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ORIGINAL ARTICLE

Hospital Acquired Infections in a large North Ugandan hospital

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Key words

Hospital Acquired Infections (HAI) • Hospital safety • Clinical audit

Summary

Introduction. *Hospital care is a precious gift in Uganda, therefore little concern is given to hospital safety and very seldom Hospital Acquired Infection (HAI) risk is evaluated. Within a quality improvement hospital program the Board of Lacor Hospital, a large Missionary Hospital of north Uganda, ordered an HAI control program to be established. The first step of this program was an HAI prevalence survey whose results are presented in this paper.*

Methods. *A one day prevalence survey was performed on patients admitted at least 48 hours before the survey: short training was offered to qualified nurses and hospital doctors. Lacking a suitable microbiological diagnostic service, clinical definitions of HAI were adopted. Questionnaires were completed by the nurses and data were analyzed and presented to the hospital personnel four days after the survey. A HAI control program was agreed and started soon after.*

Results. *The hospital has 44.000 admissions yearly with 482 beds and main hospital specialties, 410 patients were surveyed. Overall HAI prevalence was 28%, more in surgery (47%) and less in pediatrics (21%). Blood stream infections were the most frequent, followed by surgical wound infections and Urinary Tract infections, several lower respiratory tract infections and few gastrointestinal one. HAI prevalence was associated with length of stay in hospital,intravenous cannulas, urinary catheters and emergency surgery.*
Patients with severe low nutrition status, anemia and complications of the main disease bringing them to hospital experienced higher HAI prevalence.

Discussion. *This paper shows that HAI can be measured also in absence of microbiological service and that Hospital staff are ready to evaluate this problem.*
This high HAI prevalence was not expected by the staff and has been a starting point for an hospital HAI control plan.

Introduction

Most studies on Hospital Acquired infections (HAI) come from the developed world: quite few the publications on HAI in Africa hospitals, but from those available, it appears clear the problem do exist in Africa and with a dimension definitively greater than that observed in the rich world [1-4].
World Health Organization (WHO), already in 1994 [5], asked for a special attention to be given to HAI in developing word and provided with instrumental recommendations that includes methodological suggestion as the adoption of Prevalence surveys to identify the problem.
Anyhow several constrains sustain a generalized negative approach to the implementation of an HAI surveillance and control program in Africa:

- the assumption that in less rich countries the hospital admission is such a bonus that there is no space to look after HAI;
- emergency is every day and hospital staff is undersized and overwhelmed by the daily duties;
- moreover in many African hospital is common the idea that all the possible is already done, then there is no hope to improve service quality in front of the constant urgent need to increase the quantity of services for a large underserved pressing population;
- finally it is dominant in several medical institutions of developing countries the motto “best is not to observe”.

This was not the case of Lacor Hospital, where the Board launched a large quality improvement program that includes HAI surveillance and control.

Materials and methods

Following the specific WHO guidelines [5] a prevalence survey was chosen as the method to make the problem evident; a systematic continuous surveillance system was considered unfeasible in absence of microbiological dedicated services.
A one day HAI Prevalence survey protocol was prepared with a one page anonymous questionnaire. Questionnaire included a minimal set of questions, HAI definitions and instructions.
The survey was performed in a single day on all patients admitted to in patient wards at least 48 hours before the survey day.
Hospital data were obtained from the Hospital annual report 2009 and from the daily updated hospital central register: data on presences at the 6 of feb 2010 were used (3 days before survey).

A study team, including an external consultant epidemiologist, the hospital Public Health Officer, a senior qualified Nurse and a clerical statistician was established.
Two 3 hours training sessions were given to qualified nurses and one similar to the ward doctors: the protocol was discussed and staff observations were included in the final versions.
The questionnaires were distributed early in the survey morning to qualified nurses on the various wards. Oral informed consent was requested to the patients.
Two doctors and one senior nurse circulated in the wards during survey providing guidance and responding staff any questions.
HAI definitions were according to WHO guidelines [5]: the hospital is equipped with very limited microbiological facilities, well below any potential use in this survey: so that most definitions were based on clinical signs.
HAI: an infection of the patient that was not present at patient admission.
Surgical wound infection: presence of any of pus (i), edema (ii), serosity (iii), cellulitis (iv), fever (v) following a surgical intervention within the previous week.
Urinary tract infections: local pain or burning in patients with U.Cathter.
Respiratory tract infection: pneumonia or bronchitis documented by X-ray or doctor's diagnosis.
Bloodstream infections: phlebitis on site of insertion of cannulas or a lab or clinically evident septicemia not attributable to patient's disease.
Gastrointestinal infections: more than 3 loose stools in the last 24 h in patients admitted without diarrheal disease.
The diagnosis of HAI was made by the ward staff without interference from the survey supervisors.
Forms were inputted in an windows access data base and analisys was performed using Epiinfo 6.1 software.
Statistical differences were tested with Manthel-hentszel Chi square test, with t tests for means and with Kruskal wallis test.

