

## Nurses are at high risk to develop Upper Respiratory Tract Infection: a problem solving approach.

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### Abstract

**Aim:** This study aimed to explore incidence of Upper respiratory tract infection (URTI) and identify the factors that can keep the on high risk to develop URTI.

**Material and Method:** The study is a descriptive comprises 37 nurses working in the Medical, Surgical, and Pulmonary, ENT, Paediatric, ICU and Emergency units of teaching hospitals. The study was designed as a cross-sectional descriptive study. Data collection tools were: 1) Survey questionnaire to identify the incidence rate of upper respiratory tract infection among nurses and their selected personal variables, 2) Observation check-list for maintenance of hygiene in ward, and 3) Observation Check-list for use of precautions to prevent upper respiratory tract infection by Nurse. The data was calculated by using statistical software Epi- info. Categorical data represented in the form of Frequency and percentage. Quantitative data was expressed in the terms of mean and standard deviation. The data were collected by Survey and observational method from the 8 Units (Medical, Surgical, Pulmonary, ENT, Paediatric, ICUs and Emergency wards).

**Results:** The incidence rate of upper respiratory tract infection among Nurse was 51.35% (N=37). The mean age of nurses was 28.13 + 5.04. Of them, 47.37% were in the age group of 25–29 years, 89.47% were female, and 68.42% were married. It was found that none of them were doing any kind of breathing exercises. It was observed that in half of Units (50%), walls were clean, whereas majority (75%, 87.50%) of Units were not having clean Curtains and screens. In regards to cleanliness of Nurses' station and presence of waste near to the nurse's station majority (87.50%) of were not maintained clean. It was observed in majority (62.50%) of wards with flies or insects and over-crowded. All the Units were cleaned by damp dusting but the amount of disinfectant was less, and the cloth by which damp dusting done was not washed after cleaning. In majority (89.47%) of nurses that they were not following universal precautions while handling infectious material, although 68.42% of nurses not removed and discarded Precautionary Protective Equipment's (PPE) before leaving the patient's room or cubicle when they used.

**Conclusion:** The risk for occupationally acquired infection is an unavoidable part of daily patient care. URTI results from airborne transmission of organisms cause substantial illness and occasional deaths among health care workers. Further studies are needed to identify new infection control strategies to 1) improve protection of health care workers and 2) enhance compliance with established approaches. As health care is being reformed, the risk for and cost of occupationally acquired infection must be considered.

**Key words:** Upper respiratory tract infection (URTI), High risk, Nurses.

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### I. Introduction

In an era of emerging and re-emerging communicable disease threats, the importance of infection prevention and control measures in health-care settings to avoid amplification of outbreaks should not be underestimated. The main mode of transmission of most acute respiratory diseases (ARDs) is through droplets from a source patient who coughs or sneezes. Transmission can also occur through contact (including hand contamination with respiratory secretions followed by self-inoculation of conjunctiva or the mucosa of the nose or mouth) and through spread of fine infectious respiratory aerosols at short range during aerosol-generating procedures.<sup>1</sup>

Nurse works in such environment where she provide care to the patient and in the same environment likely to have infection with infectious body fluids of patients that makes nurse on at high risk to get upper respiratory infection<sup>2</sup>. Acute respiratory infections (ARIs) cause widespread diseases globally and are responsible for over 4 million deaths each year<sup>3</sup>. Risks to nurses have been less seldom examined. Theoretically they may contract classical communicable diseases during hospital work.<sup>4</sup>

In hospitals many aspects of infection control are not well documented and the influence of socio-demographic variables (experience, qualification) is unknown among Nurses in India. It is also possible that perception of the availability of equipment (gloves, hand decontaminates, sharps boxes), and the existence of an infection control nurse and an infection control policy might influence outlook. Upper respiratory tract infection (URTI) is a non-specific term used to describe acute infections involving the nose, paranasal sinuses, pharynx,

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larynx, trachea, and bronchi. Transmission of organisms causing Upper Respiratory Infections occurs by aerosol, droplet, or direct hand-to-hand contact with infected secretions, with subsequent passage to the nose or eyes. Thus, transmission occurs more commonly in crowded, inappropriate use of infection control precaution, and not Maintains Respiratory Hygiene/Cough Etiquette. Close proximity of persons together with handling of human secretions (e.g. respiratory secretions) make nurse particularly vulnerable to transmission of droplet-transmitted respiratory infections<sup>5</sup>.

