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INFORMATION FOR AUTHORS

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Assamble manuscript in the following order :

1. Title page
2. Abstract
3. Text
4. References

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- Should be limited to 300 words for original or review articles and 200 wards for case reports
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Introduction (upto 600 words), Materials and methods, Results, Discussion, Conclusion (upto 150 words).

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- Ward limits: 600 wards
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- To be consistent
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Book with one author or editor:

- Mason J. Concepts in dental public health. Philadelphia: Lippincott Williams & Wilkins; 2005.

Books with more than six authors/editors:

- Fauci AS, Braunwald E, Kasper DL, Hauser SL, Longo DL, Jameson JL, et al., editors. Harrison's principles of internal medicine. 17th ed. New York: McGraw Hill; 2008.

Chapter in a book:

Partridge H, Hallam G. Evidence-based practice and information literacy. In: Lipu S, Williamson K, Lloyd A. (eds.) Exploring methods in information literacy research. Wagga Wagga, Australia: Centre for Information Studies; 2007. p.149–170.Government

E-book:

- Irfan A. Protocols for predictable aesthetic dental restorations [Internet]. Oxford: Blackwell Munksgaard; 2006 [cited 2009 May 21]. Available from Netlibrary:http://cclsw2.vcc.ca:2048/login?url=http://www.netLibrary.com/urlapi.asp?

Journal article: print

- Chhibber PK, Majumdar SK. Foreign ownership and profitability: Property rights, control, and the performance of firms in Indian industry. Journal of Law & Economics. 1999;42(1): 209–238.

Journal article: online/electronic

- Errami M, Garner H. A tale of two citations. Nature. 2008;451(7177): 397–399. Available from:http:// www.nature. com/ nature/journal/v451/ n7177/full/451397a. html [Accessed 20th January 2015].

For newspaper articles:

- Fayerman P. Women must now wait to 40 for publicly paid amnio test. Vancouver Sun. 2009 Jun 9; Sect. A:5.

Document:

- Canada. Environmental Health Directorate. Radiation protection in dentistry: recommended safety procedures for the use of dental x-ray equipment. Safety Code 30. Ottawa: Ministry of Health; 2000.

Report

- Leatherwood S. Whales, dolphins, and porpoises of the western North Atlantic. U.S. Dept. of Commerce. Report number: 63, 2001.

Web page/website

- European Space Agency. Rosetta: rendezvous with a comet. Available from: http://rosetta.esa.int [Accessed 15th June 2015].

Dictionary, Encyclopedia or Similar reference book:

- Murchison DF. Dental emergencies. In: Merck Manual of Diagnosis and Therapy [Internet]. 18th ed. Whitehouse Station (NJ): Merck; 2009 [last modified 2009 Mar; cited 2009 Jun 23]. Available from: http://www.merck.com/mmpe/sec08/ch096/ch096a.html

Electronic material

- World Health Organization (WHO). Mortality country fact sheet 2006 [internet]. Geneva: WHO; 2006. Available from: www.who.int/whosis/mort_emro_pak_pakistan.pdf

Conference proceeding: individual paper

- Wittke M. Design, construction, supervision and long-term behaviour of tunnels in swelling rock. In: Van Cotthem A, Charlier R, Thimus J-F, Tshibangu J-P. (eds.) Eurock 2006: multiphysics coupling and long term behaviour in rock mechanics: Proceedings of the International Symposium of the International Society for Rock Mechanics, EUROCK 2006, 9–12 May 2006, Liège, Belgium. London: Taylor & Francis; 2006. p 211–216.

Video recordings:

- Dental dam: still the best dry-field technique [DVD]. Provo (UT): Practical Clinical Courses; 2007.

Lecture/presentation

- Wagner G. Structural and functional studies of protein interactions in gene expression. [Lecture] Imperial College London. 12th December 2006.

Email: personal

- Harrison R. Email sent to: Mimi Weiss Johnson. 10th June 2014.

NICE guidelines

- National Institute for Health and Care Excellence (NICE), Tuberculosis: NICE Guideline [NG33]. 2016. Available from: https://www.nice.org.uk/guidance/ng33/resources/ tuberculosis-1837390683589 [Accessed 27th May 2017].

Acknowledgement

Acknowledge any person or institute who have helped for the study.

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- Proof of accepted manuscript may be sent to the authors. No addition to the manuscript at this stage will be accepted

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- Running title provided (not more than 40 characters)
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- References cited in superscript in the text without brackets after with/without comma (,) or full stop (.)
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- Number each figure in the text in consecutive order
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Units of measurements

- Measurements of length, weight, height and volume should be reported in metric units (meter, kilogram or liter) or their decimal multiples
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Abbreviations and Symbols

- All abbreviation should be fully stated in the text where it first appears and abbreviation in parenthesis. Subsequently the abbreviation only may be used
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ORIGINAL ARTICLE

Demographic Study of Blunt Trauma Chest in Sirajganj Region

Sandwip Talukdar,[1] Debashishkumer Ghosh,[2] Kafil Uddin,[3] Muhammad Abdullahil kafi,[4] Preyanka Chowdhury,[5] Bruno Ishaque[6]

ABSTRACT

Background: Chest trauma is one of the serious injuries and also one of the leading causes of death from physical trauma. Incidence has significantly increased due to development of rapid mode of transport, new high speed vehicles, ignorance of road safety measures, fall from height, fall on road injuries due to construction activities violence, fall from under construction building. **Objectives:** Current study is designed to study clinical profile, pattern of injuries, complications and treatment modality required in chest trauma management of blunt trauma chest at Varanasi region in Sirajganj. **Methods:** The present study was done on the cases selected from dead bodies brought into mortuary of 250 Beded, General Hospital Sirajganj, Bangladesh for medico legal post-mortem examination in the year of 1st January 2021 to 31St December 2021. The data of the materials were sourced from 75 cases of blunt trauma chest. Information were gathered from the interviews of relatives and of persons accompanying them after getting written consent. **Results:** The highest death (58.7%) were in the 21-50 years of age group. The incidence were lower (0.6%) in older age group above 70 years. Male comprised majority of cases (84.0%) and most of the cases (94.7%) were Muslims. Maximum blunt trauma cases (57.3%) occurred in urban area and in the month of August (22.6%). Maximum number of accident risky since morning peak hours 9-13 hour in 33.3% cases and least blunt trauma cases happened in 1-5 hours in night hours in 6.3% cases. Maximum number of cases (30.7%) occurred on highway, least number of cases (5.0%) occurred in house. **Conclusion:** Chest trauma contribute significant to both morbidity and mortality especially in adult male victims of the road traffic accidents. Thus, early diagnosis and rapid management is of paramount importance in chest injuries.

Keywords: Blunt trauma chest, Demographic data, Death.
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INTRODUCTION

Chest trauma has remained a very important type of trauma despite advances in trauma management. The mortality rate is variable ranging from about 10.0% to 60.0% and the incidence of chest trauma in most population groups is still high accounting for 10.0% of trauma admissions.[1,2] Chest trauma is one of the major injuries encountered in trauma victims and also the leading cause of death from physical trauma after head injury. Chest injuries are found to be the primary or a contributing cause of about a quarter of all trauma related deaths.[3] Injuries to the chest are common, with up to 20.0% of trauma patient's presenting with thoracic injuries. The third most common cause of traumatic death is thoracic trauma after head and spinal injury. Although the trauma related injuries can involve many part of body, but one out of four trauma

[1]*Assistant Professor, Department of Forensic Medicine, North Bengal Medical College, Sirajganj, Bangladesh;*
[2]*Assistant Professor, Department of Community Medicine, North Bengal Medical College, Sirajganj, Bangladesh;*
[3]*Associate Professor, Department of Forensic Medicine, Rajshahi Medical College, Rajshahi, Bangladesh;*
[4]*Assistant Professor, Department of Forensic Medicine, Shaheed M. Monsur Ali Medical College, Sirajganj, Bangladesh;*
[5]*Medical Officer, Upazila Health Complex, Manda, Naogaon, Bangladesh;*
[6]*Lecturer, Department of Forensic Medicine, North Bengal Medical College, Sirajganj, Bangladesh.*

Correspondence: Sandwip Talukdar
Mobile: +8801721214535
E-mail: sandwip.talukdar@yahoo.com

patient die mainly due to thoracic Injuries or its complications.[4]It is hard to evaluate the mortality rate as the cause of death of blunt trauma may be due to pulmonary or non-pulmonary complications and associated injuries. 10.0% or less of biunt trauma cases requires surgical treatment and the remaining patient can be managed conservatively.[4,5] Only few studies have been conducted to analyse its magnitude and management in scenario. Chest injury is potentially the most dangerous of all and its management should be a matter of the most extreme urgency. Blood transfusions, artificial ventilators, antibiotics, X-rays, ultrasonography, computed tomography, lung scan, tube thoracostomy, tracheostomy, arterial blood gas analysis, spirometry, esophagoscopy and bronchoscopy have remarkably improved the management of critically ill-patients. Physiotherapy, rehabilitation has also added to the improvement in management of chest injuries. Blunt trauma is defined as injuries where organ and structures are injured without disrupting tissue integrity.[6] Road traffic accident like endemic disease which mainly affect our youth or young populations, currently motor vehicle accident rank 9th in relation of disease burden and they are projected to be ranked 3rd by 2020.[7] Optimal care of trauma patients requires a coordinated management from the point of injury, through a hospital facility established to cope with the demands of tackling this multi-systemic problems, to a rehabilitation structure that can return the patient to a maximum working potential within society. Sophisticated prehospital and trauma care systems have been shown to reduce the number of preventable deaths after trauma, maximum impact in reducing the burden of trauma must come from their prevention strategies.[8]

MATERIALS & METHODS

The present study was done on the cases selected from dead bodies brought into mortuary of 250 Beded, General Hospital Sirajganj, Bangladesh for medico legal post-mortem examination in the year of 1st January 2021 to 31St December 2021. Badly decomposed where significant injuries are not visible not included in these study. The data of the materials were sourced from 75 cases of blunt trauma chest. The victims information and history of circumstances of injury sustained were gathered from the interviews of relatives and of persons accompanying them if they had the first hand information of the sequence of events leading to such fatalities after getting written consent. Data was collected in case record form and analysed in Microsoft excel worksheet version 2021. Descriptive statistics for quantitative variables was represented as average and mean. Qualitative variables were represented as frequency and percentages.

RESULTS

The study includes 75 cases and its aims to study the demographic data of blunt trauma chest in Varanasi region. Out of 75 cases studied, 63 (84.0%) were males and 12 (16.0%) females (Figure I). Commonest age group involved was 41-50 years (18.7%), followed by 21-30 and 31-40 years of age had second highest toll list. Thus all these age group combined, 21-50 age had a 44 (58.7%) cases out of 75cases. Male: female ratio was 5.2:1. Females in the age group of 41-50 years comprised 3 (25.0%) cases followed by 31-40 years of age. This signifies that 20-50 years of age-group most dependent part and base of our economy and their tragic lives lost of most active productive and economically promising group of population. A higher incidence of fatalities in adult age group (21-50 years) because the people from these age group are more often required to move out in pursuit of their work and studies this age group is most active phase of life and they have a tendency to take risk. The preponderance of male over female in blunt trauma chest may be explained by the fact that mostly males are generally doing work for earning their family requirement. Males have a more percentage of doing job in comparison to that of female (Table I). It is observed that 43 (57.3%) cases were from urban area and 32 (42.7%) cases from rural area (Figure II). Religion wise distribution of victims showed that most of the victims belonged to Muslim religion that was 71 (94.7%) and 4 (5.3%) cases were from others. In Sirajganj district, there is dominance of Muslims over others population, so the Muslims (94.7%) were most community involved in incidence in present study (Table II). Highest number of accident were observed in the month of August 17 (22.6%), 10 (13.3%) in September, 9 (12.0%) in November and least number of accident occurred during the month of February and also in July 1(1.3%). Highest number of accidents occurred in the duration of august to December month (Table III). Results

showed that fatalities on highways were dominated by heavy motor vehicles mainly involved with 23 (30.7%) cases. Light motor vehicles cause brutality maximum in inside cities 14 (18.7%) cases, single lane was involved in 16 (21.3%) cases, people who work in under construction building for earning their livelihood and workplaces, injuries occurred in this place was 10 (13.3%) cases, house was involved in 4 (5.3%) cases. People not taking any precaution while crossing railway track, railway track involved in 8 (10.7%) cases (Table IV). Fatal accident in peak hours that was 25 (33.3%) cases occur in morning peak hours (9-13 hours). Accident in afternoon (13-17 hours) and early morning peak hours (5-9 hours) had 15(20.0%) and 14 (18.7%) cases. On single lane road too evening peak hours(17-21 hours)also had 10 (13.3%) cases thus risk of traffic accident was more during morning and evening peak hours in night hours 21-1hours there was 6 (8.0%)cases (Table V).

