KNOWLEDGE AND PRACTICES OF HEALTH CARE PROFESSIONALS WITH REGARD TO NOSOCOMIAL INFECTIONS AT A MEDICAL COLLEGE AT GOA, INDIA- A CROSS-SECTIONAL STUDY

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ABSTRACT

BACKGROUND

Nosocomial infections (NI) are acquired during hospitalization which are not present at the time of admission to a hospital. Present study is aimed at bridging this knowledge gap which will benefit the policy makers to safeguard health of professionals and patients.

MATERIALS AND METHODS

A cross-sectional study was conducted on a purposive sample of 100 doctors. The data was obtained in the form of self-administered questionnaire.

RESULTS

All participants were familiar with NI. UTI (28%) was reported as commonest NI. *Pseudomonas* (28%) was identified as commonest causative agent of NI. 94% medical professionals believed that they need training in NI. 78% of medical professionals reported regular hand washing before and after examination of patient.

CONCLUSION

Doctors who participated in study had excellent knowledge about the NI. Some deficiencies in the practices such as not ensuring sterile conditions, exiting operation room along with sterile footwear were of concern.

KEY WORDS

Nosocomial Infections, Hospital Acquired Infections, Knowledge, Practices, Doctors, Goa, India

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BACKGROUND

Nosocomial Infections (NI) also known as hospital-acquired/associated infections (HAI) are acquired during hospitalization, which are not present or incubating at the time of admission to a hospital. These infections typically occur after 48 hours of admission. The commonest organisms implicated include *Staphylococcus aureus*, coagulase-negative staphylococci, enterococci, Enterobacteriaceae, multidrug resistant *E. coli*, *Staphylococcus aureus*, *Pseudomonas*, *Enterobacter*, *Acinetobacter*, *Klebsiella*, etc. Overcrowding and transfer of patients within hospital units and build-up of susceptible patients could contribute to the development of Nosocomial Infections. As per the published literature, the common Nosocomial Infections are Urinary infections, Surgical site infections, Nosocomial bacteraemia and other infections.¹ Another reason for the contamination of clean surgeries with hospital staphylococcus was delay in operation of more than 24 hours of admission² As per World Health Organization (WHO) estimates, around 1.4 million people worldwide suffer from infectious complications acquired in hospital.

Nosocomial Infections also cause lot of economic losses to the victims in addition to physical and mental agony.³ The HAI infection rates in India ranged from 4.4% to 83.09%.^{4,5}

In a study conducted in Goa, overall Nosocomial Infections rate was 33.93 ± 4.16 infections per 100 patients. The commonest Nosocomial Infections were Urinary tract infections (UTI), followed by surgical site infections, wound infections and nosocomial pneumonia. 70% of the bacteria isolated were resistant to antibiotics tested. These microorganisms were found to be sensitive to amikacin, cefoperazone-sulbactam, methicillin, co-trimoxazole, teicoplanin, vancomycin and rifampicin. MRSA was isolated in 71.4% of patients.⁶

There is paucity of studies conducted on the knowledge and practice among young medical professionals towards Nosocomial Infections in Goa, India. The present study was aimed at bridging this knowledge gap so that this important issue could be addressed in an adequate and timely manner which will benefit the policy makers to safe guard the health of professionals and their patients.

Objectives

The Objectives of this Study were as follows-

1. To determine the level of knowledge of health care professionals on Nosocomial Infections.
2. To determine the practices adopted in daily clinical practice towards their control.

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MATERIALS AND METHODS

Study Setting

The Goa Medical College Hospital is the only tertiary care and teaching hospital in the State of Goa.

Study Design

A cross-sectional study design was employed for data collection.

Study Participants

The study participants comprised of young medical professionals (Senior Resident doctors, Junior Resident doctors and Medical Interns) working at Goa Medical College and Hospital. The work experience of the doctors varied. Senior Resident doctors had an experience of at least 3 years. Junior Resident Doctors had an experience between 1-3 years while medical Interns had less than one year of experience.

Sampling

A purposive sampling method was utilized for the data collection. A total of 100 young medical professionals were enrolled in the study. A total of 51 Resident doctors and 49 Medical Interns were enrolled after obtaining their verbal consent.

Ethical Issues

The study protocol was approved by the Institutional Ethics Committee of Goa Medical College before the commencement of data collection (Reference No: GMC/IEC/AL-18; Dated: 12/12/2016).

Data Collection

The data was collected by using a structured questionnaire. The study questionnaire was self-administered to study participants.

Data Entry and Analysis

The data was entered into EpiData software (Version 3.1)⁷ and frequency tables were generated by using SPSS software (Licensed Version 23, Customer ID 227011). The results are presented in tables using proportions.