## **II. Method**

**Type of the research-**The study was a descriptive one

### **Study population and study sample**

The study comprises 37 nurses working in the medical, surgical, pulmonary, ENT, paediatric, ICUs and Emergency wards/units of teaching hospitals in a city located in Karnataka. The data were collected between March-April 2009. The study was designed as a cross-sectional descriptive study.

The tools developed and selected for the data collection were: 1) Survey questionnaire to identify the incidence rate of upper respiratory tract infection among nurses and their selected personal variables, 2) Observation check-list for maintenance of hygiene in ward, and 3) Observation Check-list for use of precautionsto prevent upper respiratory tract infection by Nurse. Content validation and reliability was established for all tools.

The data was calculated by using statistical software Epi- info. Categorical data represented in the form of Frequency and percentage. Quantitative data was expressed in the terms of mean and standard deviation.

The data was collected personally by the investigators from morning 8am to 5pm. Survey was conducted from the 8Units (Medical, Surgical, Pulmonary, ENT, Paediatric, ICUs and Emergency wards). Available nurses were asked for presence or absence of Upper Respiratory Tract Infection. Nurses with Upper Respiratory Tract Infection in 8 Units, were observed for duration of 3 hours per ward for maintenance of ward hygiene and practice of precaution to prevent upper respiratory tract infection. The data collection process was terminated after thanking each respondent for their participation and co-operation.

### **Limitation of the study**

The study was conducted in the selected 8 units of hospitals and surveyed only 37 Nurses. Therefore, the results cover only selected one hospital and cannot be generalized.

## **III. Results**

Results are given under the following five subtopics: (a) Incidence rate; (b) demographic features; (c) Maintenance of hygiene by nurses in the ward; and (d) Uses of precautions to prevent Upper Respiratory Tract Infection by Nurse.

### **(a) Incidence rate of upper respiratory tract infection among nurses:**

The incidence rate of upper respiratory tract infection among surveyed among 37 nurses. Of 37 Nurses, 19 (51.35%) were suffering from upper respiratory tract infection.

### **(b) Demographic features:**

The mean age of nurses was 28.13 + 5.04. Of them, 47.37% were in the age group of 25–29 years, 89.47%were female, 68.42% were married, and 100% had Diploma in Nursing. It was determined that 36.84 % of thenurses had been working 4-6 years of experience, and 21.05% of them were working in Medicine ward.It was also determined that the all the nurses (100%) were taking rest  $\geq 6$ -8 hours out of 24 hours and 57.89 % were drinking  $\geq 2$ -4 litres of water in 24 hours. It was found that none of them were doing any kind of breathing exercises.

Data depicted in Table 1 showsthat most of Staff Nurses were suffering from Malaise (63.16%), Headache (89.47%), Cough (84.21%), and Dryness of naso-pharynx (94.74%), Nasal secretion (68.42%), and Expectoration of yellow & purulent sputum (94.74%) for seven days among all the Nurses (100%). It was found that symptoms were aggravated inside the Hospital among all the Staff Nurses.