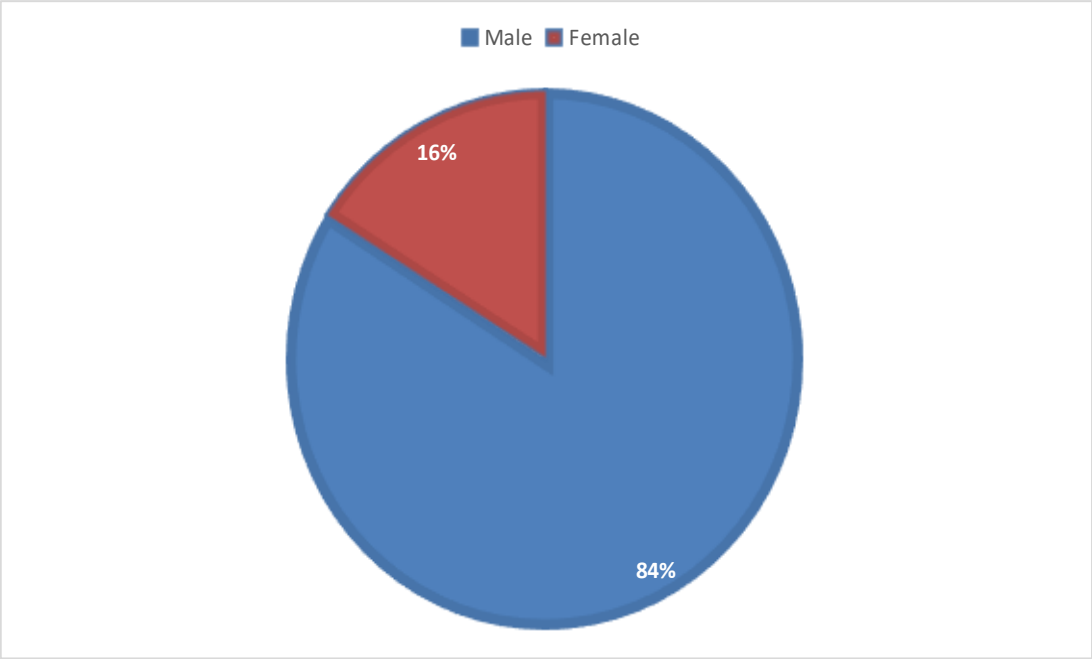

Figure I: Sex distributions of the cases (n=75)

Table I: Age wise distribution among male and female cases (n=75)

Age in year	Male		Female		Total	
	No.	%	No.	%	No.	%
0-10	1	1.6	0	0.0	1	1.3
11-20	7	11.1	0	0.0	7	9.3
21-30	13	20.6	2	16.7	15	20.0
31-40	12	19.0	3	25.0	15	20.0
41-50	11	17.5	3	25.0	14	18.7
51-60	10	15.9	2	16.7	12	16.0
61-70	7	11.1	1	8.3	8	10.7
71-80	0	0.0	1	8.3	1	1.3
81-90	2	3.2	0	0.0	2	2.7
Total	63	84.0	12	16.0	75	100

Male: female= 5.2:1.

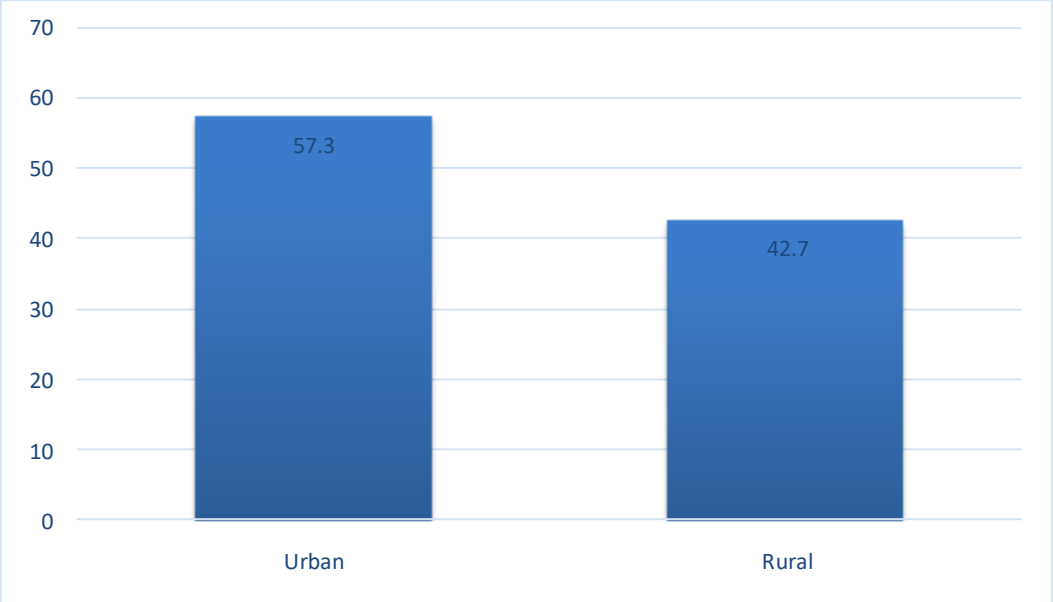

Figure II: Habitat of the cases (n=75)

Table II: Religion wise distribution of the cases (n=75)

Cases	Frequency	Percentage
Muslim	71	94.7
Others	4	5.3
Total	75	100.0

Table III: Month wish distribution of the cases (n=75)

Month	Count of month of accident	
	No	%
August	17	22.6
September	10	13.3
October	7	9.3
November	9	12.0
December	6	8.0
January	2	2.7
February	1	1.3
March	2	2.7
April	5	6.7
May	5	6.7
June	10	13.3
July	1	1.3
Total	75	100.0

Table IV: Places of accident of the cases (n=75)

Places of accident	Frequency	Percentage
Highway	23	30.7
Single lane	16	21.3
Inside city	14	18.7
Under construction building/workplace	10	13.3
House	4	5.3
Railway tract	8	10.7
Total	75	100.0

Table V: Time of incident of the cases (n=75)

Time of incident	Frequency	Percentage
1-5 hours	5	6.7
5-9 hours	14	18.7
9-13 hours	25	33.3
13-17 hours	15	20.0
17-21 hours	10	13.3
21-1 hours	6	8.0
Total	75	100.0

DISCUSSION

Chest trauma are one of the common causes of hospital admissions, disabilities, deaths and socioeconomic losses. Modern civilization has led to its rapidly increasing incidence all over the world. Chest injuries are fatal when it involves solid organ and more than one-third of blood loss occur. It involves major vital organ heart, lungs, due to blunt force injuries circulation and respiration is obstructed. Driving and walking was in haphazard manner, there is no provision of left side walking, Vehicle occupants not driving in their lanes, that's the reason collision of motor vehicle with light motor vehicle and pedestrian vehicle accidents. There should be strictly follow the traffic rules and taking safety measures. There should be heavy amount of fine on vehicle occupants so there is no repetition of mistakes and safety saves life. Out of 75 cases studied, 63 (84.0%) were males and 12 (16.0%) females, commonest age group involved was 41-50 years (18.7%), followed by 21-30 and 31-40 years of age had second highest toll list. Thus all these age group combined, 21-50 age had a 44 (58.7%) cases out of 75 cases. Kochar MP et al in 2013 concluded that most of the patient of under the age group of 11-30 years. This result is different in our study 21-50 years of age.[8] It was observed in our study that 43 (61.3%) cases were from urban area and 32 (42.7%) cases from rural area. Most of the people used their own vehicle in urban areas. The most commonly affected age group with blunt trauma chest belongs to young generation who often indulge in vehicular experimental activity (like over speeding etc) at the same time they comprise the important pillars of economy of country, thus increase in incidences will have great bearing in financial loss to the country. Male: female ratio was found 5.2:1 in our study. Females in the age group of 41-50years comprised 3 (25.0%) cases followed by 31-40 years of age. Dalal et al had a similar finding with male: female ratio of 5.48:1.[9]Most of the victims belonged to muslim religion that was 71 (94.7%) and 4 (5.3%) cases were from others. In Sirajganj district, there is dominance of Muslims over others population, so the Muslims were most community involved in incidence in present study. Highest number of accidents were observed in the month of August 17 (22.6%), 10 (13.3%) in September, 9 (12.0%) in November and least number of accident occurred during the month of February and also in July 1 (1.33%). Highest number of accidents occurred in the duration of august to December month. Gummadi et al found in 2017 maximum number of cases occur in August month same as in our study mentioned, but least during October month but in our study least in February and also in July.[10] Fatalities on highways were dominated by heavy motor vehicles. Highway mainly involved with 23 (30.7%) cases. Light motor vehicles cause brutality maximum in inside cities 14 (18.7%) cases, single lane was involved in 16 (21.3%) cases, people who work in under construction building for earning their livelihood and workplaces, injuries occurred in this place was 10 (13.3%) cases, house was involved in 4 (5.3%) cases. People not taking any precaution while crossing railway track, railway track involved in 8 (10.7%) cases respectively, whereas in study of Dalal et al it was reported in 2.0% and 1.5% respectively.[9] Fatal accident in peak hours that was 9-13hours of 25 (33.3%) cases occur in morning peak hours, afternoon (12-16 hours) and early morning peak hours (5-9 hours) had 15 (20.0%) and 14 (18.7%). On single lane road too evening peak hours (16-20 hours) also had 10 (13.3%) case thus risk of traffic accident was more during morning and evening peak hours in night hours 21-1 hours there was 6 (8.0%)cases. Olaefe et al in 2016in their study maximum accident in intercity road (88.0%) as compared to intra city (21.3%) which is different from our study.[11]

The study was conducted in one hospital with a small sample size. So, the results may not represent the whole community.

CONCLUSION

Chest trauma contribute significant to both morbidity and mortality especially in adult male victims of the road traffic accidents. Thus, early diagnosis and rapid management is of paramount importance in chest injuries. The majority of these cases can be managed conservatively. Present study has been undertaken to analyse the most neglected aspect of human suffering. It is an effort to know the pattern of blunt trauma chest and to elucidate the multi-factorial causations leading to rise in everyday blunt trauma cases.

