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**Original research article**

# Study of Health Care Associated Infections in Obstetric and Gynaecological Patients

**Anupam Kumari[1], Vijayant Kumar[2], Sudha Bharti[3]**

**[1]Senior Resident, Department of Obs. & Gynae, IGIMS Patna**

**[2]Senior Resident, Department of Paediatrics, GMC, Bettiah**

**[3]Associate Prof. Department of Obs. & Gynae, DMCH Laheriasarai**

**Corresponding Author: Vijayant Kumar**

## Abstract

**Background and Objectives:** Health Care associated infections impose aburden on the primary, secondary, tertiary health care sectors, the patient themselves and those who care for them. The study was conceptualized to study the contribution of health care associated infections to infectious morbidity in obstetrics and gynecology in-patients and to determine the various factors contributing to the same and also to determine complications/interventions required in patients with health careassociated infections.

**Material and methods** The study included 2315 patients admitted in obstetrics and gynecology ward over a period of Three year at a tertiary care centre.

**Conclusion**: The incidence of Health Care associated infections in a study period of Three year at Department of Obstetrics and Gynecology of a Tertiary care centre was found to be 3.75 per 100 patients admitted in the ward. The occurrence of Health Care associated infections was 3.8 and 3.5 per 100 patients in obstetric and gynecology set of patients. The incidence of CAUTI, SSI, CRBSI, Puerperal Pyrexia and Hospital Acquired Pneumonia was found to be 7.8, 5.01, 0.18, 0.45 and 0.043 per 100 patients developing Health Care associated infections. Various factors emerged asindependent risk factors for the development of Health Care associated infections such as diabetes and obesity. The presence of other co morbidities such as age>70 years, malignancy, Bronchial Asthma, Anemia and History of previous surgery also posed an additional risk towards development of Health Care associated infections.

**Keywords**: Health Care Associated Infection, CAUTI, SSI, CRBSI, Hospital acquired pneumonia

## Introduction

Health care associated infection (HAI) is an infection occurring in a patient in a hospital or other health care facility in whom the infection was not present or incubating at the time of admission and was acquired by the patient during admission for a reason other than that infection. These infections impose a burden on the primary, secondary, tertiary health care sectors, the patient themselves and those who care for them. nfection in obstetrics accounts for the second most common cause of maternal mortality next to post partum haemorrhage. Among surgical patients in obstetrics and gynaecology, urinary tract infections and surgical site infections are themost common health care associated infections. HAIs are considered an undesirable outcome, and as some are preventable, they are considered an indicator of the quality of patient care, an adverse event, and a patient safety issue. The health care associated infection rate in patients in a facility is an indicator of quality and safety of care. Infection control and hospital epidemiology has now taken on a global dimension, with the growing

global concern over health care associated infections and the emergence of antibiotic resistance. Health care associated infections are among the major causes of death and increased morbidity among hospitalized patients. HAIs inflict unnecessary suffering on the patients, as well as increased costs on society, mainly due to the extended hospital stay required by patients with HAIs. The increased length of stay varies from3.3 days for gynecological procedures to 21 days for orthopedic procedures[1]. Other costs include additional drugs, isolation, and revision surgeries. Control/ prevention of HAIs require clear infection control policies and guidelines with strict adherence to evidence based protocols and procedures. Observational studies confirm that evidence-based approaches can reduce infections [1].Care bundles, in general, are groupings of best practices with respect to a disease process that individually improves care, but when applied together, results in substantially greater improvement. Such bundles have been applied for VAP, CRBSIs, CAUTIs and SSIs.

**Objectives**

To determine the contribution of health care associated infections to infectiousmorbidity in obstetrics and gynaecology in-patients.

To determine the factors contributing to health care associated infections inobstetrics and gynaecology in patients.

To determine complications/interventions acquired in patients with health careassociated infections

Febrile morbidity> 3days(temp>100.4$^{o}$C), Use of higher order antibiotics, Duration of hospital stay, Surgical intervention

**Materials and method**

The study was carried out in the in-patients in the department of Obstetrics and Gynecology, Darbhanga medical college and Hosptal, Laheriasarai. It was an observational study in the setting of a tertiary care service hospital. This study has been conceptualized to study the contribution of health care associated infections to infectious morbidity in obstetrics and gynecology in-patients, to determine the various factors contributing to the same and to determine complications/interventions required in patients with health care associated infections.No ethical conflict has been identified in the study design the study being vetted and approved by the Institutional Ethics Committee. The study was carried out for a total period of Three year. The objectives of this study being the study of Health Care Associated infections in the in-patients of obstetrics and gynecology ward, the target group for this study were all the patients admitted to the ward without pre existing infections.