**Table1: Frequency and percentage distribution of nurses by their selected personal variables**

**n=19**

Selected personal variables		Frequency	Percentage (%)	
1. Age (in years)	a) 20-24	4	21.05	
	b) 25-29	9	47.37	
	c) 30 and above	6	31.58	
2. Gender:	a) Male	2	10.52	
	b) Female	17	89.47	
3. Educational qualification	a) GNM	19	100	
4. Marital status	a) Married	13	68.42	
	b) Unmarried	6	31.58	
5. Area of working	a) Medicine ward	4	21.05	
	b) Pulmonary ward	3	15.79	
	c) ENT ward	1	5.26	
	d) Ortho ward	1	5.26	
	e) Pediatric ward	2	10.52	
	f) Emergency ward	3	15.79	
	g) ICUs ward	2	10.52	
	h) Surgery ward	3	15.79	
6. Years of professional experience	a) 1-3	6	31.58	
	b) 4-6	7	36.84	
	c) 7 & above	6	31.58	
7. Duration of work	a) 8 hours	19	100	
8. Total duration of rest in 24 Hrs.	a) ≥6-8	19	100	
9. Amount of water you drink in 24 hour	a) <2 liters	8	42.11	
	b) ≥2-4 liters	11	57.89	
10. Do you perform any breathing exercise	No	19	100	
11. Symptoms you are suffering	Sore throat/irritation	Yes	19	100
	Fever	Yes	3	15.79
		No	16	84.21
	Malaise	Yes	12	63.16
		No	6	31.58
	Headache	Yes	17	89.47
		No	2	10.52
	Difficulty in swallowing	Yes	7	36.84
		No	12	63.16
	Cough	Yes	16	84.21
		No	3	15.79
	Fatigue	Yes	10	52.63
		No	9	47.37
	Physical and emotional stress	Yes	10	52.63
		No	9	47.37
	Sneezing	Yes	10	52.63
		No	9	47.37
	Dryness of naso-pharynx	Yes	18	94.74
		No	1	5.26
	Nasal secretion	Yes	13	68.42
No		6	31.58	
Nasal obstruction	Yes	15	78.95	
	No	6	31.58	
Expectoration of yellow & purulent sputum	Yes	18	94.74	
	No	1	5.26	
Otalgia (referred pain to the ear)	Yes	6	31.58	
	No	13	68.42	
12. Frequency of URTI	a) ≤1 month	6	31.58	
	b) >1-3 month	13	68.42	
13. Duration of symptoms	1weak	19	100	
14. Treatment you take	Antibiotics	19	100	
15. Symptoms gets aggravates at:	a) Home	--	0.0	
	b) Hospital	19	100	
16. Types of infectious patients in wards	Tuberculosis, Pneumonia, Asthma, Viral fever, Pharyngitis, Cellulitis, Diabetic foot ulcer, Amputated, Upper respiratory tract infected, Bronchitis.			

**(c) Maintenance of hygiene by nurses in the ward:**

The data presented in the Table 3 shows majority (87.50%) of Units had adequate ventilation and hand washing facility. Furthermore, none of the hand washing area had elbow or foot operating tap. It was observed that in half of Units (50%), walls were clean, whereas majority (75%, 87.50%) of Units were not having clean

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Curtains and screens. It was also determined that very few (12.50%) Units maintained 5 feet of space between two beds. In regards to cleanliness of nurses' station and presence of waste near to the nurse's station majority (87.50%) of were not maintained clean, and in 62.50% of ward waste was stored near to the nurse's station

Data presented in table 2 shows majority (62.50%) of wards were observed with flies or insects. In regards to over-crowded ward half of the wards were over-crowded. All the areas were cleaned by damp dusting but the amount of disinfectant was less, and the cloth by which damp dusting done was not washed after cleaning.

**Table2: Frequency and percentage regarding Maintenance of hygiene by nurses in the wards**

n=8

SN	Steps	Yes		No		Remarks
		F	%	F	%	
1.	Adequate Ventilation in ward	7	87.5	1	12.5	
2.	Hand washing facility is present in the ward	7	87.5	1	12.5	Wherever facility available, tap opening by hands.
3.	Walls are clean	4	50.0	4	50.0	
4.	Curtains and screens are clean	2	25.0	6	75.0	
5.	Space between two bed is 5 feet	1	12.5	7	87.5	
6.	Nurses station is maintained clean	1	12.5	7	87.5	
7.	Presence of waste near to the nurses' station	5	62.5	3	37.5	
8.	Flies or insect in the ward is present	5	62.5	3	37.5	
9.	Over-crowded ward	4	50.0	4	50.0	
10.	Ward is cleaned by damp-dusting method with registered disinfectants.	8	100	--	0.0	Disinfectant are used in less amount, dumping cloths were not washed after mopping the floor.