Acknowledgment

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Conflict of interest: None

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REFERENCES

1. Veysi VT, Nikolaou VS, Paliobeis C, Efstathopoulos N, Giannoudis PV. Prevalence of chest trauma, associated injuries and mortality: A level I trauma centre experience. IntOrthop. 2009; 33:1425–33.
2. Lema MK, Chalya PL, Mabula JB, Mahalu W. Pattern and outcome of chest injuries at Bugando Medical Centre in Northwestern Tanzania. J Cardiothorac Surg. 2011; 6:7.
3. Wilson RF, Murray C, Antonenko DR. Nonpenetrating thoracic injuries. SurgClin North Am. 1977; 69:15-9.
4. LoCicero IJ, Mattox KL. Epidemiology of chest trauma. SurgClin. 1989; 69: 15-19. Doi: 10.1016/S0039-6109(16)44730-4.
5. Pain management in blunt thoracic trauma (BTT):an evidence-based outcome evaluation. 2nd Review. Eastern Association for the Surgery of Trauma, 2003.
6. Bergeron E, Lavoie A, Clas D. Elderly trauma patients with rib fractures are at greater risk of death and pneumonia. I Trauma. 2003; 54: 478-485. Doi:10.1097/01.
7. West JG, Trunkey DD, Lim RC. Systems of trauma care: a study of two counties. Arch Surg. 1979; 114(4): 455-60.
8. Kochar MP, Singh SP. A Prospective randomized trial on trauma thoracic cage with rib fracture specially first rib fracture and associated complications.Int Surg.J. 2016; 3(3): 1278-1282.
9. Dalal S, Nityesha M, Vashisht MDR. Prevalence of chest trauma at an apex institute of North India: a retrospective study. Intern J Surg. 2008; 18(1): 23-30.
10. Rao GV, Raju GD. A medicolegal analysis of blunt chest injury- A forensic Approach. International Journal of Scientific Research. 2019: 8(1).
11. Olaofe OO, Odesanmi WO. Adelusola KA, Komolafe AO, Sabageh D, Odujoko OO. Pattern of chest injuries following RTA-A study from Nigerian Tertiary Health Institution. BJMMR. 2016; 17(5): 1-7.

ORIGINAL ARTICLE

The Effect of Hypertension as A Comorbid Factor on the Length of Stay in Patients Undergoing Cholecystectomy

Debashish Kumer Ghosh,[1] Sandwip Talukdar,[2] Muhammad Abdullahil Kafi,[3]
Fatema Akter Lima,[4] Kafil Uddin,[5] Shafiqul Islam[6]

ABSTRACT

Background: Cholecystectomy remains one of the most common surgical procedures performed. Cholecystectomy has numerous variated Length of stay results relies upon every nation and medical clinic. Hypertension is perhaps the most widely recognized comorbid factors and are thought to impact prolonged length of stay. **Objectives:** To assess the effect of hypertension as a comorbid factor on the length of stay in patients undergoing cholecystectomy. **Methods:** This descriptive analytic study was conducted at Dept. of Medicine& Surgery, Avicenna General Hospital, Sirajganj, Bangladesh from January to June 2022. Seventy three (73) patients included in our study. The sample size in this study was all the medical record data of patients with cholelithiasis that met the inclusion and exclusion criteria. **Results:** Total seventy three (73) patients included in our study. Shows that the cholelithiasis hypertension with length of stay ≤5 days 1(5.0%) and without 18 (46.2%) and with length of stay >5 days 8(20.5%) and without 11(28.2%), Cholelithiasis with cholecystitis hypertension without/other comorbid 8(40%) and Length of stay>5 days 6(30.0%). In our study Cholelithiasis With cholecystitiswith obstruction length of stay≤5 days without 2 (66.6%) and with length of stay>5 days 1 (33.3%), it was found that a significant difference was due to the value of<0.248 (p<0.050). There were 2 procedures were performed in this study, the number of patients who underwent laparoscopic cholecystectomy were 45 (61.6%), and 28 (38.4%) patients underwent open cholecystectomy, it was found that a significant difference was due to the value of <0.0001 (p <0.050). The number of patients who underwent cholecystectomy with hypertension who underwent a length of stay>5 days were 18 people (24.8%). The result from the Coefficient Contingency test shows that there is a correlation between hypertension as a comorbid factor and the length of stay (p<0.0001).**Conclusion:** This research has showed that there is comorbidity such as hypertension affects the length of stay in cholecystectomy.

Keywords: Cholecystectomy, Hypertension, Length of hospital stay.
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INTRODUCTION

Cholecystectomy remains one of the most common surgical procedures performed. Over 700,000 cholecystectomies are performed each year in the United States, and over 90.0% of elective cholecystectomies are performed laparoscopically.[1] One of the gold standard procedures for cholelithiasis is cholecystectomy.[2,3] Cholecystectomy surgery can be assessed from the rate of morbidity, mortality and length of stay as the outcomes. Length of stay is an estimation of the absolute number of days a patient should be hospitalized. The way to decide the length of stay is to deduct the date of release normal length of stay for patients going through cholecystectomy medical procedure is 5 days, the from the hospital (regardless of whether alive or

[1]Assistant Professor, Department of Community Medicine, North Bengal Medical College Sirajganj, Bangladesh;
[2]Assistant Professor, Department of Forensic Medicine, North Bengal Medical College Sirajganj, Bangladesh;
[3]Assistant Professor, Department of Forensic Medicine Shaheed M. Monsur Ali Medical College Sirajganj, Bangladesh;
[4]Assistant Professor, Department of Community Medicine, Central Medical College Comilla , Bangladesh;
[5]Associate Professor & Head, Department of Forensic Medicine, Rajshahi Medical College, Rajshahi, Bangladesh;
[6]Assistant Professor, Department of Community Medicine, North Bengal Medical College, Sirajganj, Bangladesh.

Correspondence: Muhammad Abdullahil kafi
Mobile: +8801717673505
E-mail: drmahkafi@gmail.com

dead) from the date of first hospitalization.[4,5] The length of stay is drawn out on the off chance that it requires over 5 days.[6] Hypertension is some of the most common comorbid factors and are thought to influence prolonged length of stay, 22.0% of the world's population suffers from hypertension.[7] A study conducted by NeraAgabiti in 2013 said that there were 1089 (8.0%) patients with hypertension as a comorbid factor.[8] Srinivas J. Ivatury also reported that there were 92 (39.7%) patients with hypertension as preoperative factor.[9] Despite its clinical significance, however, we still lack knowledge of predisposing factors and co-morbidities that may influence disease development and progression. Commonly known risk factors have been found mostly in epidemiologic studies, the reliability of which has often been questioned because different results were shown in different studies. This study was led to decide if there is an impact of hypertension, on the event of the prolonged length of stay after cholecystectomy medical procedure. Counteraction of delayed length of stay after cholecystectomy will decrease the expense of care.[6,10] Furthermore, we investigated whether chronic diseases, including hypertension, diabetes mellitus, cardiovascular disease, cerebrovascular accident, or end-stage renal disease, are risk factors for developing acute onset cholecystitis.

MATERIALS & METHODS

This descriptive analytic study was conducted at Dept. of Medicine& Surgery, Avicenna General Hospital, Sirajganj, Bangladesh from January to June 2022. Seventy three (73) patients included in our study. The sample size in this retrograde study was all the medical record data of patients with cholelithiasis that met the inclusion and exclusion criteria. All cholelithiasis patients underwent cholecystectomy and were treated in the operating room at Avicenna General Hospital were included after getting permission from hospital authority but patients with fragmented/missing medical records, a history of abdominal trauma, abdominal surgery, and biliary system malignancies were excluded. The sample used in this study was obtained using non-probability sampling with the sampling technique carried out by total sampling where the number of samples was the same as the population.To see the significant difference in the length of days of treatment in cholecystectomy patients with hypertension, the Contingency Coefficient statistical test was used. Furthermore, the test for differences in the length of day of treatment between groups with hypertension and without hypertension was carried out using the Contingency Correlation test. The degree of significance used was a = 0.05.

RESULTS

Results showed that the cholelithiasis hypertensive patients with length of stay≤5 days 1 (5%) and without 18 (46.2%) and with length of stay >5 days 8 (20.5%) and without 11 (28.2%), cholelithiasis with cholecystitis hypertensive patients without/other comorbid 8 (40.0%) and length of stay>5 days 6 (30.0%). In our study cholelithiasis with cholecystitis with obstruction hypertensive patients length of stay≤5 days without 2 (66.6%) and with length of stay>5 days 1 (33.3%), it was found that a significant difference was due to the value of <0.248 (p <0.050) (Table I).It was seen that there were 2 procedures were performed in this study, the number of patients who underwent laparoscopic cholecystectomy were 45 (61.6%), and 28 (38.4%) patients underwent open cholecystectomy. It was found that a significant difference was due to the value of <0.0001 (p <0.050) (Table II). It was also seen that the number of patients who underwent cholecystectomy with hypertension who underwent a length of stay>5 days were 18 people (24.8%), and 4 people who underwent≤5 days length of stay (4.1%). The number of patients who underwent cholecystectomy without hypertension who underwent treatment days>5 days was 25 (34.2%), and 27 people (36.9%) had≤5 days of treatment. From the statistical analysis of the Contingency Coefficient Correlation, it was found that a significant difference was due to the value of <0.0001 (p <0.050) (Table III). Results of this study showed that the number of geriatric patients who underwent a length of stay>5 days were 6 (8.1%), and 4 (5.5%) patients who underwent≤5 days length of stay, without a significant difference due to the value of p>0.050 (0.914) (Table IV).

Table I: Distribution of diagnose, Como rid Hyruitanin and Length of hospital stay (n=73)

Diagnose	Hypertension	Length of stay ≤5 days	Length of stay > 5 days	p value
Cholelithiasis	With	2 5.1%	8 20.5%	0.002
	Without/Other Comorbidity	18 46.2%	11 28.2%	
Cholelithiasis With cholangitis	With	0 0.0%	1 16.6%	0.546
	Without/Other Comorbid	1 16.6%	4 66.7%	
Cholelithiasis With cholecystitis	With	1 5.0%	5 25.0%	0.030
	Without/Other Comorbid	8 40.0%	6 30.0%	
Cholelithiasis With cholecystitis with cholangitis	With	0 0.0%	1 100.0%	
	Without/Other Comorbid	0 0.0%	0 0.0%	
Cholelithiasis With cholecystitis with obstruction	With	0 0.0%	3 75.0%	
	Without/Other Comorbid	0 0.0%	1 25%	
Cholelithiasis With obstruction	With	0 0.0%	1 33.3%	0.248
	Without/Other Comorbid	2 66.6%	0 0.0	

Table II: Distribution of procedures and length of stay (n=73)

Procedures	Length of stay≤5 days	Length of stay>5 days	p value
Laparoscopic cholecystectomy	26 35.6%	19 26.0%	<0.0001
Open cholecystectomy	4 5.5%	24 32.9%	

Table III: Distribution of Hypertension and length of stay (n=73)

Comorbid Factor	Length of stay>5 days	Length of stay≤5 days	p value
Hypertension	18 24.8%	3 4.1%	<0.0001
Non-Hypertension	25 34.2%	27 36.9%	

Table IV: Distribution of geriatric status and length of stay (n=73)

Status	Length of stay≤5 days	Length of stay>5 days	p value
Non-Geriatric	26 35.7%	37 50.7%	0.914
Geriatric (>65 years old)	4 5.5%	6 8.1%	