**Inclusion criteria**:

The study included all the patients admitted in obstetrics and gynaecology ward

**Inclusion criteria**

Catheter associated urinary tract infection, Puerperal pyrexia, Infectious complications associated with medical termination of pregnancy, Surgical site infection, Postoperative infections, Puerperal sepsis, Infectious complications associated with intrauterine contraceptive devices

**Exclusion criteria**

Community acquired infections, Pre-existing infections prior to hospitalization/obstetrics and gynaecologicinterventions.

The study was an observational study, every patient's records was documentedand maintained as per the proforma and the data was compiled for analysis.Conclusion was drawn based on the observations made during the study period.

**Results**

The study was an observational study in the setting of a tertiary care servicehospital. This study has been conceptualized to study the contribution of healthcare associated infections to infectious morbidity in obstetrics and gynecology in- patients, to determine the various factors contributing to the same and to determine complications/interventions required in patients with health care associated infections. A total of 2315 patients were included in the study after excluding all the patients admitted with pre- existing or community acquired infections. The patients were divided into gynecology and obstetric group and the obstetric group had a subgroup of those patients who had undergone obstetric procedures such as extra amniotic saline infusion and amniocentesis. Out of total2315 patients, 647 patients were in gynecology group and 1668 patients in obstetric group. Of the 1668 patients in obstetric group, 19 patients were in the obstetric procedure group. Factors taken into account in all the patients were age, hemoglobin, presenceof co morbid factors, type of intervention/ surgery, duration of surgery/ procedure, theoccurrence of health care infection, the requirement of stepping up of antibiotic, development of septicemia, requirement of shifting to ICU, number of patients readmitted due to development of HAI and surgical interventions done. The study also encompassed residual morbidity and death owing to HAIs. However, there wasno mortality in the study group.

**Incidence of HAI in the study group**

| | HAI Present | HAI Absent | Percentage |
|---|---|---|---|
| NO OF PATIENTS | 87 | 2228 | 3.75 |

Of 2315 patients, HAI was found in 87 patients i.e. 3.75 patients in per 100 patientsincluded in the study. The CDC criterias were used to classify an infection as Healthcare associated. The incidence of HAI was found to be almost similar in both obstetrics and gynecology group. The incidence rate in obstetric group was found to be 3.83 per 100patients admitted in obstetric ward without infectious etiology while in Gynecology group, the incidence was 3.5 per cent. The main interventions or procedures in obstetric group were vaginal deliveries, cesarean sections, amniocentesis and extra amniotic saline infusion. In Gynecology, there were various surgeries which were studied under four sub groups as per the route of surgery – vaginal, laparoscopic, combined laparoscopy and vaginal and abdominal. There were patients who were admitted for evaluation or for conservative management in both obstetrics and gynecology wards and they were included in the study. However, there was no incidence of HAI in latter group of patients. A total of 435 patients underwent catheterization. CDC criteria were implemented fordiagnosing Catheter Associated Urinary Tract Infection. 34 patients out of 435 patients developed CAUTI. The incidence being 7.8 patients per 100 patients catheterized. Every patient underwent urine analysis on admission. A urine report negative for presence of pus cells was considered as an asymptomatic patient. Patientshaving pre existing urinary tract infection were excluded. The percentage of patients acquiring HAI in the four groups were 19.04,1.9, 4.76 and1.09, respectively. Thus, the maximum number of HAIs occurred in patients undergoing surgery by open route while the least number of infections in vaginal route. Many studies previously have shown more number of infections in patients undergoing surgery by vaginal route. The lower incidence could be owing to the preparation done for a patient prior to the surgery such as hair removal by clippers, betadine painting of vagina one night prior, ruling out pre existing UTI, ensuring adequate control of all comorbid conditions and obtaining a pre anaesthesia fitness. All these pre operative measures are followed in every case as indicated. The incidence of HAI is significantly less in surgeries done by laparoscopy when compared to open surgeries. The vaginal and laparoscopic surgeries also ensure a speedy recovery and a faster discharge from the hospital and this could be a contributing factor in

decreased incidence of HAI in these groups. show the association of duration of surgery to the development of HAI. All the surgeries( major and minor) were taken into account andan average of the duration of surgeries calculated. It was noted that patients who developed HAI had had a longer surgery (78.8 minutes). There could be a contribution to prolonged surgery by the type of surgery being carried out such as a staging laparotomy or due to surgical difficulty encountered in a patient who has undergone an abdominal surgery previously. The data however corroborates that a prolonged surgery may be a risk factor towards development of HAI in a patient. A good surgical technique and adherence to protocols should certainly help in better outcomes. The readmission of a patient is a stress for a patient as the patient after discharge from a hospital has the sense of riddance from disease and illness but getting readmitted for a complication arising out of the treatment offered is a setback to a patient and adversely affects a doctor patient relationship..

