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HEALTH CARE ASSOCIATED INFECTION CONTROL MEASURES IN NEONATAL INTENSIVE CARE UNITS OF A TERTIARY CARE HOSPITAL OF HIMACHAL PRADESH

Community Medicine

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ABSTRACT

BACKGROUND: Health care-associated infection (HCAI), also referred to as "nosocomial" or "hospital" infection, is an infection occurring in a patient during the process of care in a hospital or other health care facility which was not present or incubating at the time of admission.

MATERIAL & METHODS: A cross sectional study was carried over a period of two months in NICU settings of IGMC, Shimla. 15 staff nurses and 20 residents (Junior residents & Senior residents). Thus, sample size of 35 was covered.

RESULTS: On assessment of hospital specific parameters, HICC, HICP, and HICG were found to be at par with WHO standards. Management of BMW was also found to be appropriate. The problem areas were CSSD and laundry services as they were not of adequate size and staff was also inadequate. In ICU separate cabin for high risk infection patient was not there. Proper hand washing setup was not there and visitors were not encouraged to wash hands or wear caps. All of the staff were adequately qualified for the work in ICU although no. of staff was below standard for an ICU.

CONCLUSION: well defined hospital control committee was present. Problem areas identified were infrastructure, CSSD & laundry services.

KEYWORDS

NICU, PICU, HCAI, Infection control

INTRODUCTION

Health care-associated infection (HCAI), also referred to as "nosocomial" or "hospital" infection, is an infection occurring in a patient during the process of care in a hospital or other health care facility which was not present or incubating at the time of admission. HCAI can affect patients in any type of setting where they receive care and can also appear after discharge. Furthermore, they include occupational infections among staff. HCAI represents the most frequent adverse event during care delivery and no institution or country can claim to have solved the problem yet. Based on data from a number of countries, it can be estimated that each year, hundreds of millions of patients around the world are affected by HCAI. The burden of HCAI is several folds higher in low- and middle-income countries than in high-income ones.1

Newborns are at higher risk, with infection rates in developing countries 3-20 times higher than in high-income countries. Among hospital-born babies in developing countries, health care- associated infections are responsible for 4% to 56% of all causes of death in the neonatal period, and 75% in South-East Asia and Sub-Saharan Africa. Surgical site infection is the leading infection in the general patient population in countries with limited resources, affecting up to two third of operated patients and with a frequency up to nine times higher than in developed countries. Every day, HCAI results in prolonged hospital stays, long-term disability, increased resistance of microorganisms to antimicrobials, massive additional costs for health systems, high costs for patients and their family, and unnecessary deaths. Thus, this study is designed to determine the infection control practices among health care professionals in a tertiary care hospital.2

METHODOLOGY

A cross sectional study was carried over a period of two months in NICU settings of IGMC, Shimla. This is 872 bedded tertiary care government hospital of Himachal Pradesh. The hospital is also a referral Centre for various critical diseases. It is largest and most sophisticated government hospital of Himachal. There are two NICU & one pediatrics ICU under the department of Pediatrics. Head of department and senior professor is in-charge of NICU. Junior residents and nursing staff are responsible for full time service delivery in NICUs. Junior residents generally have a posting of one month on rotation basis. Presently 15 staff nurses and 20 residents (Junior residents & Senior residents). Thus, sample size of 35 was covered. Those HCP not providing consent & Junior residents having a posting of less than one month were excluded. The study consisted of assessment of the following hospital specific and ICU specific parameters like HICC, Central sterile and supply department, Incinerator plant, Laundry services in IGMC, Shimla. ICU specific parameters like number of patient beds, ventilators, nurses in the ICU per shift, number of doctors (junior residents, senior residents, house job residents), type of tap: hand operated, elbow operated, foot operated, visitors guidelines, fogging and fumigation of ICUs, presence of hub cutter, presence of hypochlorite solution, hand rub at each bed side &posters of hand hygiene and BMW waste management. The information about first five ICU specific parameters was collected from in depth interview of sister in-charge or a sister with at least 3 years' experience in the NICU. The information is based on four random visits to each NICU at least 15 days apart. Lack of any of the articles mentioned above will be taken as non-compliance. Data were collected, compiled and entered into MS excel spread sheet and statistical analysis was done using SPSS Version 20 and appropriate statistical tests were applied.

RESULTS

Hospital specific and ICU specific parameters, Hospital has a well-defined Infection Control Policy, Committee, and Guidelines. There is a small 24x7 CSSD unit operating in the hospital. Set up has 2 parts, one major common area for receiving, cleaning, and autoclaving and one small area for inspection sorting and packaging and issuing of sterilized items. Total five autoclaves, four manual and one automatic is available. Steam sterilization by autoclaving is method of sterilization. Items sterilized are OT and ICU equipment, OT linen, no other item is sterilized in this CSSD unit. B & D Test pack are used as quality indicator. Incinerator plant was not functional at the time of study and outsourced by some outside agency. Regarding laundry services, a Centralized linen distribution system is followed in the hospital. In Plant laundry services are present. A separate building spread over an area of 2500 sq. feet approx with U Flow type. Equipment's used are Washing machine, Hydro-extraction, Drying tumbler & Flat iron. Staff consist of supervisor, dhobi, bearer & sweeper. NICU & PICU specific parameters are shown in table 1 & 2.