DISCUSSION

This study is a descriptive analytical study using secondary data from the medical records of patients from Department of Medicine and Surgery at Avicenna General Hospital, Sirajganj.In our study shows that the cholelithiasis hypertension with length of stay≤5 days 1 (5%) and without 18 (46.2%) and with length of stay>5 days 8 (20.5%) and without 11 (28.2%), cholelithiasis with cholecystitis hypertension without/other comorbid 8 (40%) and length of stay>5 days 6 (30.0%). In our study cholelithiasis with cholecystitiswith obstruction length of stay≤5 days without 2 (66.6%) and with length of stay>5 days 1 (33.3%), it was found that a significant difference was due to the value of <0.248 (p <0.050).According to Abdulkadir's study in 2001, it was reported that the operative complication ratio was 9 cases (4.9%) and postoperative complications amounted to 12 cases (6.5%) higher in patients withwith p values of 0.026 and 0.0061 respectively.[3] In this study, there were 18 (24.8%) cases with comorbid hypertension who experienced a prolonged length of stay (length of stay). The results showed that hypertension comorbid factors affected the length of hospitalization days. Other studies that are in line with the results of this study, among others, a study conducted by Shih-Ping Cheng in 2007 said that hypertension is one of the comorbid factors that cause an extension of the length of hospitalization days more than 5 days, whereas many as 28 (60.9%) patients hypertension experienced an extended length of stay (p<0.001).[6] Possibly according to Kiefer, the Renin-Angiotensin-Aldosterone System (RAAS) plays an important role in controlling blood pressure.[11,12] This system is responsible for the pathophysiology of hypertension and target organ damage.[13] Target organ damage includes vascular remodeling, resulting in inhibition of angiogenesis in wound healing through activation of AT2 receptors, which will prolong wound healing time so that the length of hospitalization day will be prolonged.[11] It was seen in our study that there were 2 procedures were performed in this study, the number of patients who underwent laparoscopic cholecystectomy were 45 (61.6%), and 28 (38.4%) patients underwent open cholecystectomy, it was found that a significant difference was due to the value of <0.0001 (p <0.050). According to Varon and Manik during surgical procedures, patients with or without previous hypertension tend to experience increased blood pressure and tachycardia during induction of anesthesia. So that when going to carry out surgery, the increase in excessive blood pressure must be controlled to normal limits, because it is necessary to treat hypertensive patients first before going to a surgical procedure, so hypertension can affect the length of hospitalization days.[14] In our study it was found that the number of patients who underwent cholecystectomy with hypertension who underwent a length of stay>5 days were 18 people (24.8%), and 4 people who underwent≤5 days length of stay (4.1%).The number of patients who underwent cholecystectomy without hypertension who underwent treatment days>5 days was 25 (34.2%), and 27 people (36.9%) had≤5 days of treatment. From the statistical analysis of the contingency coefficient correlation, it was found that a significant difference was due to the value of <0.0001 (p <0.050). The type of surgical procedure also affects the length of treatment days, according to Steven L. Zacks, patients whounderwent open cholecystectomy were hospitalized longer than patients who underwent laparoscopic cholecystectomy.[15] Hospitalization for more than five days was 24 (32.9%) and only 4 (5.5%) patients underwent hospitalization for less than 5 days. Meanwhile, 26 (35.6%) patients who underwent laparoscopic cholecystectomy were hospitalized within 5 days more than patients who required hospitalization for more than 5 days. Our study also found that the number of geriatric patients who underwent a length of stay>5 days were 6 (8.1%), and 4 (5.5%) patients who underwent≤5 days length of stay, without a significant difference due to the value of p>0.050 (0.914). In addition to hypertension, age also plays a role in lengthening the length of stay, according to a study conducted by Sivesh K. Kamarajah, increasing age increases the risk of complications, conversions, postoperative mortality, and lengthening the length of stay.[16] But in this study, there was no difference because the sample size of geriatric cases undergoing cholecystectomy was too small, the number of cases was 10 (13.6%).

This study tracked down various shortcomings and limits, including the low number of samples used in this study, the sample used was 73 cases out of 101 cases of cholelithiasis that qualified inclusion and exclusion criteria of this study, this number is exceptionally little when contrasted

with research and existing journal. Notwithstanding the low example size, this study didn't order patients dependent on the kind of cholecystectomy performed, which may prompt a bias of the outcomes in patients undergoing open cholecystectomy and laparoscopic cholecystectomy.

CONCLUSION

This study showed that hypertension affects the prolonged length of stay in patients undergoing cholecystectomy. Counteraction of delayed length of stay after cholecystectomy will decrease the expense of care. Continued study needs to be performed to further evaluate the effects found in this analysis.

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REFERENCES

1. Vollmer CM, Callery MP. Biliary injury following laparoscopic cholecystectomy: why still a problem? Gastroenterology. 2007; 133: 1039–1041.
2. Lundgren L, Henriksson M, Andersson B, Sandström P. Cost-effectiveness of gallbladder histopathology after cholecystectomy for benign disease. BJS. 2020; 1125-1136.
3. Ryan JM, O'Connell E, Rogers AC, Sorensen J, McNamara DA. Systematic review and meta-analysis of factors which reduce the length of stay associated with elective laparoscopic cholecystectomy. Hpb. 2021; 161-172.
4. Tedja VR Individual, socio demographic, and administrative factors in relation to the length of stay of inpatients in Pantai Indah Kapuk Hospital 2011. J. GiziKlin. 2012; 18.
5. Rahmayati E, Asbana Z, Aprina A. Faktor-Faktor yang Berhubungandengan Lama PerawatanPasienPascaOperasi di RuangRawatInapBedahRumahSakit. J. Ilm. KeperawatanSaiBetik. 2018; 13: 195.
6. Cheng SP, Chang YC, Liu CL, Yang TL, Jeng KS, Lee JJ et al. Factors associated with prolonged stay after laparoscopic cholecystectomy in elderly patients. Surgical endoscopy. 2008; 22(5): 1283–1289. Doi.org/10.1007/s00464-007-9610-4.
7. World Health Organization. Prevalensidan Karakteristik Hipertensi Pada Usia Dewasa Muda di Indonesia. Tarumanagara Med. J. 2013; 1: 395-402.
8. Agabiti N, Stafoggia M, Davoli M, Fusco D, Barone AP, Perucci CA. Thirty-day complications after laparoscopic or open cholecystectomy: a population-based cohort study in Italy. BMJ open. 2013; 3(2): e001943. Doi.org/10.1136/bmjopen-2012-001943.
9. Ivatury SJ, Louden CL, Schwesinger WH. Contributing factors to postoperative length of stay in laparoscopic cholecystectomy. J. Soc. Laparoendosc. Surg. 2011; 15: 174-178.
10. Kapoor T, Wrenn SM, Callas PW, Abu-Jaish W. Cost Analysis and Supply Utilization of Laparoscopic Cholecystectomy. Minim. Invasive Surg. 2018.
11. Kiefer FN, Neysari S, Humar R, Li W, Munk VC, Battegay EJ. Hypertension and angiogenesis. Current pharmaceutical design. 2003; 9(21): 1733–1744. Doi.org/10.2174/1381612033454540.
12. Patney V, Chaudhary K, Whaley-Connell A. Treatment of Diabetic Kidney Disease With Hypertension Control and Renin Angiotensin System Inhibition. Adv. Chronic Kidney Dis. 2018; 25: 158-165.
13. Nerenberg KA, Zarnke KB, Leung AA, Dasgupta K, Butalia S, McBrien K et al. Hypertension Canada's 2018 Guidelines for Diagnosis, Risk Assessment, Prevention, and Treatment of Hypertension in Adults and Children. The Canadian journal of cardiology. 2018; 34(5): 506–525. Doi.org/10.1016/j.cjca.2018.02.022.
14. Varon J, Marik PE. Perioperative hypertension management. Vasc. Health Risk Manag. 2008; 4: 615-627.
15. Zacks SL, Sandler RS, Rutledge R, Brown RS. A population-based cohort study comparing laparoscopic cholecystectomy and open cholecystectomy. Am. J. Gastroenterol. 2002; 97: 334-340.
16. Kamarajah SK, Karri S, Bundred JR, Evans R, Lin A, Kew T et al. Perioperative outcomes after laparoscopic cholecystectomy in elderly patients: a systematic review and meta-analysis. Surgical endoscopy. 2020; 34(11): 4727–4740. Doi.org/10.1007/s00464-020-07805-z.

ORIGINAL ARTICLE

Proportion of Surgical Site Infection and Associated Factors among the Admitted Patients in Tertiary Care Hospital in Bangladesh

Muhammad Abdullahil Kafi,[1] Afroza Sultana,[2] Sandwip Talukdar,[3]
Shahana Begum,[4] A.K.M. Fazlul Haque[5] Syed Quamrul Huda[6]

ABSTRACT

Introduction: Surgical site infection (SSI) is a common cause of morbidity and mortality among operated patients. Increase in hospital stay and enhanced cost of health care. **Objectives:** The aim of this study was to determine the proportion and associated factors of the patients. **Methods:** This was a cross sectional type of descriptive study. Two hundred patients who underwent surgical procedures in the surgical wards were recruited. Demographic information was obtained using standardized questionnaire, surgical site were examined to determine infection, and case notes were reviewed for clinical information including notes. **Results:** Off 200 hundred patients, SSI occurred in 30 patients (15.0%). Most common age is 71-80 years for SSI and 2nd in 61-70 years. Mean age of the patients was 40.10±21.23(SD) years Significant risk factors associated with infection were anemia, obesity, prolonged pre-operative hospital stay, longer duration of surgery, prolong duration of hospital stay. The most common pathogens isolated were staphylococcus (40.0%) followed by Pseudomonas (26.6%), E-coli (20.0%) and Klebsiela (13.4%) **Conclusions:** Surgical site infection has remained a major nosocomial infection in our countries. Factors shown to be associated with increased risk are wound class, nature of surgery, malnutrition and diabetes mellitus (DM).

Keywords: Surgical site infection (SSI), Associated factors of SSI, Microbial etiology
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INTRODUCTION

Surgical site infection (SSI) is very common, being the second most common cause of adverse events in hospital worldwide. Surgical Site Infection is defined as infectionoccurring within 30 days after a surgical procedure andaffecting either the incision or deep tissues at theoperation site. These infections may be superficial ordeep or involving an organ space.[1]There has beenadvance in SSI control practices which include improvedoperating room ventilation, sterilization methods, use ofbarriers, surgical technique and availability ofantimicrobial prophylaxis. Despite, these SSIs remaincommon causes of morbidity and mortality amonghospitalized patients.[2] Studies have shown that wound infection was significantly increasing with level of wound class, emergency interventions, pre-operative hospital stay, and use of drains 2,3,4 pain; discomfort; delayed wound healing; prolonged or permanent disability; and,

[1]*Assistant Professor, Department of Forensic Medicine, Shaheed M. Monsur Ali Medical College, Sirajganj;*
[2]*Honarary Medical Officer, Shaheed M. Monsur Ali Medical College Hospital, Sirajganj, Bangladesh;*
[3]*Assistant Professor, Department of Forensic Medicine, North Bengal Medical College, Sirajganj, Bangladesh;*
[4]*Assistant Professor, Department of gynae & Obs, Shaheed M. Monsur Ali Medical College, Sirajganj, Bangladesh;*
[5]*Assistant Professor, Department of Pediatrics, Maternal and Child Health Training Institute (200 Beded Maternal and Child Health Hospital), Lalkuthi, Mirpur, Dhaka, Bangladesh.*
[6]*Professor, Department of Dentistry, Shaheed M. Monsur Ali Medical College, Sirajganj, Bangladesh;*

Correspondence: Muhammad Abdullahil kafi
Mobile: +8801717673505
E-mail: drmahkafi@gmail.com

in worst cases, death . In spite of all efforts put in place to prevent the occurrence of SSI, certain levels have been considered as acceptable by the level of primary wound contamination.[3] The prevalence varies from hospital to hospital and across different countries.[4-6] When surgical patients with nosocomial SSI died, 77% of the deaths were reported as related to the infection and the majority (93%) were serious infections involving organs or spaces accessed during the operation.[7] They are also dependent on the health care facility, procedures performed, and care level.[8] In low- and middle-income countries (LMIC), SSI incidence may be approximately up to 4 times higher than in high-income countries.1 SSI involve a complex relationship among several factors: microbial, patient, surgical, and environmental.[4]

Total quality management in hospitals is gaining emphasis these days. Control of postoperative complications is an essential component of total quality management. In this context it becomes important to determine the prevalence of surgical site infections, assess the magnitude of the problem and provide a rationale to set priorities in infection control in the hospitals. Not many studies are done in India in this direction. Hence the present study had been undertaken.

MATERIALS & METHODS

This was a cross sectional type of descriptive study conducted in the department of Surgery, Shaheed M. Monsur Ali Medical College & Hospital, Sirajganj, from September 2020 to September 2021. All the patients clinically diagnosed by as surgical cases. Patients aged from 0-80 years, who came to in and out patients department of surgery and indoor facilities were included of Shaheed M. Monsur Ali Medical College & Hospital. Total 200 patients were included as a study population. The sampling technique was purposive. All the study patients were recorded after fulfilling the inclusion criteria. The aim and objectives of the study along with its procedure, risk and benefits of the study were explained to the respondents in easily understandable language and then informed consent was taken from each of them. The target population for the present study was all patients undergoing surgery either as elective or emergency surgical procedures and developed wound infection within the stipulated duration of this study. All patients were evaluated and followed up from the time of admission until the time of discharge and 30 days postoperatively to determine the incidence of SSI. The structured and pretested questionnaires were used to collect data. Detailed history regarding each case was recorded, such as age, sex, co morbid conditions, antibiotic therapy and postoperative hospital stay. The operations were classified as clean, clean contaminated, contaminated and dirty. Other data including associated risks factors (i.e diabetes, obesity, malnutrition, COPD, medical jaundice, hypertension and drugs etc) use of prophylactic antimicrobial agents, the type and duration of surgery. Post surgical wound swabs or pus aspirates were collected from the clinical infected surgical sites following laboratory standard procedure for specimen collection. Bivariate analysis for association between potential risk factors and their potential association with SSI was performed using ehi square (x2) and Fishers exact test. Data were analyzed using statistical package for the social science (SPSS) software word version 20.0. P- value< 0.05 was considered statistically significant.