**Discussion**

Health Care Associated infections are an important public health problem, because of their frequency, morbidity, mortality and cost. In this study, a total of 87 patients had Health care associated infections, with 5 different types of infections, among 2315 patients admitted in obstetrics and gynecology wards staying in hospital for a minimum of 48 hours. This study was to determine the incidence of Health care associated infections, its affecting factors and the resultant associated morbidity.

**Various Health Care Associated Infections**

This study reveals the incidence rate of nosocomial infection was 3.75 per 100 patients admitted, staying in hospital for a minimum of 48 hours after hospitaladmission, in one year. The incidence of Health Care Associated infections in Obstetrics group was found to be 3.8 per 100 patients and in gynecological set of patients 3.5 per 100 patients. The incidence of CAUTI, SSI, CRBSI, Puerperal Pyrexia and Hospital Acquired Pneumonia was found to be 7.8, 5.01, 0.18, 0.45 and 0.043 per 100 patients developing Health Care associated infections. Urinary tract infections (UTIs) account for ~40% of all Health care associated infections [2] and ~18%–25% of all Health care associated bacteremia. [3] Hospital acquired surgical site infection (SSI) is one of the major healthproblem throughout the world.[4, 5, 6, 7] It represents 14-16 % of the Health care associated infections and are the second most common hospital acquired infections and has been associated with increased morbidity and economic impact . Surgical site infection is the leading infection in the general patient population in countrieswith limited resources, affecting up to two third of operated patients and with a frequency up to nine times higher than in developed countries. In Nigeria, Health careassociated infections rate of 2.7 % was reported from Ife [8], while 3.8 % [9] from Lagos and 4.2 % from Ilorin.[10] Lower respiratory infection (LRI) or pneumonia represents 13 % of Health care associated infections. This is the most dangerous of all Health care associated infections with a case fatality rate of 30 %. Healthcare associated blood stream infections (BSIs) represent 14 % of Healthcare associated infections. Healthcare associated bacteraemia can be classified as primary or secondary. Primary Healthcare associated bacteraemia occurswithout any infection in other sites. Secondary bacteraemia is the presence of infection in a site such as urinary tract, surgical wound or lower respiratory tract which can lead to a blood stream infection with the same organism. Mortality from Healthcare associated bacteraemia is greater than primary bacteraemia and is greaterif it is community – acquired. 3 patients out of 1582 patients developed CRBSI; the incidence being 0.18 per 100 patients who were underwent an intravenous access. The catheter related blood stream infections specially the peripheral catheters are considered only when septicaemia is present while if they areassociated with only phlebitis, they are excluded. The CRBSI included in this study showed bacteremia and hence

were included under the same. 3 out of 87 patients developed Secondary CRBSI, the incidence being 3.4 per cent. The total number of patients with CRBSI hence was 6 out of the total 87 patients withHAI, the incidence being 6.8 per cent.

In a prospective study of 8474 patients, Mead et al [11] demonstrated an increased clean wound infection rate in patients less than 1 year old (2.7%) or greater than 50 years old (2.8%), versus those 1 to 50 years old (0.7%). Even in clean contaminated procedures, age has been associated with an increased infection rate, as in the 1988 study by Claesson and Holmlund in a relatively homogeneous population of patients undergoing elective colorectal procedures. This association remained valid even after multivariate analysis. corroborated this finding [12, 13,14,15] Gil-Egea et al[13] studied 4468 clean wounds and found an infection rate of 3.4% in patients less than 65 years old and 2.7% in those 65or older. Haley et al, [14] using stepwise multiple logistic regressions, did not find age to be an independent predictor of wound infection in 58,498 patients. This study showed that incidence of health care associated infection in patientswas relatively higher in patients with anemia (defined as Hb < 11g per dl),the p valuebeing 0.094. In Studies undertaken by the National Institute of Nutrition, Hyderabad , showed that proportion of T and B lymphocytes showed a tendency to fall in anemicwomen which was significant when hemoglobin levels were less than 8 g/dl. Thisalteration in immune status of anemic pregnant women causes increased risk of infections and consequent increased morbidity especially urinary tract infection.. A longer duration of preoperative hospitalization is associated with wound infection, theoretically via colonization with multiply resistant organisms. Both 5-yearand 10-year studies by Cruse and Foord[16,17] appear to support this in the latter study, for example, patients hospitalized for 0 to 1 days a clean wound infection rate of 1.2%, whereas those hospitalized for more than 2 weeks had a 3.4% infection rate. Mead et al, using Cruse's epidemiologic techniques, also found a higher riskof wound infection in patients with prolonged preoperative hospitalization.

## Conclusion

The incidence of Health Care associated infections in a study period of one year atDepartment of Obstetrics and Gynecology of a Tertiary care centre was found to be 3.75 per 100 patients admitted in the ward. The occurrence of Health Care associated infections was 3.9 and 3.8 per 100 patients in obstetric and gynecology set of patients.

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