RESULTS

Socio-Demographic Details

Of the total 100 young medical professionals who completed the study questionnaires, 44% were Males and 56% were Females. The study participants comprised of Medical Interns (49%), Junior Resident doctors (41%) and Senior Resident doctors (10%) (Table 1). The mean age of the doctors was 23.9375 ± 1.90740 years. These doctors worked in Departments of Medicine, Surgery, OBG, Dermatology, ENT, Ophthalmology, Pulmonary Medicine, Paediatrics and Community Medicine [Table 1]. All the doctors interviewed were familiar with Nosocomial Infections.

Knowledge Regarding Nosocomial Infections in Clinical Practice

The various types of nosocomial infections reported were UTI (28%), post-operative wound infections (25%), respiratory tract infections (17%), pneumonia (15%), Ventilator Associated Pneumonia (11%), and Pyoderma (1%) (Table 2).

Variable	Categories	Frequency	Percent
Sex (N=100)	Male	44	44.0
	Female	56	56.0
Designation (N=100)	Medical Interns	49	49.0
	Junior Resident Doctors	41	41.0
	Senior Resident Doctors	10	10.0
Specialty (N=100)	Pulmonary Medicine	2	2.0
	Community Medicine	10	10.0
	ENT	8	8.0
	Ophthalmology	5	5.0
	Medicine	20	20.0
	Obstetrics and Gynecology	22	22.0
	Pediatrics	7	7.0
	Dermatology	7	7.0
	Surgery	19	19.0

Table 1. Demographic Variables of Study Population

Variables	Categories	Frequency	Percent
Nosocomial Infections (N=100)	Post-Operative Wound Infections	25	25.0
	Urinary Tract Infections	28	28.0
	Ventilator Associated Pneumonia	11	11.0
	Respiratory Tract Infections	17	17.0
	Pyodermas	1	1.0
	Pneumonias	15	15.0
	Not Specified	3	3.0
Pathogens (N=100)	Pseudomonas	28	28.0
	Acinetobacter baumannii	17	17.0
	Methicillin Resistant Staphylococcus aureus	1	1.0
	Streptococcus	11	11.0
	Staphylococcus aureus	25	25.0
	Escherichia coli	15	15.0
	Not Specified	3	3.0
Modes of Transmission (N=100)	Fomites	10	10.0
	Unsterile Instruments	14	14.0
	Improper Sterilization Technique	4	4.0
	Contact with Patients & Staff	34	34.0
	Aerosols from Patients	27	27.0
	Infected Catheters	8	8.0
	Dirty linen	3	3.0

Table 2. Knowledge Regarding Common Nosocomial Infections

The most prominent pathogen causing Nosocomial Infections reported by the doctors was Pseudomonas (28%) as shown in Table 2. The commonest mode of transmission reported by study participants was direct contact with patients and staff (34%). The various other modes of transmission are listed in Table 2. All doctors were aware of universal safety precautions and believed that Nosocomial

Infections are a major concern for them in their practice and also concurred for its inclusion in Medical education syllabus.

Reported Practices Related to Prevention of Nosocomial Infections.

About, 94% medical professionals believed that training is required to improve their skills as regard to Nosocomial Infections, whereas 6% did not felt this need. Of the total, 74% medical professionals believed that the Institution has taken appropriate actions for prevention of Nosocomial Infections, while 26% did not agree to the same. According to 41% medical professionals', due importance is given to universal safety precautions, however 59% felt that there was inadequate importance. A total of 78% of medical professionals reported regular hand washing before and after examination of patient as shown in Table 3.

Variable	Categories	Frequency	Percentage
Wash hands before and after patient examination (N=100)	Regularly	78	78.0
	Sometimes	22	22.0
Ensure sterile conditions while catheterization (N=100)	Regularly	70	70.0
	Sometimes	28	28.0
	Never	1	1.0
	Not specified	1	1.0
Exit sterile portion of OT with gown and slippers(N=100)	Regularly	7	7.0
	Sometimes	55	55.0
	Never	38	38.0
Wear gloves while dressing post-operative wounds(N=100)	Regularly	93	93.0
	Sometimes	7	7.0
Recommend isolation of patients with infection(N=100)	Regularly	57	57.0
	Sometimes	39	39.0
	Never	3	3.0
	Not specified	1	1.0

Table 3. Nosocomial Infections Related Preventive Practices Among Study Participants

Clinical Decisions Adopted to Control Nosocomial Infections

Around 70% of study participants reported that they regularly ensure sterile conditions while performing catheterization procedure as noted in Table 3. About 7% of doctors exited sterile portion of Operation Theatre (OT) along with OT foot wares and gowns regularly while 55% did so occasionally (Table 3). A total of 93% doctors wear gloves regularly for dressing while 7% did it sometimes (Table 3).

