

Transformative Project to Reduce Hospital Acquired Infection (HAI) at District general Hospital, Matale, Sri Lanka

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Abstract- Hospital acquired infection (HAI) is an important cause of morbidity, mortality and prolonged hospital stay, and leads to increased treatment costs. The DGH, Matale was surveyed in January 2013 and in August 2014 for HAI by a team of two infection control nurses and one medical officer in 2013 and three infection control nurses and one medical officer in 2014. Infection Control strengthening Package (ICSP) was introduced to reduce HAI which includes fundamental changes in the infection control activities.

The prevalence of HAI decreased significantly ($p < 0.0001$) from 13.8% in 2013 to 8.9% in 2014 (Table 1). Despite an increase in the total number of patients admitted from 2560 to 2861, the infection rates decreased in all units, except intensive care units. There was a markedly increased number of surgical patients with multi-system infections, but their post-operative wound infection rates showed a statistically significant decrease (Table 2). In the orthopaedic unit too, there was a significant decrease in the rate of wound infections. The rates of wound infection, cannula infection and respiratory infections showed a statistically significant, reduction between the two surveys (table 2).

Infection Control strengthening Package (ICSP) which introduce to reduce HAI is an effective tool. It can be used to improve infection control practices and thereby to combat HAI in similar settings. Further, prevalence surveys can be used to assess the impact of infection control programs on hospital acquired infection, especially in hospitals with limited resources.

Index Terms- Hospital Acquired Infection, Matale, Sri Lanka, Transformative Project

I. INTRODUCTION

Hospital acquired infection (HAI) is an important cause of morbidity, mortality and prolonged hospital stay, and leads to increased treatment costs [1]. Although infection control policies were introduced at the District General Hospital (DGH), Matale from 2013, no studies have been done to review the effectiveness of infection control policies. Studies on the prevalence of HAI at regular intervals would reflect the effectiveness of guidelines given for infection control. This paper deals with a study on the prevalence of HAI at the DGH, Matale before and after introduction and implementation of infection control policies.

II. METHODOLOGY

The DGH, Matale was surveyed in January 2013 and in August 2014 for HAI by a team of two infection control nurses and one medical officer in 2013 and three infection control nurses and one medical officer in 2014, under the direction of two consultants in the laboratory. HAI was defined as an infection which the patient did not have at the time of admission and which was acquired after 48 hours of hospital stay [2].

A questionnaire was completed by infection control nurses with the help of the medical officers and nurses in each ward. The data obtained included age, sex, ward (specialty), reason for admission, evidence of established infection, site of infection, duration of hospital stay, previous operations, urinary catheterization, and venous annulation.

2.1 INTRODUCTION OF INFECTION CONTROL STRENGTHENING PACKAGE (ICSP)

After the initial survey in 2013, infection control measures were intensified. The number of full-time infection control nurses was increased from 2 to 3 and a medical officer was assigned to oversee infection control activities on full time basis. Infection Control strengthening Package (ICSP) was introduced to reduce HAI which includes fundamental changes in the infection control activities. Training programs on infection control, including universal precautions, were arranged for every grade of health care worker. The ward staff was requested to consider handwashing as the single most important aspect for controlling HAI. Proper disposal of clinical waste was started by introducing plastic disposable bags and colour coded bins and segregating the waste in standards. A liaison nurse was identified in each ward to assist the full-time infection control nurse. The ward staff was requested to use guidelines for rational use of antibiotics or consult the microbiologist [3].

The use of antiseptics alone was recommended in post-operative wound infection when the infection was localized to skin and subcutaneous tissue, with no evidence of systemic infection. Precautionary measures for urinary catheterization were given and guidelines for catheter care included periodic changes if the catheter needed to be in situ [4]. The staff was motivated to culture urine weekly, so that the appropriate antibiotic could be used either as a single dose while changing catheters or to treat an infection [5].

Statistical analysis was performed using the SPSS version 20 and the significance was assessed using the Chi-square test.

III. RESULTS

The prevalence of HAI decreased significantly ($p < 0.0001$) from 13.8% in 2013 to 8.9% in 2014 (Table 1). Despite an increase in the total number of patients admitted from 2560 to 2861, the infection rates decreased in all units, except intensive care units. An increase in infection rates was noted in intensive care units ($p < 0.05$) attributable to the admission of increased number of accidents. These patients had multiple tissue injury, had longer stay within the units and also needed respiratory support. Although the total infection rate decreased in surgical wards and in the orthopaedic unit, this was not statistically significant (Table 1). There was a markedly increased number of surgical patients with multi-system infections, but their post-operative wound infection rates showed a statistically significant decrease (Table 2). In the orthopaedic unit too, there was a significant decrease in the rate of wound infections.

