nosocomial Infection, Organism.
Introduction
Nosocomial infections are infections that develop 48 or 72 hours after the patient’s admission to the hospital or during the specified period of 10 to 30 days after discharge (1). These infections should be non-existent at the time of the patient’s admission and should not be at their incubation period either. The most common types of nosocomial infections include urinary tract, respiratory tract, surgical wound and blood infections (2). Nosocomial infections are not limited to certain individuals and can develop in all patients admitted to hospitals. Nosocomial infections can double mortality rates in patients admitted to hospitals. The risk factors of nosocomial infections include age, chronic diseases such as diabetes, renal failure, prolonged hospitalization, the use of invasive methods of diagnosis, the use of catheters, multiple medical manipulations such as surgery, immunocompromised patients, the use of immune system suppressive drugs, receiving broad-spectrum antibiotics and colonization of resistant microorganisms (3, 4 & 5). Nosocomial infections are among the major causes of morbidity and mortality in hospitalized patients (6). In addition, these infections increase medical expenses and length of hospital stay. It gets worse when the indirect costs of bed occupancy, absence from work, disability and causing harm to other patients are added in (1 & 6). The growing resistance to antibiotics has dramatically increased hospital mortality rates in recent years (7). Nosocomial infections have a high prevalence. Nosocomial infection rates are estimated at 5-15% of admitted patients in developed countries and at 25% in developing countries (8). There is a risk for development of this infection even in the most modern, well-equipped hospitals of developed countries. The prevalence of these infections varies across different centers. According to the Center for Disease Control and Prevention, nosocomial infections take the lives of 2 million Americans and cost more than 11 billion dollars in damage to hospitals in the US (9 & 10). Different studies have reported the prevalence of these infections as 5-20%, and even higher when it comes to patients requiring invasive medical procedures (11). The incidence rate of infection at the site of cesarean section is between 3% and 15% depending on the study method, the study population and the use of prophylactic antibiotics (12). In a study conducted at the Gynecology Department of a Qazvin hospital, the prevalence of nosocomial infections in patients undergone urinary catheterization was reported as 25%, and the more prevalent organisms involved included Enterobacteriaceae causing urinary tract infections (13). Due to the increased rate of nosocomial infections at gynecology wards and its growing significance, and due to their damaging effects on women health, the present study was conducted at the gynecology ward of Imam Reza Hospital of Kermanshah to determine the frequency of nosocomial infections and factors associated with them.

Materials and Methods
The present cross-sectional study was conducted in the gynecology ward of Imam Reza Hospital of Kermanshah in 2012-13 and examined admitted patients who had developed nosocomial infections such as urinary tract, respiratory, blood and surgical site infections. Nosocomial
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Infections signified that patients had no symptoms of infection such as fever, lethargy, skin rashes and muscle pain at the time of admission and developed a fever above 38°C and showed symptoms of infection confirmed by the physician or a culture test 48 hours after admission up to 6 weeks after discharge. Other cases of infection that did not meet the specified criteria were excluded from the study. The patients’ demographic information, such as type of bacteria isolated from the culture, the site of infection, type of surgical manipulation and antibiotics used were collected using the questionnaire designed based on the National Monitoring System of Nosocomial Infections and then examined for comparing the incidence rate of nosocomial infections over the two-year period. The patients’ data were analyzed in SPSS-19.

Results

In 2012, 6244 women, and in 2013, 6855 women were admitted to the hospital, making a total of 13099 cases. 0.44%, and 0.99% of the admitted patients developed nosocomial infections, making the incidence rate of nosocomial infections in 2012 and 2013 equal to 44.8 and 99.1 in every 10,000 patients, in respective order.

Table 1: Prevalence of nosocomial infections in 2012 and 2013.

<table>
<thead>
<tr>
<th>Type of Infection</th>
<th>2012</th>
<th>2013</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urinary</td>
<td>11 (39.3%)</td>
<td>30 (44.1%)</td>
<td>41 (42.71%)</td>
</tr>
<tr>
<td>Surgical wounds</td>
<td>16 (57.1%)</td>
<td>32 (47.1%)</td>
<td>48 (50%)</td>
</tr>
<tr>
<td>Blood</td>
<td>1 (3.6%)</td>
<td>5 (7.3%)</td>
<td>6 (6.25%)</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>0 (0%)</td>
<td>1 (1.5%)</td>
<td>1 (1.04%)</td>
</tr>
</tbody>
</table>

Diagram 1: Distribution of nosocomial infections according to the age groups.
Table 2: The isolated microorganisms per year.