**(d) Uses of precautions to prevent Upper Respiratory Tract Infection by Nurse.**

It was observed in majority (89.47%) of nurses that they were not following universal precautions while handling infectious material and not maintain distance (3 feet) while providing care to infectious patient. Also, none of Staff Nurses were washing their hands before and after each procedure. In more than half (57.89%), nurses worn mask during dry dusting, whereas majority (89.47%) of nurses were not cleaning the beds by damp dusting. In regards to cleaning of patient care device and Maintains respiratory Hygiene/Cough Etiquette majority (89.47%) of nurses not clean daily patient care devices and 78.95% nurses not maintain respiratory hygiene.

Data presented in table 3 shows more than half (57.89% & 57.89%) of nurses not covering sneezes and coughs and placing masks on coughing patients and did not wear artificial fingernails or extenders. Furthermore, 68.42% of nurses not removed and discarded Precautionary Protective Equipments (PPE) before leaving the patient's room or cubicle when they used.

**Table3: Frequency and percentage regarding Uses of precautions to prevent Upper Respiratory Tract Infection by Nurse.**

n=19

SN	Content	Yes		No	
		F	%	F	%
1.	Follow universal precaution while handling infectious material.	2	10.52	17	89.47
2.	Maintain distance (3 feet) while providing care to infectious patient.	2	10.52	17	89.47
3.	Wash hands before and after performing nursing activities/care	0	0.0	19	100
4.	Wear mask during dry dusting	11	57.89	8	42.11
5.	Cleaning of bed by damp dusting	2	10.52	17	89.47
6.	Patient-care devices are cleaned daily (e.g., electronic thermometers, glucose monitoring devices)	2	10.52	17	89.47
7.	Maintains Respiratory Hygiene/Cough Etiquette	4	21.05	15	78.95
8.	Covering sneezes and coughs and placing masks on coughing patients	8	42.11	11	57.89
9.	Wear artificial fingernails or extenders	8	42.11	11	57.89
10.	Before leaving the patient's room or cubicle, remove and discard Precautionary Protective Equipments (PPE).	6	31.58	13	68.42

#### **IV. Causes Identified**

From the analysis of the gathered information causes were identified which were responsible for the problem of upper respiratory tract infection among nurses. These causes were:

##### **A. Personal factors:**

1. Less in-take of water.
2. Not performing any breathing exercises.

##### **B. Environmental factors:**

1. Absence of elbow/foot operating tap for hand wash
2. No regular cleaning of wall of wards.
3. No regular washing of screens and curtains.
4. Inadequate space between two beds.
5. Nurses stations are not maintained clean
6. Presence of waste near to nurse's station.
7. Presence of insect/flies in the wards.
8. Wards were over-crowded by patient's relatives.
9. Use incorrect ratio of disinfectant solution with water and mopping cloths were not washed after cleaning wards.

##### **C. Nurses practicing factors:**

1. Majority of Nurses are not following universal precaution while handling infectious material.
2. Not maintain distance (3 feet) while providing care to infectious patient.
3. No nurse is washing hands before and after performing nursing activities/care
4. Majority of nurses nor Wearing mask during dry dusting
5. Very less nurses are cleaning bed by damp dusting
6. In general wards nurses are not cleaning patient-care devices
7. The major observation was majority of nurses were not Maintaining Respiratory Hygiene/Cough Etiquette
8. Nurses were not covering sneezes and coughs and not placing masks on coughing patients

#### **Desired Outcome**

- To minimize the incidence of upper respiratory tract infection among nurses by improving their practices regarding prevention of upper respiratory tract infection.