Results

Hospital data

The Lacor hospital has a 44,000 inpatients yearly admission with 482 beds with a bed occupation rate well over 100% [6]. There are 11 wards including Medicine, Surgery, Pediatrics, Maternity; there is also a burn unit and an ICU.
The overall occupation rate was 123% and over 200% in the pediatric unit: 29 was the number of qualified nurses available on the morning roster of the day, a smaller number covered the afternoon and night. Overall, there were 20 patients per nurse with the number being 45 patients per nurse in pediatrics.
There were 26 medical doctors on staff in the hospital (one for every 20 patients) and every morning medical rounds were performed in each ward together with a dozen medical interns.
More than half of the patients were children, very few patients are over 50.
The most frequent diagnoses were Malaria (45%) and other infectious diseases (41%). The hospital conducts more than 4500 deliveries per year. Other diagnoses include accidents and chronic diseases.
Inpatients hospital mortality was around 4% in 2009 [6].

Performance

In the late afternoon of survey day forms were collected and manually checked for completion, 12% were sent back to the ward for completion.
In the evening the forms were considered complete and the survey closed.
No patient or staff refusal was registered.
On the survey day 558 patients were present in the hospital wards and 410 matched the selection criteria and were surveyed.

HAI prevalence

Table I shows the survey results.
Wards units have been aggregated into 4 general areas.
For the Neonatology, Isolation and Burns Wards the numbers of patients was too small to allow for conclusions.
26 surgical wound infections (SWI) were observed: 19 of which in Surgery1 ward; this ward is defined as the septic surgery ward as patients of Surgery 2 ward with infections are normally transferred in Surgery 1.
33 Lower respiratory tract infections were observed, 19 in patients undergoing major surgery (including 2 mothers) and 13 in children severely malnourished or with severe chronic diseases; one was observed in the Medicine ward.

Risk factors

Table II offers evidence of associations of infections with some risk factors:
Patients with an IV cannula had 14% of blood stream infection and 42% of those with an urinary catheter developed an UTI.
In this survey the mean hospital stay of patients surveyed was 17.3.
The hospital stay was strongly associated with HAI prevalence doubling between those staying one week or less and those staying from 1 to 2 weeks.
For the 123 surgical procedures registered in the survey 48% had been performed In emergency conditions. HAI Surgical Wound infection was 3 times more frequent in emergency operated patients than those undergoing elective surgery, as in Tabel II.
None of the 26 Surgical Wound Infections occurred in patients who had undergone clean surgery, 5 (19%) in patients of dirty/contaminated surgery and 21 (81%) in patients that underwent a septic surgical operation.

Diagnosis and HAI

Diagnosis made at the time of the survey was inevitably associated to the HAI risk. Children with severe states of malnutrition (kwashiokor) and anemia pre-

Tab. I. Prevalence of Hospital Acquired Infections by speciality, wards and site of infection.

Speciality-Wards	N. surveyed	Site of infection					Total infections		Infected patients	
		Urinary tract	Surgical wound	Blood stream	Respiratory	Gastro-intestinal	N.	prevalence %	N.	prevalence %
Medicine	72	6	1	10	1	0	18	25	17	23,6
Medicine	49	3		5	1		9	18,4	9	18,4
Isolation	2						0	0	0	0
ICU	11	1	1	3			5	45,5	5	45,5
TB	10	2		2			4	40	3	30
Surgery	94	13	21	9	17	4	64	68,1	45	47,9
Surgery 1	55	10	19	5	16	4	54	98,2	37	67,3
Surgery 2	36	3	2	4	1		10	27,8	8	22,2
Burns	3						0	0	0	0
Maternity	60	9	3	1	2		15	25	14	23,3
Paediatrics	184	0	1	23	13	5	42	22,8	39	21,2
Pediatrics	145	0	0	14	4	2	20	22,8	18	21,2
Neonatology	4		1	1			2	50	2	50
Nutrition	35			8	9	3	20	57,1	19	54,3
Total	410	28	26	43	33	9	139	33,9	115	28

sented 44% HAI prevalence. Similarly, between patients with open wounds or traumas 43% had evidence of an HAI. Four out of 7 patients admitted in the Burn unit had an Hospital Acquired infection. Most women admitted for gynecological problems or pregnancy who developed a nosocomial infection (13/44, 29,5%) were those who presented with severe complications such as fistulas, ectopic pregnancies, obstructed labor.

These findings therefore show that despite a disease severity score index not being available, severe diseases diagnosis shows a relationship with HAI risk.

