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Associated Diseases and Isolated Organisms of Pneumonia in Intensive Care Unit Patients

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Abstract:

Objective: Descriptive type of cross sectional study was conducted to determine associated diseases and isolated organisms of pneumonia in Intensive Care Unit patients. Methods: A pre-tested, modified, semi-structure questionnaire was used to collect the data with a sample size was 115. Data were entered and analyzed by using SPSS software. Results: The study found that 7%, 33%, 40% and 20% of the respondents belong to age group 1-20, 21-40, 41-60 and 61-80 years respectively, with mean age 41.40 $\pm$ 25.658 years. Among them 67% were male and 33% female. Regarding occupation 3.5%, 25.2%, 24.3%, 11.3% and 35.7% were students, service holders, housewife, workers and retired person respectively. About 4.3%, 0.9%, 40.9%,

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3.5%, 21.7% and 28.7% patients suffered from right upper, right middle, right lower, left upper, left middle and lingular areas pneumonia. In case of isolated organisms of pneumonia, 34.8%, 21.7%, 13%, 18.8% and 30.4% was Pseudomonas aeruginosa, Staphylococcus aureus, Streptococcus pneumonia, Escherichia coli and Klebseilla pneumonia. Besides 17.4%, 22.6%, 1.7%, 33.9%, 1.7%, 11.3%, 13.9% and 16.5% belonged to head injury, stroke, Gullein Barre Sundrome (GBS), unconscious, quadriplegia, cardiac disease, lung disease and geriatric case respectively. Study also found that 86.3% unskilled and 6.7% skilled service providers had no the knowledge about pneumonia. Conclusion: It concludes that different type of micro-organism isolated in pneumonic patient, they had several associated disease including head injury and radiologic shadow found in different lobes.

Key words: Pneumonia, Isolated microorganism

Background

Pneumonia is an acute respiratory illness associated with recently developed radiologic pulmonary shadowing which is either segmental or affecting more than one lobe. As the sitting in which a pneumonia develops has such major implications for the likely organisms involved and hence dictates the immediate choice of antibiotics, pneumonia are now classified as community-acquired, hospital acquired, or those occurring in the immune-compromised host, or damaged lung including suppurative and aspirational pneumonia.[1] An intensive care unit is a special facility within a hospital that is dedicated to treating patients who are critically ill. The patients may be experiencing multiple organ failure, respiratory arrest, or other serious problems that require intensive monitoring.[2] The study conducted by Emine Alp, Muhammet Güven to determine the frequency, risk factors and mortality of nosocomial pneumonia and found that 6.8% nosocomial pneumonia, 75.5% ventilator-associated pneumonia, 7% community acquired, % 10.7aspiration pneumonia.[3] Physiotherapists are involved in

the management of patients with critical illness. The physiotherapist should be responsible for implementing chest physiotherapy, mobilization plans and exercise prescription and make recommendations for progression of these plans, jointly with medical and nursing staff.[4] A Community based public health education and training for health providers at all levels about correct and applicable prevention and assessments of pneumonia of them 37.14 % mothers were graduates, 39.29 % laborers .[5] A prospective study was conducted by Emine Alp et. al. editors to determine the frequency, risk factors and mortality of nosocomial pneumonia in the intensive care units and found 6.8% developed nosocomial pneumonia and 75.5% ventilator-associated , crude and attributable mortality were 65% and 52.6%.[6] The study was conducted by George DL and et. al. editors of two university-affiliated hospitals in ICU patients and found that Staphylococcus aureus, Streptococcus pneumoniae, Pseudomonas aeruginosa, and Hemophilus species made up 65% of isolates from the lower respiratory tract, whereas only 12.5% of isolates were enteric gram-negative bacilli.[7] The study was conducted by Chevret S, Hemmer M, Carlet J and Langer M and found that crude incidence was estimated at 8.9% 7-day and 14-day pneumonia rates at 15.8% and 23.4%, respectively, high risk when either coma, trauma, respiratory support.[8] Gram-negative bacilli and Staphylococcus aureus were the most frequently isolated bacteria was found respiratory therapy equipment and contaminated nebulizers were possible sources of nosocomial pathogens. Staff education programs including the barrier precautions, and selective decontamination of the digestive tract. Prevention strategies should focus on more effective infection control techniques.[9]