DISCUSSION

The present study, observe the measures taken to control infection in ICU set up of a tertiary care hospital. It has been done in two part, one what are various measures taken to control infection at administrative level to provide guideline, infrastructure and monitoring. Current study reports that, hospital is having its own infection control policy and guidelines which are printed in a booklet as easily accessible to health care provider. It mentions about hospital infection control committee, its responsibilities and functioning adequately. Infection surveillance and its method are well defined. Investigation of an outbreak and precautions to be taken during an outbreak is there. Infection control laboratory has also been established. Standard hand hygiene practice and BMW management are also mentioned in this booklet. Necessity of having an infection control policy is well understood by the hospital and adequate and at par with WHO standards.[1] It was observed that hospital has a very small CSSD of area approx. 600 sq. feet for a 870 bedded hospital. Ideally in such large

hospitals area of CSSD should be 7 sq. feet per bed. Which comes out to be approx. 6000 sq. feet. Hence only 10 % of the area required. Also the CSSD has not been divided according to standards for infection control. An ideal CSSD has 6-8 divisions depending on the facilities it provides. But the hospital under study has only two division. Staff was also found to be inadequate. Many posts were found to be vacant. Only steam sterilization is being used as a method of sterilization via autoclaves. No other method is in use like dry heat sterilization or gas sterilization. The above findings suggest that hospital has a sun standard CSSD and instrument supplied to ICU are being sterilized here, hence may lead to spread of infection. It was found that following an order from Govt. of India, incinerator plant is closed since 2010 and BMW is managed by a private agency which follows all the standard guidelines for BMW management. Segregation of waste was also found to be appropriate at ICU level. Hence, BMW management practices at hospital seems to be appropriate and adequate. In plant laundry services are available in the hospital under study having an area of approx. 4000 sq. feet, which is less than required for a 870 bedded hospital (approx. 8000sq. feet.). Capacity of washing machines in total was found to be 250 kgs, which is less than required for 870 bedded hospital i.e. 325 kgs approx. Other equipment were found to be adequate. Shortage of staff was also noticed as only a staff of 15 were working there is not adequate for washing a laundry load of 900 bedded hospital. Centralized linen distribution is followed in the hospital under study. Above findings suggest that laundry and linen services was found to be inadequate which may contribute to HCAI. Hospital under study has got a very small ICU with only 5 beds. No. of nursing staff was also found to be inadequate as recommended ratio of nursing staff to bed is 1: 1 per shift. But here 3 nursing staff is available for 5 beds per shift. Taps were found to be hand operated and ideally these should be either elbow operated or foot operated. Proper hand washing facilities were also lacking as hand dryer and disposable towels were not present. Visitors were not given caps to wear which may lead to hair fall and can contribute to spread of infection. Staff was also found to not practice wearing a cap. Visitors were also not forced to wash hands before touching patients. Fogging and fumigation is also carried out once a month which should ideally be once a week. Patients infected with HIV, tuberculosis or swine flu were only separated by curtains. This may lead to spread of infection to other patients.

CONCLUSION & RECOMMENDATIONS

Infection control committee of a hospital plays a vital role in controlling HCAI by making infection control policy and guidelines. But at the same time awareness should also be there among health care providers especially in Intensive care units, where in patients with severe infections are frequently admitted. This awareness can only be achieved through proper training at frequent interval. Central sterile and supply department should be made according to standard guidelines to prevention HCAI. It should be divided in various zones for various works and staffing should be adequate. Biomedical waste, especially infectious waste should be segregated separately and proper disposal should be carried out. For this frequent training session can be carried out by department of microbiology to increase awareness of biomedical waste management. Linen and laundry services should ideally be within premises of a large hospital and proper wash formula should be used. Adequate staff is also important, otherwise because of workload staff would not follow the proper washing instructions. Infrastructure in ICU is important in prevention of HCAI like proper spacing, presence of proper hand washing setup, availability of the personal protective equipment and separate space for patients with high risk infections. Staffing of ICUs should also be adequate according to standard laid down by WHO which is unfortunately lacking in most places especially in developing countries like India.

TABLE1: Neonatal intensive care unit (NICU) attached with labour room

DEPARRMENT		PAEDIATRIC
NO. Of beds		8
NO. Of ventilators		1
NO. Of nurses posted		25
NO. Of nurses/ shift	MORNING	3
	EVENING	3
	NIGHT	2
NO. Of doctors/ shift		3
Distance between paitient's bed (minimum)		5 ft
Visitors guidelines		Only parents allowed to enter NICU after donning the gown. Separate room adjacent to NICU for mothers to breastfeed child
Hand washing facility		Elbow operated tap with sink and soap
PPE used routinely		Gown, gloves, separate ICU slippers
Isolation rooms		No
Fogging/fumigation		Depends on neonatal load.
Hub cutter		Yes
Hypochlorite solution		Yes
Alcoholic based hand rub		Yes
Presence of poster display of hand washing steps		Yes
Poster displaying BMW segregation		Yes

Table 2: Neonatal intensive care unit (NICU)

DEPARRMENT		Paediatrics
NO. Of beds		4
NO. Of ventilators		6
NO. Of nurses posted		27
NO. Of nurses/ shift	MORNING	3
	EVENING	3
	NIGHT	2
NO. Of doctors/ shift		4
Distance between paitient's bed(minimum)		5 ft
Visitors guidelines		Only parents allowed to enter NICU after donning the gown. Separate room adjacent to NICU for mothers to breastfeed child
Hand washing facility		Automatic dispenser with sink and soap
PPE used routinely		Gown, gloves, separate ICU slippers
Isolation rooms		No
Fogging/fumigation		Depends on neonatal load.
Hub cutter		Yes
Hypochlorite solution		Yes
Alcoholic based hand rub		Yes
Presence of poster display of hand washing steps		Yes
Poster displaying BMW segregation		Yes

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