Table I. Prevalence of HAI in the two surveys

	2013		2014	
	Total number of patients	Number of infected patients (%)	Total number of patients	Number of infected patients
Medical wards	1022	176 (17.22%)	1088	80 (7.35%) *
Surgical wards	1476	145 (9.82%)	1706	136 (7.97%)
Intensive Care Unit	45	15 (31.25%)	53	29(50.87%) †
Orthopaedic Unit	17	10 (58.82%)	14	04 (28.5%)
All Units	2560	346 (13.79%)	2861	249 (8.89%) *

* Significantly lower prevalence than in 2013 ($p < 0.0001$)

† Significantly higher prevalence than in 2014 ($p < 0.055$)

Table 2. Sites of HAI among patients in different units

	Number (and percentage) of patients with infection					
	Wounds	urinary tract	IV cannula	GI tract	Respiratory tract	Eye
Medical wards						
2013 (no.1022)	10 (0.98)	14 (1.37)	30 (2.97)	5 (0.49)	117 (11.45)	0
2014 (no. 1088)	3 (0.27) *	17 (1.56)	2 (0.18) ***	4 (0.37)	47 (4.32) ***	7 (0.64)
Surgical wards						
2013 (no.1473)	90(6.30)	28 (1.90)	8 (0.54)	2(0.14)	14(0.95)	0
2014 (no. 1702)	72 (4.2) **	36 (2.34)	7 (0.41)	3(0.18)	8(0.47)	6 (0.35)
Intensive care units						
2013 (no.48)	2 (4.16)	2(4.16)	8 (16.66)	-	3(6.25)	-
2014 (no. 54)	2 (3.50)	5 (8.77)	0**	-	22(38.59) †	-
Orthopaedic units.						
2013 (no.17)	9 (52.94)	0	1 (3.51)	-	-	-
2014 (no. 14)	1 (7.14) **	3 (21.43)	0	-	-	-
All						
2013 (no.2560)	114(4.44)	44 (1.72)	47 (1.83)	7 (0.27)	134 (5.22)	0
2014 (no.2861)	78 (2.72) ***	65 (2026)	9 (0.31) **	7 (0.24)	77 (2.68) **	13 (0.45)

* Significantly lower than Prevalence in 2013 (* $p < 0.05$, ** $P < 0.01$, *** $P < 0.001$)

† Significantly higher than prevalence in 2014 († $p < 0.001$)

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The rates of wound infection, cannula infection and respiratory infections showed a statistically significant, reduction between the two surveys (table 2). Although the urinary tract infection rates increased from 1.72% to 2.26% and gastrointestinal tract infections acquired in hospital decreased from 0.27% to 0.24%, both showed not statistically significant (Table 2).

IV. DISCUSSION

Prevalence of HAI was markedly reduced because of implementation of measures directed to decrease them. The marked reduction in cannula - site infections was attributable to re-siting of intravenous cannulas every 3 to 4 days, particularly in patients receiving beta-lactam antibiotics intravenously, which give rise e thrombophlebitis. Re-siting of cannula was checked by infection control nurses on their daily rounds. Most respiratory infections were noted among patients in the intensive care units. With regular monitoring it was possible to reduce the incidence of respiratory infections.

The reduction in the prevalence of post-operative wound infections was statistically significant in all units except the intensive care units where the numbers were small (Table 2). The total number of surgical patients was higher at the time of the second survey. In spite of this, the rates of infection were lower because of implementation of guidelines including Isolation, and hand washing which prevented organisms spreading between patients [6].

Although catheter policies had been introduced, the incidence of catheter infections showed a slight increase, but this was not statistically significant. Catheter infections seen in orthopaedic units were in paraplegics. There was no significant difference in the prevalence of gastrointestinal infections in the two surveys. A high prevalence of eye infections was noted during the second survey probably because there was an outbreak of viral kerato-conjunctivitis in Matale area.

V. CONCLUSION

Repeated prevalence surveys offer a practical and sensitive way of assessing hospital infection and should be used widely. They provide data regarding both infected and non-infected patients and also allow identification of risk factors. Prevalence surveys can be used to assess the impact of infection control programs on hospital acquired infection, especially in hospitals with limited resources.

Further, Infection Control strengthening Package (ICSP) which introduce to reduce HAI is an effective tool. It can be used to improve infection control practices and thereby to combat HAI in similar settings.

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