Materials and Methods

Descriptive type of cross sectional study was conducted of Dhaka city in order to determine associated diseases and isolated organisms of pneumonia in Intensive Care Unit patients with 115 samples. The study sites were National Institute of Diseases of the Chest and Hospital (NIDCH) is situated at Mohakhali adjacent of Gulshan area and Metropolitan Medical Centre Limited (MMC Ltd) Mohakhali, Dhaka city in Bangladesh. A pre-tested modified semi structure questionnaire was used to collect the information on the basis of objectives and variables. Common organisms were isolated by culture in International Centre for Diarrheal Disease Research Bangladesh (ICDDR'B), NIDCH and MMC Ltd. Affected lobes are detected by individual radiological findings of chest. Ninety six skilled and unskilled service providers also include the research work for knowledge practice and preventing approach for infection control in intensive care unit. These service providers taken different type of preventive measures of pneumonia including chest physiotherapy used disposable instruments, proper ventilation and maintain visitor restriction. The collecting data were editing and analyzed by using statistical packages for social science (SPSS) software version 16.0.

Results

Analysis of socio-demographic variables and table1 found that 7%, 33%, 40% and 20% of the respondents belong to age of 1-20 years, 21-40 years, 41-60 years and 61-80 years respectively with mean age 41.40 $\pm$ 25.658 years. Among them 67% were male and 33% female. Table 1 also reveals that the educational level of the respondents 7% are primary, followed by 14.8% secondary, 12.2% higher secondary, 55.7% graduate and 10.4%

and above post graduate respectively and occupations of the respondents were 3.5% students, 25.2% service holders, 24.3% housewife, 11.3% workers and 35.7% were retired person.

Table 1: Distribution of respondents by socio-demographic characteristic (n=115)

	Items	Frequency	Percentage
Age group	1-20	8	7.0
	21-40	38	33.0
	41-60	46	40.0
	61-80	23	20.0
	Total	115	100.0
	Mean $\pm$ SD	41.40 $\pm$ 25.658	
Sex	Male	77	66.96
	Female	38	33.04
	Total	115	100
Educational status	Primary	8	7.0
	Secondary	17	14.8
	Higher secondary	14	12.2
	Graduate	64	55.7
	Post graduate	12	10.4
	Total	115	100
Occupation	Student	4	3.5
	Service holder	29	25.2
	House wife	28	24.3
	Worker	13	11.3
	Retried person	41	35.7
	Total	115	100.0

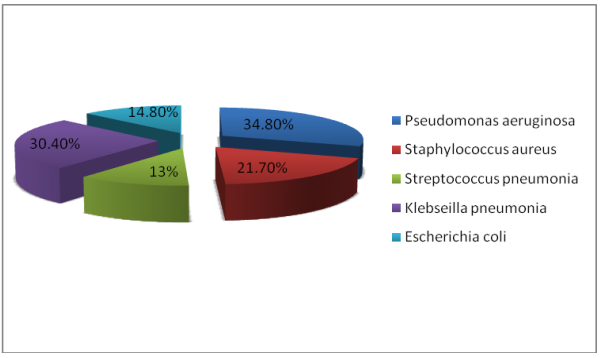

Figure 1: Distribution of the respondents by growth common organisms

Figure no. 1 shows that growth organisms of the respondents. About 34.8% were Pseudomonas aeruginosa, followed by 21.7% Staphylococcus aureus, 13% Streptococcus pneumonia, 18.8% Escherichia coli and only 30.4% were Klebseilla pneumonia.

Table No. 2: Distribution of the respondents by radiologic pulmonary shadow of affected segment (n=115)

	Items	Frequency	Percentage
Affected side	Right Lung	53	46.1
	Left Lung	62	53.9
	Total	115	100.0
	Total	115	100.0
Affected lobes	Right upper	5	4.3
	Right middle	1	0.9
	Right lower	47	40.9
	Left upper	4	3.5
	Left middle	25	21.7
	Lingular	33	28.7
	Total	115	100.0

Table no. 2 reveals that pneumonic shadow found in 53.9% of left lung and 46.1% were right lung. Among them 4.3%, 0.9%, 40.9%, 3.5%, 21.7% and 28.7% were right upper, right middle, right lower, left upper, left middle and lingular area which diagnosed by radiological findings.