#### **Solutions**

- Develop the standard procedure for nurses to improve their practice regarding use of precautionary measures while providing infectious patients and materials, maintenance of cleanliness in nurse's station.
- Give the feedback to nursing superintendent and supervisors to make policies of washing screens and curtains, provision of separate space for collection and storage of waste in the wards.
- Make recommendation and discussion with medical superintendent to make arrangement of periodic cleaning of wards, hand washing facilities, adequate space to maintain distance between two beds.
- Prepare and place display boards for universal precautionary protective equipments.
- Sensitize the area nursing supervisor to check for utilization of precautionary measures by nurses.

#### **Consider consequences**

- When nurses attend the clinical conference/seminar/workshop or get the self-instruction module with bed side demonstration; their knowledge and skill will improve regarding the upper respiratory tract infection
- Discussing with nursing superintendent and supervisors to enlighten them about problem and causes related to environmental factors that lead to URTI among nurses.
- Hold the discussion with chairperson of CNE about the felt need of staff nurses to attend in service education on prevention of upper respiratory tract infection; make him/her to plan the in service education programme to nurses on prevention of upper respiratory tract infection.
- Hold the discussion with medical superintendent to make aware him about the problem of upper respiratory tract infection and environmental factors.
- Display of awareness boards helps the nurse to improve their practice regarding patient care, use of precautionary measures that can prevent them from upper respiratory tract infection.

### **Make a Decision-**

On the basis of possible solutions and their consequences it was found that all solutions are directly or indirectly minimize the incidence and problem of s upper respiratory tract infection. So following decisions are made:

1. Develop the standard procedure for nurses to improve their practice regarding prevention of upper respiratory tract infection.
2. Give the feedback to nursing superintendent and supervisors regarding cleanliness of the ward, adequate amount of disinfectant solutions with proper instruction to class D worker for cleaning of mopping cloth after cleaning wards, andseparate space to store waste from in the wards.

### **Implementation**

- Developed theself-learning module and standard procedure for nurses to improve their practice regarding prevention of upper respiratory tract infection by following universal precaution measures.
- A plan was made to make recommendation and discussion with medical superintendent regarding environmental problems that causes upper respiratory tract infection.
- Sensitize the area nursing supervisor to observe for nurses for practicing of and following universal precautionary measures, while on supervisory round.
- Motivate supportive staffs such as ward attendants, House Keeping Staffs and others to abide by the time schedule for cleaning and transferring the waste.

### **V. Conclusion**

The risk for occupationally acquired infection is an unavoidable part of daily patient care. URTI results from airborne transmission of organisms cause substantial illness and occasional deaths among health care workers. Further studies are needed to identify new infection control strategies to 1) improve protection of health care workers and 2) enhance compliance with established approaches. As health care is being reformed, the risk for and cost of occupationally acquired infection must be considered. The problem selected by the investigator was very useful for self-growth as well as the nurses. Nurses were given Self Instructional Module as well as standard protocols on prevention of upper respiratory tract infection.

### **STANDARD TO BE FOLLOWED FOR PREVENTION OF UPPER RESPIRATORY TRACT INFECTION**

**Standard Precautions** combine the major features of Universal Precautions (UP) and Body Substance Isolation (BSI) and are based on the principle that all blood, body fluids, secretions, excretions except sweat, nonintact skin, and mucous membranes may contain transmissible infectious agents. These include: hand hygiene; use of gloves, gown, mask, eye protection, or face shield, depending on the anticipated exposure; and safe injection practices.