Discussions and conclusions

This is the first time that Lacor hospital conducted a HAI prevalence survey. Very few such surveys have been done in African Hospitals in the last decade [1 2, 6] and only one unpublished is known to have been conducted in an Ugandan Hospital.

Survey preparation was short and training of the team limited to one day.

The survey was completed in one day on the target population. HAI definitions were well understood.

The results are very much coherent with what is known on the natural history of HAI worldwide.

Tab. II. Prevalence of Hospital Acquired Infections by selected risk factors.

	N. of patients	N. infected	Prevalence of	p-value*
IV cannula				
Yes	294	43	14,6	0,000013
No	116	0	0	
Urinary catheter				
Yes	66	28	42,4	0,00000001
No	344	0	0	
Hospital stay				
≤ 1 week	229	33	14,4	0,00000001
≤ 2 weeks	76	25	32,9	
> 2 weeks	105	57	54,3	
Surgical procedure				
Emergency	59	20	33,9	0,00000001
Elective	64	6	9,4	

Hospital personnel were cooperative and actively responded to the survey invitation.
HAI is a quality indicator of hospital inpatient services that is well recognized worldwide. WHO estimates that at least 1.5 million of hospital patients worldwide do experience a HAI in any Hospital at any time [5].
There are substantial differences between the characteristics of the patients entering developed and developing countries hospitals. Very young with acute diseases in Africa, very old with Chronic disease in Europe. Also the kind of care is different with much more intervention and very minimal diagnostics in Africa versus massive diagnostic investigations in Europe.
Old age is a major risk factor for HAI in Europe which is not the case of Uganda where life expectancy at birth is estimated to be 48 years (2008 Ugandan Census).
Immunological fragile patients are very common in European hospitals while in Uganda it is malnutrition, Malaria, TB and AIDS that threaten the immune system.
Invasive diagnostic techniques and therapeutics are very common in Europe, not so in Africa.
Most patients enter the hospital with an infectious disease (very often with complications) or with an infection, even surgical patients carry an infection with their diseases. This is why most patients are under antibiotic treatment, even many malaria cases receive antibiotics for malaria complications.
In few other African surveyed hospitals, HAI prevalence was ranging between 17% and 20% [1, 2]; the rate goes up to 50% in Intensive Care Units [3].
The rate found in this survey is high, compared with other published survey results.
But this rate is in line with available knowledge on HAI indicating definitively a good operational quality of the survey.
The type of infections observed is not different from what observed elsewhere. UTI, Surgical Wound infection, Blood stream infection, respiratory infections and gastroenteritis.
Risk factors show to be, as expected, strongly associated to the HAI prevalence: a wide area for preventive interventions.
The strong limitation of the microbiology diagnostics was not an impediment to the survey. This breaking a strong myth and showing that HAI surveillance can be done also where Microbiology is not available.
Thus it is to be recognized that in absence of germs isolations and antibiogram tests it is difficult to prepare an appropriate antibiotic use strategy, but on other side, the antibiotic use in Lacor Hospital is very wide and very basic, thus unlikely to create a big antibiotic resistance problem.
An HAI control plan was presented to the Hospital board and discussed with the hospital staff; main points of this program were:
To establish an Infection Control Hospital Committee, Improve ward personnel hand washing, minimize the use of urinary catheters in number and in time, change intravascular cannulas after 5 days of in situ and insert the new one in another site, Carefully wash with soap and water and disinfect the skin before any invasive procedure, do not soak ward metallic instruments in any solution but wash, disinfect and wipe after any use, sterilize after in body contacts. Wash with water and soap surgical wounds and apply light coverage dressing; avoid aggressive bondage. Mobilize patients as soon as possible, specially surgical and severely diseased ones. Isolate patients that develop HAI respiratory infections or HAI gastroenteritis. Reduce hospital stay and register on medical charts the presence of HAI.
At the time this paper was written (six months after the survey) several of those recommendations were in use; another prevalence survey is expected after one year from the one here described.

References

[1] Hospital Coordinator Group. *HAI prevalence in Mekele Hospital, Tigray, Ethiopia*. J Hosp Infect 2005;56:142-149.

[2] Jroundi I, Khoudri I, Azzouzi A, et al. *Prevalence of HAI in a Moroccan Hospital*. Am J Infect Control. 2007;35:412-6.

[3] Vincent J-L, Rello J, Marshall J, et al. *International study of HAI in ICU*. JAMA 2009;302:2323-9.

[4] Kallel H, Bahoul M, Ksibi H, et al. *Prevalence of HAI in a Tunisian Hospital*. Santè Publique 2006;18(2):187-94.

[5] *WHO Prevention of hospital acquired Infections: a practical guide*. 2nd ed. WHO /CDS/CSR/EPH/2002.12

[6] St: Mary's hospital Lacor Annual report year 2008/2009. Nov. 2009.

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