RESULTS

Of 1065 admitted patients, 41% underwent surgery. Three patients did not undergo surgery. The final cohort therefore included 200 patients: 160 (80.0%) male and 40 (20.0%) female. Total number of infected cases were 30,male 20 and female 10, percentage of infection in male 12.5% and female in 25 % (Table I). Among the total number of cases (200), infected cases were 30 (15.0%). Most common age is 71-80 years for SSI and 2nd in 61-70 years. Mean age of the patients was 40.10±21.23(SD) years (Table II). Results showed that, among the patients most related co morbid condition is Diabetes Mellitus (27.5%), then malnourished patients were found 20.0% (Table III). Off the total number of cases, clean surgical wound recorded none (0.0%) among 76 cases. There were 12 (9.1%) clean–contaminated wounds and 15 (25.0%) contaminated wounds among 66 and 24 cases relatively. SSI rate was highest in dirty wounds18 (52.94%) among 34 cases (Table IV).Table 5. Most of the cases are elective surgery then emergency surgery. Total number of elective surgery 152, infected 8, percentage 5.3%.total number of emergency surgery 48, infected 22, percentage 45.8% (Table V). The most common pathogens isolated were staphylococcus (40.0%) followed by Pseudomonas (26.6%), E-coli (20.0%) and Klebsiela (13.4%) (Table VI).

Table I: Proportion in relation to sex (n=200)

Sex	Number of cases	Infected	Percentage
Male	160	20	12.5%
Female	40	10	25.0%

Table II: Infection in relation to age group (n=200)

Age in years	Number of cases	Infected	Percentage
0-10	22	2	9.1%
11-20	4	0	0.0%
21-30	28	2	7.1%
31-40	34	10	29.4%
41-40	50	0	0.0%
51-60	44	8	18.1%
61-70	14	6	42.8%
71-80	4	2	50.0%
Total	200	30	15.0%

Mean age: 40.10±21.23(±SD)

Table III: Relation to risk factors of SSI (n=200)

Associated factors	Number of cases	Infected	Percentage
Normal nutrition	75	6	8.0%
Malnutrition	20	4	20.0%
Obesity	20	3	15.0%
COPD	15	2	13.3%
DM	40	11	27.5%
Medical jaundice	15	2	13.3%
Drugs	9	1	11.1%
Hypertension	6	1	16.7%
Total	200	30	15.0%

Table IV: Incidence in relation to type of SSI (n=200)

Type	Number of cases	Incidence	Percentage
Clean wound	76	0	0.0%
Clean contaminated wound	66	12	9.1%
Contaminated wound	24	15	25.0%
Dirty wound	34	18	52.9
Total	200	30	100.0%

Table V: Infection in relation to type of operation (n=200)

Type	Number of cases	Infected	Percentage
Elective	152	8	5.3%
Emergency	48	22	45.8%
Total	200	30	15.0%

Table VI: Incidence/Proportion of organism isolated (n=30)

Organism	Number of cases	Percentage
E- coli	6	20.0%
Staphylococci	12	40.0%
Pseudomonas	8	26.6%
Klebsiella	4	13.4%
Total	30	100.0%

DISCUSSION

Post-operative wound infection still remains one of the most important causes of morbidity and is the most common nosocomial infection in surgically treated patients.[2,12] The present study was carried out among 152 elective surgery cases & 48 emergency surgical cases in the government tertiary care teaching hospital at Shaheed M. Monsur Ali Medical College Hospital, Sirajganj, Bangladesh. The majority of surgeries (96.0%) was elective. Off the total number of cases, clean surgical wound recorded none (0.0%) among 76 cases. There were 12 (9.1%) clean–contaminated wounds and 15 (25.0%) contaminated wounds among 66 and 24 cases relatively. SSI rate was highest in dirty wounds 18 (52.9%) among 34 cases. The rate of SSI varies greatly worldwide and from hospital to hospital. The rate of SSI varies from 2.5% to 41.9% as per different studies.[4-7,9] The incidence of SSI in the present study is 15.0% even though high, is in agreement with the various studies. The rate of SSI increases with the increase in age. In the current study a higher proportion of SSI was found among the subjects older than 50 years. This is comparable to other studies.[6,12-15] This is due to poor immune response, existing co morbidities in old patients and reduced compliance with treatment.[6]In the present study a significant proportion of males developed SSI compared to females. In another study in Pune, there was a marginal preponderance of male patients developing SSI (7.4%) over female patients with SSI (5.1%).[16] In Aligarh, females (27.0%) showed preponderance of SSI than males (18.0%).[17] However according to Berard F and Gandon J sex is not a pre determinant of the risk of SSI.[18]

Co morbid conditions like, diabetes, malnutrition, anemia, obesity and hypertension were the significant risk factors for SSI. Comparable results were found in various studies involving different surgical procedures.[14,19] Pre-operative antibiotics are known to decrease incidence of SSI cases. Prophylactic antibiotic usage was not a routine in the studied hospital. Only selected patients who had some infection or other risk factor received antibiotic prophylaxis. When it was not used a large proportion (24.0%) developed SSI compared to the situations where such prophylaxis was given. Staphylococcus aureus was the predominant organism isolated from the surgical sites followed by Pseudomonas and E.coli in the present study. Klebsiella, were the other organisms isolated from SSIs. Lilani et al., and Mahesh et al., also found pre-ponderance of Staphylococcus aureus and Pseudomonas in SSIs in their studies.[4,20] Many studies have reported Staphylococcus aureus as the commonest isolate from the postoperative wound infection.[9,21,22] Other organisms have shown varied preponderance in different studies. Staphylococcus aureus forms the bulk of the normal flora of skin and nails.[23] Hence; it is the commonest organism found in most of the SSIs. The high incidence of gram-negative organisms in the postoperative wound infections can be attributed to be acquired from patient's normal endogenous micro flora.[22]

The current study had some limitations such as incidence of SSIs was measured using Morris criteria in this study and the same was compared with studies using different criteria for diagnosing SSIs. Since the study duration was 6 months, generalization couldn'tbe done in this study. Culture was done for only few bacteria because of operational feasibility which was its another limitations.

CONCLUSION

The incidence of SSI was high which was found in current study. Gender, Diabetes mellitus and malnutrition were significant predictors for SSIs. Staphylococcus aureus was the most common organism associated with SSI. So, to prevent SSIs Surveillance mechanisms and institutional antibiotic policy should be developed. Quality control exercises should become a routine and Medical auditing should be done periodically.

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REFERENCES

1. Suljagi ć V, Jevtic M, Djordjevic B, Jovelic A. Surgical site infections in a tertiary health care center: Prospective cohort study. Surg Today. 2010; 40: 763-71.
2. Xue DQ, Qian C, Yang L, Wang XF. Risk factors for surgical site infections after breast surgery: A systematic review and meta-analysis. Eur J Surg Oncol. 2012; 38: 375-81.

3. Ashby E, Davies MJ, Wilson AP, Haddad FS. Age, ASA and BMI as risk factors for surgical site infection measured using ASEPSIS in trauma and orthopaedic surgery. J Bone Joint Surg Br. 2012; 94 (SUPP 4): 58.
4. World Health Organization. Report on the burden of endemic health care associated infection worldwide: clean care is safer care. Geneva [Switzerland]: WHO Document Production Services; 2011.
5. Pathak A, Mahadik K, Dhaneria SP, Sharma A, Eriksson B, Lundborg CS. Sur- veillance of antibiotic consumption using the "focus of infection" approach in 2 hospitals in Ujjain, India. PLoS One. 2012; 7: e38641.
6. Clinical and Laboratory Standards Institute. Performance standards for antimicrobial susceptibility testing: twenty-first informational supplement. Wayne [PA]: Clinical and Laboratory Standards Institute, 2011.
7. Varsha S, Saikat B, Upendra L. Surgical site infections: A one year prospective study in a tertiary care center. Int J Health Sci (Qassim). 2012; 6: 79-84.
8. Malik S, Gupta A, Singh KP, Agarwal J, Singh M. Antibiogram of Aerobic Bacterial Isolates from Post-operative Wound Infections at a Tertiary Care Hospital in India. J Infect Dis Antimicrob Agents. 2011; 28: 45-52.
9. Mathur P. Hand hygiene: back to the basics of infection control. Indian J Med Res. 2011; 134: 611-20.
10. Hafez S, Saied T, Hasan E,Elnawasany M, Ahmad E, Lloyd L et al. Incidence and modifiable risk factors of surveillance of surgical site infections in Egypt: a prospective study. Am J Infect Control.2011; 40: 426-30.
11. Gibbons C, Bruce J, Carpenter J, Wilson AP, Wilson J, Pearson A et al. Identification of risk factors by systematic review and development of risk-adjusted models for surgical site infection. Health Technol Assess. 2011; 15: 1-156.
12. Salkind AR, Rao KC. Antibiotic prophylaxis to prevent surgical site infections. Am Fam Physician. 2011; 83: 585-90.
13. Isibor JO, Oseni A, Eyaufe A, Ahmadu T. Incidence of aerobic bacteria and Candida albicans in postoperative wound infections. Afr J Microbiol Res. 2008; 2: 288-91.
14. World Health Organization. Report on the burden of endemic health care associated infection worldwide: clean care is safer care. Geneva [Switzerland]: WHO Document Production Services, 2011.
15. Subbalaxmi M, Lakshmi V, Lavanya V. Antibiotic resistance: experience in a tertiary care hospital in south India. J Assoc Physicians India. 2010; 58(Suppl): 18-22.
16. Pathak A, Mahadik K, Dhaneria SP, Sharma A, Eriksson B, Lundborg CS. Sur- veillance of antibiotic consumption using the "focus of infection" approach in 2 hospitals in Ujjain, India. PLoS One. 2012; 7: e38641.
17. Horan TC, Andrus M, Dudeck MA. CDC/NHSN surveillance definition of health care-associated infection and criteria for specific types of infections in the acute care setting.Am J Infect Control. 2008; 36: 309-32.
18. Clinical and Laboratory Standards Institute. Performance standards for antimicrobial susceptibility testing: twenty-first informa-tional supplement. Wayne [PA]: Clinical and Laboratory Standards Institute, 2011.
19. Mathur P. Hand hygiene: back to the basics of infection control. Indian J Med Res. 2011; 134: 611-20.
20. Sahu SK, Shergill JS, Sachan PK, Gupta P. Superficial incisional surgical site infection in elective abdominal surgeries: a prospective study. Internet J Surg. 2011; 26. DOI: 10.5580/14a8.
21. Gibbons C, Bruce J, Carpenter J, Wilson AP, Wilson J, Pearson A et al. Identification of risk factors by systematic review and development of risk-adjusted models for surgical site infection. Health Technol Assess. 2011; 15: 1-156.
22. Aiken AM, Karuri DM, Wanyoro AK, Macleod J. Interventional studies for preventing surgical site infections in sub-Saharan Africa: a systematic review. Int J Surg. 2012; 10: 242-9.
23. Leong G, Wilson J, Charlett A. Duration of operation as a risk factor for sur- gicalsite infection: comparison of English and US data. J Hosp Infect. 2006; 63: 255-62.