<table>
<thead>
<tr>
<th>Type of microorganism</th>
<th>Year</th>
<th></th>
<th>Year</th>
<th></th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2012</td>
<td></td>
<td>2013</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Staphylococcus aureus</td>
<td>5(20.8%)</td>
<td></td>
<td>10(22.7%)</td>
<td></td>
<td>15(22.1%)</td>
</tr>
<tr>
<td>Citrobacter</td>
<td>4(16.7%)</td>
<td></td>
<td>6(13.6%)</td>
<td></td>
<td>10(14.7%)</td>
</tr>
<tr>
<td>Enterobacter</td>
<td>2(8.3%)</td>
<td></td>
<td>4(9.1%)</td>
<td></td>
<td>6(8.3%)</td>
</tr>
<tr>
<td>Pseudomonas aeruginosa</td>
<td>1(4.2%)</td>
<td></td>
<td>1(2.3%)</td>
<td></td>
<td>2(2.9%)</td>
</tr>
<tr>
<td>Candida albicans</td>
<td>4(16.7%)</td>
<td></td>
<td>10(22.7%)</td>
<td></td>
<td>14(20.6%)</td>
</tr>
<tr>
<td>Coagulase-negative Staphylococi</td>
<td>1(4.2%)</td>
<td></td>
<td>5(11.4%)</td>
<td></td>
<td>6(8.8%)</td>
</tr>
<tr>
<td>E.coli</td>
<td>2(8.3%)</td>
<td></td>
<td>7(15.9%)</td>
<td></td>
<td>9(13.2%)</td>
</tr>
<tr>
<td>Enterococcus</td>
<td>2(8.3%)</td>
<td></td>
<td>0(0%)</td>
<td></td>
<td>2(2.9%)</td>
</tr>
<tr>
<td>Multimicrobial Proteus</td>
<td>2(8.3%)</td>
<td></td>
<td>0(0%)</td>
<td></td>
<td>2(2.9%)</td>
</tr>
<tr>
<td>Infection</td>
<td>1(4.2%)</td>
<td></td>
<td>1(2.3%)</td>
<td></td>
<td>2(2.9%)</td>
</tr>
</tbody>
</table>

Discussion

Nosocomial infection rates are estimated at 5-15% of admitted patients in developed countries and at 25% in developing countries (8). Nosocomial infections are highly prevalent and can be developed in the most modern, well-equipped hospitals of developed countries. In Iran, nosocomial infection rates have been reported with different prevalence rates across different centers (2). A study conducted in Qom province showed the incidence rate of nosocomial infections in a local gynecology ward to be 120 in every 10,000 women (13). In comparison with the available statistical data of our study, it seems that the incidence rate of nosocomial infections of our study is lower than others and also lower than expected rate. This can be explained by doing some measures in the hospital including the particular care with which the hospital’s medical personnel and authorities proceed such as control cultures frequently and regularly, forming committees for the control of nosocomial infections, training personnel, washing hands prior to proceeding with treatment measures, the controlled use of antibiotics and getting health education. However, it could also be partly due to the department's under-reporting, prolonged length of stay, the impossibility of following up on patients after discharge and the admitted patients' own failure to follow up on their nosocomial infections. According to our results, the highest and the lowest incidence rate of infection pertains to the age group of 20 to 40 and the age group under 20 and a significant relationship exists between age and nosocomial infections (P<0.05). The results of the present study are consistent with the results of studies conducted in Tabriz, Tehran and Ahvaz as well as studies conducted abroad (7, 13, 14 & 15). However, in a study conducted in Sanandaj, no significant relationship was found between age and nosocomial infections (12). As this study was conducted at a gynecology ward of a hospital, the majority of women admitted belonged to the age group of 20 to 40. According to the World Health Organization’s report, general surgery and orthopedic surgery wards as well as ICUs have the highest incidence rate of nosocomial infections (22). In other studies, surgical site infections have an incidence rate of 0.5% to 10% and 2.9% (2, 17 & 18). Other studies conducted in the US, the UK and Georgia showed the rate to be 2.6 %, 3.2% and above 10% (19, 20 & 21). All studies have reported
surgical site infections to be the most prevalent of nosocomial infections, which is somewhat consistent with the results of the present study. These differences could be due to post-surgical measures such as infection control, proper disinfection and antibiotic prescriptions.

The most common microorganisms causing nosocomial infections vary according to the site of infection and a variety of causative agents such as viral, bacterial and fungal agents are involved in their development (23). As our results indicate, *Staphylococcus aureus* is the common agent in the development of infections and the less common pertains to *Proteus*. Wilson also found *Staphylococcus* to have the largest share in the development of infections (20).

In a study conducted in Qom, *Staphylococcus aureus* was found to be the most common infectious agent followed in order by *Pseudomonas* (2). In the US, gram-negative bacilli were the most common strains (64%) causing nosocomial infections (*Pseudomonas aeruginosa* (21%) and *Staphylococcus aureus* (20%); (24). Other studies conducted are consistent with the discussed study.

**Conclusion**

Nosocomial infections are infections that develop in patients during their hospital stay. The statistical data available on the incidence rate of nosocomial infections varies across different centers from 2.8% to 10%. The absence of precise statistics on the incidence of this complication makes it necessary to investigate the incidence rate of nosocomial infections and factors associated with them. According to this study, restricted medical interventions, regular hand-washing and the use of antibacterial gels and disposable gloves are necessary for reducing the incidence rate of nosocomial infections. Antibiotic use should also be monitored. Vaccinating personnel, selecting the appropriate disinfectants and properly disinfecting devices and wards, proper wound care, training personnel, proper follow-up and timely reporting of cases of nosocomial infection and following up on discharged patients for nosocomial infections can increase the credibility of recorded cases of nosocomial infection—all of which will be realized if and when those in charge make the effort to solve the problem with a degree of sympathy.

**Acknowledgment**

We would like to express our gratitude to all the colleagues and infection control personnel at Imam Reza Hospital for their contributions to this study.

**References**