### **RESPIRATORY HYGIENE/COUGH ETIQUETTE:**

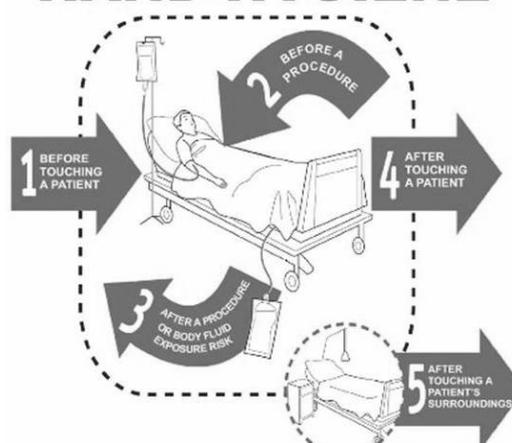
The elements of Respiratory Hygiene/Cough Etiquette include

- 1) Posted signs, in language(s) appropriate to the population served, with instructions to patients and accompanying family members or friends;
- 2) Source control measures (e.g., covering the mouth/nose with a tissue when coughing and prompt disposal of used tissues, using surgical masks on the coughing person when tolerated and appropriate);
- 3) Hand hygiene after contact with respiratory secretions; and
- 4) Spatial separation, ideally >3 feet, of persons with respiratory infections in common waiting areas when possible.

### **HAND HYGIENE:**

- 1) During the delivery of healthcare, avoid unnecessary touching of surfaces in close proximity to the patient
- 2) Perform hand hygiene: see picture:- 5 moments for hand hygiene

## **5 Moments for HAND HYGIENE**



- 3) Do not wear artificial fingernails or extenders if duties include direct contact with patients at high risk for infection and associated adverse outcomes (e.g., those in ICUs or operating rooms).

#### **PERSONAL PROTECTIVE EQUIPMENT:**

- 1) Wear PPE (gloves, mask, caps, and apron) when the nature of the anticipated patient interaction indicates that contact with blood or body fluids may occur.
- 2) Prevent contamination of clothing and skin during the process of removing PPE
- 3) Before leaving the patient's room or cubicle, remove and discard PPE.

#### **PATIENT-CARE EQUIPMENT AND INSTRUMENTS/DEVICES**

Wear PPE (e.g., gloves, gown), according to the level of anticipated contamination, when handling patient-care equipment and instruments/devices that is visibly soiled or may have been in contact with blood or body fluids.



#### **CARE OF THE ENVIRONMENT**

- 1) Clean and disinfect surfaces that are likely to be contaminated with pathogens, including those that are in close proximity to the patient (e.g., bed rails, over bed tables) and frequently-touched surfaces in the patient care environment (e.g., door knobs, surfaces in and surrounding toilets in patients' rooms) on a more frequent schedule compared to that for other surfaces (e.g., horizontal surfaces in waiting rooms).
- 2) Use registered disinfectants that have microbiocidal (i.e., killing) activity against the pathogens most likely to contaminate the patient-care environment.
- 3) Review the efficacy of in-use disinfectants when evidence of continuing transmission of an infectious agent (e.g., rotavirus, *C. difficile*, norovirus) may indicate resistance to the in-use product and change to a more effective disinfectant as indicated.
- 4) In facilities that provide health care to pediatric patients or have waiting areas with child play toys (e.g., obstetrics/gynecology offices and clinics), establish policies and procedures for cleaning and disinfecting toys at regular intervals.
- 5) Spray insecticide if insects/flyes present in the ward.

#### **LINEN / BED SCREENS / CURTAINS**

- 1) Never discard sheets onto the floor. Always use the correct colour coded bag.
- 2) Used sheets must be rolled or folded carefully before disposal to prevent airborne dispersal of skin cells.
- 3) *Bed screens/curtains must be changed if visibly soiled*, after a patient with an infectious condition has been discharged and routinely not less than every six months.
- 4) Always prefer damp dusting, use mask during dry dusting.

#### **UNIFORMS**

- 1) Staff must change as soon as is practical if uniform or clothes become visibly soiled or contaminated with blood or body fluids.
- 2) Wrist or hand jewellery, apart from a plain band ring, must not be worn by clinical staff when carrying out clinical procedures. Wrist watches must be removed before performing hand hygiene.
- 3) Staff should keep finger nails short and clean and must not wear false nails or nail varnish.

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