ORIGINAL ARTICLE

Performance of Serum PSA and PSAD in the Diagnosis of Prostatic Lesions

Md. Sadrul Alam Hafiz,[1] Abdul Khaleque Akond,[2] Tarzeen Khadiza Shuchi,[3] Sharmeen Jahan,[4] Md. Habibur Rhaman,[5] A.K.M Fazlul Haque[6]

ABSTRACT

Introduction: Nodular hyperplasia and prostate carcinoma are two major diseases of the prostate. The aggregated morbidity and mortality that can be attributed to prostate cancer are certainly sufficient to justify a search for effective and efficient strategies for early detection, i.e preoperative detection of nodular hyperplasia and prostatic carcinoma. **Objectives:** The aim of the study was to observe the PSA and PSAD in determining benign or malignant prostatic lesions. **Methods:** This cross-sectional observational study was conducted at the department of Pathology, Sir Salimullah Medical College, Dhaka, Bangladesh, during the period of January 2007 to December 2008. A total of 100 patients from those with prostatic lesions admitted to various hospitals in Dhaka city with prostate enlargement were selected through the purposive sampling method for the study. **Results:** The mean age was 68.5±7.5(±SD) years in the benign prostate lesion group, 77.9±7.0 years in patients with malignancy, and 67.5±3.5 years in patients with prostatic intraepithelial neoplasia. The mean prostate volume was 43.8±7.3 cm^3 ranging from 28.0-70.0 cm^3 in patients with benign lesions whereas, the mean prostate volume was 28.8±2.8 cm^3 ranging from 24.0-33.0 cm^3 in patients with malignant lesions. The commonly used cut-off limit of 4 ng/ml for PSA showed 57.95% and 100.0% sensitivity and specificity respectively and the cut-off limit of 0.15 for PSAD showed 59.0% and 100.0% sensitivity and specificity respectively in the present study. **Conclusion:** The study revealed significant differences in prostate-specific antigen and prostate-specific antigen density among prostatic carcinoma, nodular hyperplasia, and patients with asymptomatic prostatitis which can be helpful in the early detection of prostate cancer and decrease the number of unnecessary biopsies.

Keywords: Prostatic lesions, Prostate specific antigen (PSA), Prostate specific antigen density (PSAD)
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INTRODUCTION

The incidence of prostate cancer is highest among the male population of the United States, where it is the second leading cause of cancer-related mortality.[1] In 2003, roughly 220900 new cases were discovered, with approximately 29000 of them likely to be fatal.[2] In contrast, the proportion of patients with prostatic cancer in Asian nations is substantially lower than in Western countries. However, the prevalence is rapidly growing in several Asian nations, including Japan. Most prostate cancers have osseous metastases at the time of diagnosis, and the tumor is thus incurable. As a result, research has concentrated on developing tools for the early diagnosis of prostatic cancer.[1] PSA, or Prostate-specific Antigen, is a prostatic epithelial product that is ordinarily released in the semen. It is a serine protease that cleaves and liquefies the only

[1]Associate Professor, Department of Pathology, Shaheed M. Monsur Ali Medical College, Sirajganj, Bangladesh;
[2]Former Professor & head, Department of Pathology, Sir Salimullah Medical College, Dhaka, Bangladesh;
[3]Assistant Professor, Department of Ophthalmology, National Institute of Ophthalmology & Hospital, Dhaka, Bangladesh;
[4] Lecturer, Department of Pathology, Shaheed M. Monsur Ali Medical College, Sirajganj, Bangladesh;
[5]Associate Professor, Department of Biochemistry, Shaheed M. Monsur Ali Medical College Sirajganj, Bangladesh;
[6]Assistant Professor, Department of Pediatrics, Maternal and Child Health Training Institute (200 Beded Maternal and Child Health Hospital), Lalkuthi, Mirpur, Dhaka, Bangladesh.

Correspondence: Dr. Md. Sadrul Alam Hafiz
Mobile: +8801766092701
E-mail: sadrulalam72@gmail.com

trace quantities of PSA circulate in the serum of healthy males. The majority of laboratories use 4 ng/ml as the cut-off value between normal and abnormal. It has been shown that high PSA blood levels occur in conjunction with both localized and advanced cancer.[2]It is also raised in nodular hyperplasia, prostatitis, infarct, ejaculation, and prostate instrumentation. Age has a significant role in the rise of PSA levels. As a result, age-adjusted PSA values are evaluated to assess if diagnostic tests are required. When age-adjusted PSA values are utilized, each 10-year age group has a distinct PSA level classified as normal. In several cases, prostate-specific antigen has been employed in the diagnosis and therapy of prostate cancer.[3] A PSA level of more than 10 ng/ml increases the likelihood of extra-prostatic prostate cancer.[4] Information about the extent of prostate cancer helps in patient management. Despite the fact that various studies have shown that PSA is a good predictor of prostatic cancer, it remains a challenging problem to differentiate between carcinoma of the prostate and nodular hyperplasia in patients with intermediate blood PSA levels (4 ng/ml to 10 ng/ml). The gray zone is defined as serum PSA levels ranging from 4 to 10 ng/ml.[5] Benson et al. proposed a new approach employing PSA density (PSAD) by dividing serum PSA value with the prostate volume. It may offer improved discrimination for the detection of patients with carcinoma of prostate.[6] Serum PSA density reflects the PSA generated per gram of prostate tissue. PSA and PSA density can both be used as prostate cancer screening tests, increasing the rate of detection. However, in order to accurately evaluate the effects of PSA density, the main value of PSA and its cut-off value in identifying prostate cancer or malignant lesions are critical. Because PSA levels might vary depending on patient age and demographic characteristics, the current study was designed to look at PSA levels along with the PSAD values, and their relationship to both benign and malignant tumors.

MATERIALS & METHODS

This cross-sectional observational study was conducted at the Department of Pathology, Sir Salimullah Medical College, Dhaka, Bangladesh. The study duration was two years, from January 2007 to December 2008. A total of 100 patients admitted to various hospitals in Dhaka city with prostate enlargement were selected through the purposive sampling method. Patients with an enlarged prostate due to prostatic lesions were included but patients with an enlarged prostate and raised PSA due to other causes than prostatic lesion were excluded. Ethical clearance for the study was taken from the ethical committee, and permission for the study was taken from the concerned departments. Informed written consent was obtained from each participant after ensuring anonymity. Subjects were assured of their ability to withdraw from the study at any given time. All the necessary information and clinical data including ultrasonography reports were systematically recorded in a predesigned data sheet. After clinical diagnosis as benign prostatic hyperplasia or prostatic carcinoma, the patients underwent open transabdominal prostatectomy (e.gretropubic, transvesical), transurethral resection of the prostate, or transrectal biopsy. Ten percent (10%) formalin preserved specimens were collected after operation or biopsy. In cases of specimens of open prostatectomy, length, breadth, and weight, colour, consistency, and surface nodularity of the prostate were noted during the macroscopic examination.Prostate volume was messured by ultrasonography. All data were recorded in tabulated form and subsequent analysis was done by standard statistical methods using SPSS version 16.

RESULTS

The study results showed that among the total 100 participants, 86 had benign lesions, 12 had malignant lesions, while 2 had pre-malignant lesions or prostatic intraepithelial neoplasia (PIN) (Figure I). In this study the age ranged was from 50 to 90 years. The maximum number of benign lesions were found in the age group of 61-70 years, malignant lesions in the age group of 71-80 years, and all prostatic intraepithelial neoplasia in the age group of 61–70 years. The mean age was 68.5±7.5(±SD) years in the benign prostate lesions, 77.9±7.0 years in patients with malignancy, and 67.5±3.5 years in patients with

prostatic intraepithelial neoplasia (Table I).The mean PSA was found 5.77±2.63 ng/ml ranging from 1.00-11.45 ng/ml in patients with benign lesions whereas, in patients with malignant lesions the mean PSA was 23.69±12.24 ng/ml ranging from 4.9-55.0 ng/ml. In the case of prostatic intraepithelial neoplasia, the mean PSA was 5.75±1.34 ng/ml ranging from 4.8-6.7 ng/ml. the PSA was correlated with histopathological findings (Table II). Prostate volume was measured by per-abdominal ultrasonography. The mean prostate volume was 43.81±7.32 cm^3 ranging from 28-70 cm^3 in patients with benign lesions, whereas the mean prostate volume was 28.79±2.79 cm^3 ranging from 24-33 cm^3 in patients with malignant lesions. Patients with prostatic intraepithelial neoplasia showed a mean prostate volume of 36.87±3.33 cm^3 ranging from 36-41 cm^3. The value of prostate volume was correlate with histopathological diagnosis of benign or malignant and found significant (Table III). The mean PSA density was 0.14±0.07, ranging from 0.02-0.33 in the benign group, whereas in the malignant group, the mean PSA density was 0.83±0.49, ranging from 0.19-2.20 and in prostatic intraepithelial neoplasia group, the mean PSA density was 0.15±0.02 ranged from 0.14-0.17. The mean value of PSAD was correlated with histopathological diagnosis and found significant (Table IV). The mean PSA was 5.04±2.46 ng/ml in nodular hyperplasia, 6.52±2.22 ng/ml in nodular hyperplasia with inflammation, and 8.9±2.55 ng/ml in nodular hyperplasia with metaplasia. (Table V). Out of 51 patients who had PSA less than 4 ng/ml, all were benign histopathologicaly. Out of 49 patients who had PSA levels more than 4 ng/ml, 37 were benign and 12 were malignant histopathologicaly. Comparing the PSA findings histopathologicaly, it was observed that the sensitivity of PSA was 57.95%, specificity 100%, accuracy was 63%, positive predictive value was 100% and negative predictive value was 24.48% (Table VI). Out of 52 patients who had PSAD less than 0.15, all were benign histopathologicaly. Out of 48 patients who had PSAD levels more than 0.15, 36 were benign and 12 were malignant histopathologicaly. Comparing the PSAD findings histopathologicaly, it was observed that the sensitivity of PSAD was 59%, specificity 100%, accuracy 64%, positive predictive value was 100% and negative predictive value was 25% (Table VII).

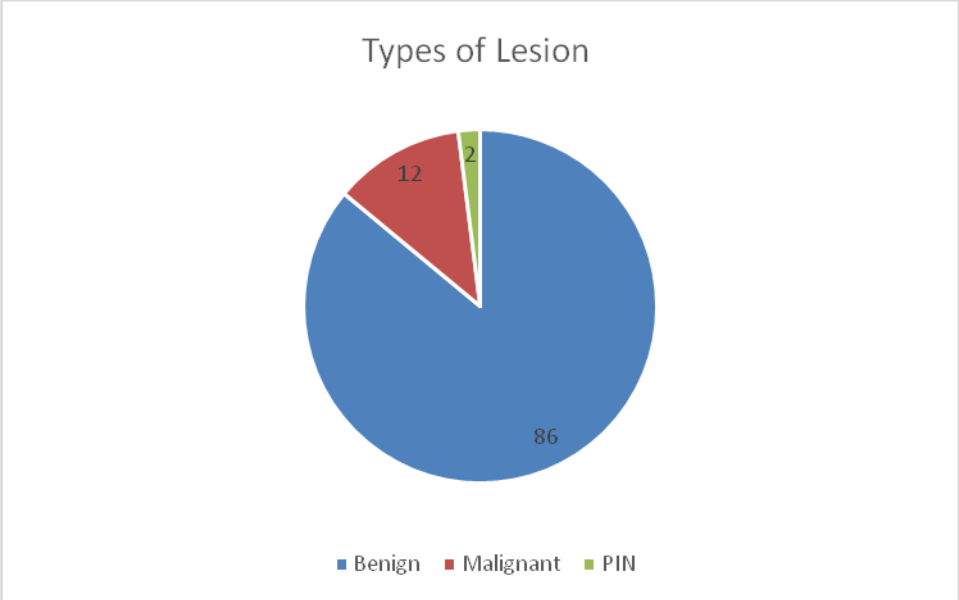

Figure I: Distribution of the participants by type of prostatic lesions (n=100)

Table I: Distribution of the participants by age groups (n=100)