Table No. 3: Distribution of the respondents by associated diseases (Multiple Responses)

Associated diseases	Frequency	Percent
Head injury	20	17.4
Stroke	26	22.6
GBS	2	1.7
Unconscious	39	33.9
Quadriplegia	2	1.7
Cardiac disease	13	11.3
Lung disease (COPD)	16	13.9
Geriatric case	19	16.5

Table no. 3 shows that associated diseases of the respondents 17.4%, 22.6%, 1.7%, 33.9%, 1.7%, 11.3%, 13.9% and 16.5%

followed by Head injury, Stroke, GBS, Unconscious, Quadriplegia, Cardiac disease, Lung disease (COPD) and Geriatric case respectively.

Table No. 4: Distribution of the respondents by knowledge of service providers about pneumonia and nosocomial infection (n=96)

	Items	Frequency	Percentage
Skilled service providers	yes	42	93.3
	No	3	6.7
	Total	45	100
Unskilled service provider	Yes	7	13.7
	No	44	86.3
	Total	51	100

Table no. 4 shows that among the service provider 93.3% were skilled and 13.7% unskilled service providers know the severity of pneumonia and nosocomial infection. Among them 6.7% were skilled and 86.3% unskilled service providers did not know the severity of pneumonia and nosocomial infection. This group of service providers responsible for spread out infection in intensive care unit.

Table No. 5: Distribution of the respondents by type of preventive measures taken (Multiple Responses)

Type of preventive measures	Frequency	Percent
Chest physiotherapy	66	57.4
Use disposable instruments	97	84.3
Maintain proper ventilation	95	82.6
Use hand gloves, mask and apron during touch the patient	98	85.2
Charging position 2 hourly	82	71.3
Use disposable succession catheter only one time	12	10.4
Maintain proper visitor restriction	7	6.1

Table no. 5 reveals that among the respondent 57.4% ware taken chest physiotherapy, 84.3% used disposable instruments, 82.6% maintained proper ventilation, 85.2% use hand gloves, mask and apron during touch the patient, 71.3% charging position 2 hourly, 10.4% use disposable succession catheter only

one time and 6.1% maintain proper visitor restriction. Pneumonia and nosocomial infection occur due to lack of visitors restriction and do not use disposable succession catheter only one time.

Discussion

The present study found that 7%, 33%, 40% and 20% of the respondents belongs to age of 1-20 years, 21-40 years, 41-60 years and 61-80 years respectively with mean age 41.40 $\pm$ 25.658 years. Among them 67% were male and 33% female and occupations of the respondents were 3.5% students, 25.2% service holders, 24.3% housewife, 11.3% workers and 35.7% were retired person this findings were similar to the study carried out by Walden AP et.al.editors.[10] The Isolated common organisms 34.8% were Pseudomonas aeruginosa, followed by 21.7% were Staphylococcus aureus, 13% are Streptococcus pneumonia, 18.8% are Escherichia coli and only 30.4% are Klebseilla pneumonia this findings were supported to the findings of George DL. et. al. editors.[7, 11] Study reveals that, 53.9% of the respondents affected Left Lung and 46.1% were Right Lung. Among them 4.3%, 0.9%, 40.9%, 3.5%, 21.7% and 28.7% were right upper, right middle, right lower, left upper, left middle and lingular area which diagnosed by radiological findings there is no similar findings such literature review. Associated diseases of the respondents 17.4%, 22.6%, 1.7%, 33.9%, 1.7%, 11.3%, 13.9% and 16.5% followed by Head injury, Stroke, GBS, Unconscious, Quadriplegia, Cardiac disease, Lung disease (COPD) and Geriatric case respectively this study findings were supported to the findings of Ifran M et. al. editors and Walter MD et. al editors.[12,13,14] Among the service provider 6.7% skilled and 86.3% unskilled did not know the severity of pneumonia and nosocomial infection. This group of service providers responsible for spread out infection in intensive care

unit. Of the respondent 57.4% ware taken chest physiotherapy, 84.3% used disposable instruments, 82.6% maintained proper ventilation, 85.2% use hand gloves, mask and apron during touch the patient, 71.3% charging position 2 hourly, 10.4% use disposable succession catheter only one time and 6.1% maintain this study findings were supported to the findings of Craven DE et. al. editors.[9]

Conclusion

The study conclude that unconscious, stroke, head injury, geriatric, COPD, cardiac disease, quadriplegia, GBS patients are more prone to pneumonia and common isolated organisms were pseudomonas aeruginosa, klebseilla pneumonia, staphylococcus aureus, Escherichia coli, streptococcus pneumonia respectively. Service providers of intensive care unit had several types of preventive measures for infection control, Including chest physiotherapy, use disposable instruments, visitor restriction and proper barrier precautions.

Disclosure

All the authors declared no competing interest.

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