A total of 57% of doctors recommended isolation of patient with Nosocomial Infections regularly and 39% recommended isolation only sometimes (Table 3). About, 82% regularly sent patient's tissue or fluid for culture and drug-sensitivity testing (Table 3). Commonest nosocomial infection encountered by the medical professionals found frequently in daily practice is shown in (Table 4). Majority of doctors mentioned Vancomycin to treat Nosocomial Infections as listed in Table 4.

Variable	Frequency	Frequency	Percent
Perform culture and sensitivity to isolate bacteria(N=100)	Regularly	82	82.0
	Sometimes	17	17.0
	Never	1	1.0
Commonest nosocomial infection observed in practice(N=100)	Post-operative wound infection	18	18.0
	Urinary tract infection	22	22.0
	Puerperal sepsis	1	1.0
	Hospital acquired pneumonia	27	27.0
	Methicillin resistant staphylococcus aureus	20	20.0
	No response	12	12.0
Antibiotics used to treat nosocomial infection(N=100)	Piperacillin	4	4.0
	Vancomycin	26	26.0
	Imipenem	3	3.0
	Ceftazidime	19	19.0
	Linezolid	22	22.0
	Others	25	25.0
	Not recorded	1	1.0

Table 4. Specific Actions Taken by Doctors for The Prevention and Control of NI in Their Practice

DISCUSSION

Study participants were all young medical professionals. All the participants were familiar with Nosocomial Infections. Similar studies from the various parts of the world reported variable levels of knowledge of Nosocomial Infections among Health care workers.⁸⁻¹⁰ The different types of nosocomial infections cited were UTI, post-operative wound infections, respiratory tract infections, pneumonia, Ventilator Associated Pneumonia, and Pyoderma. Similar findings were reported by S. Masavkar et al where majority of the study participants were knowledgeable about the Nosocomial Infections. However in another study the knowledge of the study participants was very poor.^{11,12}

The most prominent pathogens causing Nosocomial Infections mentioned by the doctors were Pseudomonas, Staphylococcus aureus, Acinetobacter baumannii, Escherichia coli, and others. These are similar to the list of organisms isolated in a study by U Kamat et al at Goa Medical College.⁷ This finding reveals that the study participants are well versed with the kind of organisms frequently isolated by the Department of Microbiology at their institution. In the current study, bacteria pseudomonas was reported as a major Nosocomial infectious agent. The most probable reason being that the majority of the study participants represented surgical specialties. Similar microorganisms were encountered by health professionals in other studies.^{2,13,14} The mode of transmission of Nosocomial Infections cited by medical professionals was direct contact with patients and staff, aerosols from patients, unsterile instruments and fomites. All doctors were aware of universal safety precautions and believed that Nosocomial Infections are a major concern to them in their respective practice and also agreed for its inclusion in Medical education syllabus. Majority of study participants practiced handwashing. In similar studies reported the handwashing practice varies from place to place.¹⁵⁻²²

Majority of study participants regularly ensure sterile conditions while performing catheterization procedure and very few of them exited sterile portion of Operation Theatre (OT) along with OT footwears and gowns regularly. This kind of practice can increase the risk of infection to the patients being operated in OT.²³ In a similar study, a higher proportion of study participants ensured sterile precautions before catheterization.²⁴ Most of the doctors' wore gloves regularly for dressing. In another study less proportion of health care workers wore gloves to prevent infection.²⁵⁻²⁷

Half of the doctors recommended isolation of patient with Nosocomial Infections regularly. In another study by M Jain et al reported that 25% of study participants believed that isolation would help in prevention of Nosocomial Infections.²⁸ Majority of the doctors regularly sent patient's tissue or fluid for culture and drug-sensitivity testing. Commonest nosocomial infection encountered by the medical professionals was Hospital acquired pneumonia, Urinary tract infection, Methicillin resistant staphylococcus aureus, Post-operative wound infection. Similar findings were reported by other researchers.^{29,30} In another study Nosocomial Infections reported was cholera which is not reported in the current study setting.⁹ Majority of the study participants mentioned that the antibiotics that could be employed for the treatment of Nosocomial Infections were Vancomycin, Linezolid, Ceftazidime, etc. A study done at Goa Medical College reported that isolates were sensitive to Methicillin, Rifampicin, co-trimoxazole, Teicoplanin, Vancomycin.⁷

CONCLUSION

Doctors had excellent knowledge about the Nosocomial Infections. Some deficiencies in the practice such as not ensuring sterile practices, exiting OT with OT footwear were areas of concern.

Recommendations

The medical school syllabus must include topic of Nosocomial Infections so that the future doctors are adequately equipped to handle such cases encountered in their regular practice.

Limitation

Only young medical professionals were interviewed hence the opinions of senior faculty is not taken into consideration. The sample size is purposive and small hence may be limited in the generalizability of the findings of the study.

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