Age group	Benign	Malignant	Prostatic intraepithelial neoplasia
	n	n	n
50-60	17	0	0
61-70	40	2	2
71-80	25	8	0
81-90	4	2	0
Total	86	12	2
Mean age: 68.5±7.5 (±SD) years		77.9±7.0 years	67.5±3.5 years

Table II: Mean PSA levels of different groups of prostatic disease (n=98)

Type of lesion	No	Mean	±SD	Range (Min -Max)	p value
PSA(ng/ml)					
Benign	86	5.77	±2.63	(1.00- 11.45)	0.001***
Malignant	12	23.69	±12.24	(4.9- 55.0)	

Table III: Prostate volume of different groups of prostate diseases (n=98)

Type of lesion	N0	Mean	±SD	Range (Min -Max)	p value
Prostate volume (cm3)					
Benign	86	43.81	±7.32	(28- 70)	0.001***
Malignant	12	28.79	±2.79	(24- 33)	

Table IV: PSA density of different groups of prostatic disease (n=98)

Type of lesion	n	Mean	±SD	Range (Min -Max)	t value	p value
PSA density						
Benign	86	0.14	±0.07	(0.02- 0.33)	4.87	0.001***
Malignant	12	0.83	±0.49	(0.19- 2.20)		

Table V: PSA and PSAD of the patients with different types of benign prostatic disease (n=86)

Subgroup of benign prostatic disease	No	PSA		PSAD	
		Mean	±SD	Mean	±SD
Nodular hyperplasia	55	5.04	±2.46	0.12	±0.06
Nodular hyperplasia with inflammation	24	6.52	±2.22	0.16	±0.08
Nodular hyperplasia with metaplasia	7	8.9	±2.55	0.19	±0.08
F value		9.672		4.541	
P value		*0.001		0.013	

p value reached from one-way ANOVA. *statistically significant p value

Table VI: Comparison of histological findings with PSA at different cut-off values (n=100)

PSA	Histopathological diagnosis		Total
	Benign	Malignant	
<4	51	0	51
>4	37	12	49
Total	88	12	100
Criteria		**Percentage**	
Sensitivity		57.95%	
Specificity		100%	
Accuracy		63%	
PPV		100%	
NPV		24.48%	

Table VII: Sensitivity, specificity, positive predictive value, and negative predictive value of PSAD at different cut-off values (n=100)

PSAD	Histopathological diagnosis		Total
	Benign	Malignant	
<0.15	52	0	52
>0.15	36	12	48
Total	88	12	100
Criteria		**Percentage**	
Sensitivity		59%	
Specificity		100%	
Accuracy		64%	
PPV		100%	
NPV		25%	

DISCUSSION

The goal of the present study was to find viable methods of early detection of prostate carcinoma cases. The early detection of prostate carcinoma can be helpful to patients who have clinically significant prostate cancers at an early stage when treatment is most likely to be effective. Potentially curable prostatic cancer produces no symptoms, the majority of the patients seek medical attention only after the onset of symptoms related to advanced or metastatic disease. Therefore, the high rate of mortality from prostate cancer may be due to late detection. In recent studies screening for prostate cancer has combined the measurement of serum PSA with the more traditional approach of digital rectal examination.[7] PSA is the organ-specific serum marker and clearly is the most important and useful tumor marker for adenocarcinoma of the prostate.[6] But there are many conditions, in addition to prostate cancer that can cause an elevation in serum PSA levels. As a result, the diagnostic performance of PSA is reduced by many false positive results.[8]There have been different approaches to improve the diagnostic role of PSA. An important concept is PSA density (PSAD), obtained by dividing serum PSA concentration by prostate volume. Several investigators showed that PSA density is significantly higher in prostate carcinoma compared to nodular hyperplasia and suggested that it might be an aid in differentiating nodular hyperplasia from prostatic carcinoma.[6] But even if we are to rely on other possible diagnostic methods like PSA density (PSAD), proper measurement and a cut-off value of PSA is an absolute necessity. The present study was conducted with the hope of determining the sensitivity and accuracy of both PSA and PSAD in determining malignant lesions in a selected age group of our demographic area. In the present study, all cases of lesions were then divided into three total groups, where 86 were benign lesions,

12 were malignant lesions and 2 were pre-malignant lesions or PIN. The distribution of the participants according to the type of lesion was done histopathologically. It was observed that the majority of the benign lesions existed among participants aged between 61-70 years. Malignant lesion cases were more common among those aged between 71-80 years. This was a common global finding, as many studies regarding prostatic carcinoma in older age groups.[9] The age correlation of benign and malignant and PIN cases were based on histopathological findings. Bostwick et al. found prostatic intraepithelial neoplasia in the 60-69 years age group.[10] PIN appears to precede cancer by more than 10 years.[11] Among the 86 benign cases mean PSA was 5.77 with standard deviation (SD)±2.63 ng/ml, in 12 malignant cases the mean PSA was 23.69 ng/ml with standard deviation (SD)±12.24 ng/ml and in prostatic intraepithelial neoplasia group the mean PSA was 5.75 ng/ml with standard deviation (SD)± 1.34 ng/ml, PSA of benign, malignant and prostatic intraepithelial neoplasia showed statistically significant difference. These findings were almost similar to the mean values of 2 other studies.[12,13] In the current study, it was observed that the mean prostate volume was 43.81 cm^3 with a standard deviation (SD)±7.32 cm^3 varied from 28-70 cm^3 for the benign group, whereas in the malignant group, Prostate volume was 28.79 ±2.79 cm^3 varied from 24-33 cm^3 and in prostatic intraepithelial neoplasia, prostate volume was 36.87±3.33 cm^3 varied from 36-41 cm^3. Statistical analysis showed significant differences in the prostate volume of different groups. To determine PSAD, accurate measurements of the prostate volume are very important. In addition to calculating PSAD, estimation of prostate volume may be useful in a variety of clinical settings. Among the 86 benign cases mean PSA density was 0.14± 0.7, whereas, in the case of 12 malignant cases, the PSA density was 0.83±0.49. Two cases of prostatic intraepithelial neoplasia had a PSA density of 0.15±0.02. PSA density showed significant differences among benign, malignant, and prostatic intraepithelial neoplasia patients. Other investigators also found similar results in regards to PSA density levels or PSAD.[1,14] However, a 1997 study by Banu et al. found higher levels of mean PSAD for both malignant and benign cases, where the malignant group still had the higher PSAD.[15]The current study and other studies mentioned that the mean PSAD was higher in prostate cancer than in nodular hyperplasia. It again reinforced the observation that PSAD is a very useful diagnostic tool in differentiating nodular hyperplasia from prostatic carcinoma.[6]Among the present study participants, a total of 60 patients had PSA ranging between 4-10 ng/ml. Among them, 59 were nodular hyperplasia cases and one was adenocarcinoma. Holding a PSAD cut-off value of 0.15, it was observed that 27 cases of nodular hyperplasia had a PSAD value of< 0.15, while the remaining 32 had a PSAD value of >0.15. Statistical analysis showed a significant difference between benign and malignant patients using a PSAD cut-off value of 0.15, which was similar to the findings of Klingleret al.[5] The mean PSA was found at 5.04±2.46 ng/ml in nodular hyperplasia, 6.52±2.22 ng/ml in nodular hyperplasia with inflammation, and 8.9±2.55 ng/ml in nodular hyperplasia with metaplasia.The mean PSAD was 0.12±0.06 in nodular hyperplasia, 0.16±0.08 in nodular hyperplasia with inflammation, and 0.19±0.08 in nodular hyperplasia with metaplasia. The mean PSA values of Nodular Hyperplasia in our study were similar to the findings of Ellis et al., where the value was 5.8 ng/ml.[16] The mean difference between the PSA values of different types of benign prostatic disease was highly significant, and the difference in PSAD was also significant. There was a statistically significant difference between nodular hyperplasia and adenocarcinoma group in different PSAD ranges. In the present study sensitivity, specificity, and predictive values of PSA and PSAD at different cut-off levels were shown. The commonly used cut-off value of 4 ng/ml for PSA showed 57.95% and 100% sensitivity and specificity respectively. A cut-off value of 0.15 for PSAD showed 59% and 100% sensitivity and specificity respectively. The sensitivity of our study was lower compared to that of Gohji et al., who used the same cut-off value of 0.15 in regards to PSAD, but the specificity was much higher in our study.[1] The present study demonstrated a significant difference in PSA and PSAD between prostate cancer and nodular hyperplasia. The study was conducted in a few hospitals with a small sample size. So, the results may not represent the whole community.

CONCLUSION

The present series demonstrated significant differences of serum PSA and PSAD values

between the benign and malignant groups. In the intermediate PSA range of 4-10 ng/ml, (gray zone) PSAD value discriminated well between benign and malignant patients.In conclusion, the present study revealed significant differences in prostate-specific antigen, and prostate-specific antigen density, among prostatic carcinoma, nodular hyperplasia, and patients with nodular hyperplasia with asymptomatic prostatitis. If these parameters are considered with clinical history and other findings, in a patient with prostate enlargement, they can be helpful in the early detection of prostate cancer and decrease the number of unnecessary biopsies.

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REFERENCES

1. Gohji K, Nomi MS, Egawa S, Morisue K, Takenaka A, Okamoto M, Ohori M and Fuji A. 'Detection of prostate carcinoma using prostate-specific antigen, its density and the density of the transition zone in Japanese men with intermediate serem prostate-specific antigen concentrations'. American cancer society. 1997; 79: 1969-1976.
2. Epstein JI. The lower urinary tract and male genital system, In: Kumar, Abbas, Fausto (eidtior), Pathologic basis of diseases; 7th edn, WB Saunders Co. Ltd. Philadelphia. 2005; 1047-1058.
3. Chan DW, Sokoll LJ. Prostate-specific antigen: it's discovery and bio chemical characteristics. Urolclin North Am. 1997; 24: 253.
4. Coley CM, Barry MJ, Fleming C, Fahs MC and Malley AG. 'Early detection of prostate cancer'. Ann Intern Med. 1997; 126: 468-479.
5. Klingler HC, Woo H, Rosario D, Cutinha PE, Anderson J, Ward AM, Chapple CR. 'The value of prostate-specific antigen density and free: Total PSA ratio in selecting patients with a normal digital rectal examination and intermediate total PSA levels for further investigation,' British Journal of urology. 1998; 82: 393-397.
6. Benson MC, Whang IS, Olsson CA, McMahon DJ, Cooner WH. 'The use of prostate-specific antigen density to enhance the predictive value of intermediate levels of serum prostate-specific antigen'. J Urol. 1992; 147: 817-821.
7. Crawford ED, Leewansangtong S, Gokta's S, Holthans K, Baier M. 'Efficiency of prostate-specific antige and Digital rectal examination in screening'. The prostate. 1999; 38: 296-302.
8. Nixon RG, Brawer MK. 'Enhancing the specificity of Prostate-specific antigen (PSA): An overview of PSA density, velocity and age-specific reference ranges'. Br. J Urol. 1997; 79: 61-67.
9. Rullis I, Shaeffer JA, Lilien OM. Incidence of prostatic carcinoma in the elderly. Urology. 1975; 6(3): 295-297.
10. Bostwick DG, Liu L, Brawer MK, Qian J. 'High grade prostatic intraepithelial neoplasia', Rev. Urol. 2004; 6: 171-179.
11. Brosman SA. 'Prostatic intraepithelial neoplasia', e medicine. 2005. emedicine. medscape.com
12. Bazinet M, Meshref AW, Trudel C. 'Prospective evaluation of prostate-specific antigen density and systematic biopsies for early detection of prostatic carcinoma'. Urology. 1994; l-43: 44-51.
13. Sasaki R, Habuchi T, Sato K, Akao T, Kakinuma H, Lizhong W et al. ' The Clinical Utility of Measuring Total PSA, PSA Density, □ Seminoprotein and □ Seminoprotein/ Total PSA in prostate Cancer Prediction'. Jpn J ClinOncol. 2000; 30(8): 337-342.
14. Rommel FM, Agusta VE, Breslin JA, Huffnagle HW, Pohl CE, Sieber PR, Stahl CA. 'The use of Prostate-specific antigen and prostate-specific antigen density in the diagnosis of prostate I cancer in a community based urology practice'. J Urol. 1994; 151: 86-93.
15. Banu NA. 'Role of prostate-specific antigen, prostate-specific antigen density, prostatic acid phosphatase and acid mucin in the diagnosis of prostate carcinoma', BSMMU (Thesis), 1997; p. 87.
16. Ellis WJ, Brawer MK. 'PSA in Benign Prostatic Hyperplasia and Prostatic Intraepithelial Neoplasia'. UrolClin North Am. 1993; 20: 621-625.

ORIGINAL ARTICLE

Association of Low Socioeconomic Status and Development of Pneumonia under Five Children: A Case-Control Study

A.K.M Fazlul Haque,[1] Newaz Ahmed,[2] Md. Sadrul Alam Hafiz,[3] Md. Mozammel Haque,[4] Mohammad Mustafizur Rahman,[5] Muhammad Abdullahhil Kafi,[6]

ABSTRACT

Background: Pneumonia is an inflammation of the lung that is most often caused by infection with bacteria, viruses or other organisms, the leading cause of death in children under five in the world that amenable to corrective measures. **Objectives:** To explore the association of low socio economic status and development of pneumonia among under five children. **Methods:** A case (pneumonia patient under 5 children)-Control (other than pneumonia patient of same age) study was conducted inpatient department of pediatrics of Shahid Ziaur Rahman Medical College Hospital, Bogura over a period of December 2009 to March 2010 on total 300 patient. (Case 150, control 150). **Results:** In this study mean age of pneumonia in <24 months group and in ≥24 months group was found 110 (73.3%) & 58 (38.7%) and 40 (26.7%) & 92 (61.3%) among cases and controls respectively. There was no difference in the proportion of males and females (male 77, 51.3% vs 79, 52.7% and 73, 48.7% vs 71, 47.3%, P value- >0.05) among cases & controls. Majority of cases belong to low socio economic status in respect of parents education (father illiterate 37, 24.7% & 21, 14.0% and Mother illiterate 45, 30.0% & 24,16.0%), housing status (63, 42.0% & 37, 24.7%), family's income (78, 52.0% & 46, 30.7%) among case and controls respectively. **Conclusion:** In our study, lower socio-economic status have 2 times more chance of developing pneumonia in compare to middle and higher socioeconomic status, many of these risk factors are amenable to corrective measures.

Keywords: Low socioeconomic status, Pneumonia, Under five children.

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INTRODUCTION

Pneumonia (Respiratory infections associated with clinical signs of pneumonia) the leading cause of death in children under five in the world, kills more children than AIDS, malaria and measles combined. Over two million children die from pneumonia each year, accounting for almost 1 out of 5 children under five death worldwide.[1] Undernourished or malnourished children particularly those not exclusively breastfeed or with inadequate zinc intake are at higher risk of developing pneumonia. Similarly Children and infants suffering from other illness such as AIDS or measles, are more likely to develop pneumonia. Environmental factors such as living in crowded homes and exposure to parental smoking or indoor air pollution also have a role to play in increasing children susceptibility to pneumonia. It is estimated that more than 150 million episodes of pneumonia occur every year among children

[1]*Assistant Professor, Department of Pediatrics, Maternal and Child Health Training Institute (200 Beded Maternal and Child Health Hospital), Lalkuthi, Mirpur, Dhaka, Bangladesh;*
[2]*Assistant Professor, Department of Cardiology, Sheikh Hasina National Institute of Burn and Plastic Surgery, Dhaka, Bangladesh;*
[3]*Associate Professor, Department of Pathology, Shaheed M. Monsur Ali Medical College, Sirajganj, Bangladesh;*
[4]*Assistant Professor, Department of Pediatric Surgery, Shaheed M. Monsur Ali Medical College, Sirajganj, Bangladesh.*
[5]*Assistant Professor, Department of Surgery, Shaheed M. Monsur Ali Medical College, Sirajganj, Bangladesh;*
[6]*Assistant Professor, Department of Forensic Medicine, Shaheed M. Monsur Ali Medical College, Sirajganj, Banglades.*

Correspondence: A.K.M Fazlul Haque
Mobile: +8801712128765
E-mail: hdrakmfazlul@gmail.com

under five in developing countries, accounting for more than 95% of all new cases worldwide.[2] Large population-based studies reported that the incidence of community acquired pneumonia among children less 5 years old was approximately 0.026 e/cy, Suggesting that more than 95% of all episodes of clinical pneumonia in young children worldwide occur in developing countries.[3] UNICEF and WHO have estimated that 1.3 million child deaths could be averted every year if pneumonia prevention and treatment interventions were universally delivered.[4] Among the 42 countries of the world with 90% of the child mortality burden, 14-24% of the under 5 mortality is due to pneumonia and nearly 70% of this pneumonia mortality occurs in the Africa, south and southeast Asia regions. The majority of this burden is borne during early childhood with greatest risk from the mortality occurring during neonatal period. Achieving one of the eight millennium development Goals (MDGS) will require urgent action to reduce the childhood pneumonia death, which at present account for 19% of all under-five deaths. More than a million lives could be saved if prevention (Vaccination and proper nutrition) and treatment interventions were implemented universally.[5] Infant from families of low socioeconomic status are said to suffer higher rates of lower respiratory illness. The incidence of lower repertory illness was 1.41 in the low socioeconomic group, 1.26 in middle group and 0.67 in the high group. The prevalence of persistent respiratory symptoms was 39% in infants in the low socioeconomic group, 24% in infant in middle group, and 14% infant in high group. Infants of low socioeconomic status are at increased risk of persistence respiratory symptoms.[6,7] Pediatricians and heath scientists said "pneumonia is still the leading cause of childhood deaths in Bangladesh".[8] The incidence of pneumonia under five children in Kamalapur urban surveillance site is 0.5 episode/cy.[9] Prevalence of pneumonia among under five children by child's characteristics and area 2005 is 21%.[1]

There are links between environmental risk factors with acute respiratory infections. Many of these risk factors are amenable to corrective measures. Therefore knowledge of these risk factors related to acquisition of pneumonia will help in its prevention through effective health education of the community and appropriate initiatives taken by the government. Still there is limited understanding of relation in real setting between determinants and pneumonia mortality and morbidity. This study finding will provide better understanding that can assist the community in setting priorities and making correct choices to reduce the burden of pneumonia and also help to improve the disease condition and interventions for their control.

MATERIALS & METHODS

This case-control study was carried out from December 2009 to March 2010, a total of 4 months period in the dept of pediatrics of Shahid Ziaur Rahman Medical College Hospital, Bogura. All the cases (patient) clinically diagnosed as pneumonia of under five children irrespective of sex, who came to inpatient department of pediatrics of Shahid Ziaur Rahman Medical College Hospital, Bogura were included in the study. Total 300 patient were included in this study. The protocol was passed through ethical review committee of Shahid Ziaur Rahman Medical college, Bogura. The sampling technique was purposive. Each and every parent or guardian of the studied children was informed well about the objective of this study and written consent was taken from them. Then a detailed history was taken by principal investigator himself through interviewing the parents and through clinical examination of patients using well-structured questionnaire. Alongside, detailed history and examination of children with disease other than pneumonia (like: typhoid, Dysentery, rheumatic fever, Meningitis etc.) was undertaken considering them as controls. Socioeconomic status defined on the basis of parent's educational status, monthly income and housing status. The association of low socioeconomic status among pneumonia and non-pneumonia were compared by the odds ratio, stratified analysis and multiple logistic regressions. After completion of data collection, data were analyzed and results were compared among the two groups. Data was rechecked, edited and entered in SPSS 16.0 version. Frequency distribution of pneumonia and other illnesses were seen at 5% level of significance. The risk factors associated with pneumonia was tested by odds ratio and chi-square at 5% level of significance and by logistic regression analysis

RESULTS

Results from this study showed that among cases and controls, the mean age distribution was in <24month group 110 (73.3%) & 58 (38.7%) and among ≥24 months group 40 (26.7%) & 92 (61.3%) respectively. There was no difference in the proportion of males and females (males 77, 51.3% Vs. 79, 52.7% and female 73, 48.7% Vs. 71, 47.3%, P value->0.05). Study results showed among the cases, parent's educational status was lower than the controls. About 62 (41.3%) father and 65(43.3%) mother was illiterate among the cases, whereas among the controls about 54 (36.0%) father and 59 (39.3%) mother was illiterate. In this study association of housing status and development of pneumonia also significant. The distribution of housing status among the cases and controls were low status 63 (42.0%) Vs. 37 (24.7%) and high status 3 (2.0%) Vs.10 (6.7%) respectively. This results indicated that pneumonia patient around 2 times more exposed to lower housing status than controls. Family income of pneumonia group were significantly lower than no pneumonia group (78, 52% Vs. 46, 30.7%) (Table I). The study findings showed that the children who were suffered from pneumonia were more likely to live in crowded place than children who were suffered from non-pneumonia. None of the known risk factors like crowded area, ventilation status, cooking area inside the bedroom, indoor air pollution, family history of asthma and tuberculosis has statistically significant association (Table II). The study results showed there was an significant association between low socioeconomic status and development of pneumonia and distribution of cases and controls in these three major groups were as low socioeconomic status 78, 52% Vs 41, 27%, middle status 68, 45% Vs 85, 57% and high status 4, 3% Vs 24,16%. In comparison to higher status the children of lower status 10 times more chance to development of pneumonia (higher status is a reference group Odds! and Odds of lower status 11.41, 3.32-39.19, P- value <0.01) (Table III). We used logistic regression to evaluate the effect of socio economic status on the likelihood of pneumonia adjusting for the effect of all risk factors together. The unadjusted Odds ratio estimated for the effect of low socioeconomic status was 1.75. After controlling for, fathers education, mothers education and all risk factors together, Odds increased to 2.16, 2.17, and 2.22 but there was no change after adjusting for age, hence all other variables confounded the effect of SES except age (Table IV). Therefore, after adjusting for all risk factors socioeconomic status is still highly significant. Distribution of case and controls in different socioeconomic status were as follows ultralow status 22 Vs 1, low status 56 Vs 40, lower middle 55 Vs 70,middle-middle 13 vs 15, upper middle 2 Vs 14, high status 2 vs 10 respectively (Figure I)

Table I: Association of socio-demographic variables among cases and controls (n=300)

Variables	Case N (%)	Control N (%)	Odds ratio	95% CI	p-value
Age					
<24 months	110 (73.3)	58 (38.7)	4.36	2.58-7.36	<0.05
≥ 24 months	40 (26.7)	92 (61.3)			
Sex					
Male	77 (51.3)	79 (52.7)	1.05	0.67-1.66	>0.05
Female	73 (48.7)	71 (47.3)			
Father education					
Ultra low status	62 (41.3)	54 (36.0)	1.23	0.01	<0.05 (0.01)
Low status	37 (24.7)	21 (14.0)			
Lower middle	23 (15.3)	33 (22.0)			
Middle-middle	22 (14.7)	25 (16.7)			
Upper-Middle	3 (2.0)	10 (6.07)			
High status	2 (2.0)	7 (4.7)			
Mother education					
Ultra low status	65 (43.3)	59 (39.3)	1.29	1.08–1.54	<0.05 (0.004)
Low status	45 (30.0)	24 (16.0)			

Lower middle	22 (14.7)	29 (19.3)			
Middle-middle	15 (10.0)	28 (18.7)			
Upper-Middle	3 (2.0)	5 (3.3)			
High status	0 (0.0)	5 (3.3)			
Housing type					
Ultra low status	32 (21.3)	1 (0.7)	1.72	1.42 -2.09	<0.05 (000)
Low status	63 (42.0)	37 (24.7)			
Lower middle	34 (22.7)	62 (41.3)			
Middle-middle	14 (9.3)	25 (16.7)			
Upper-Middle	4 (2.7)	15 (10.0)			
High status	3 (2.0)	10 (6.7)			
Room type					
Ultra low status	34 (24.7)	11 (7.3)	1.78	1.36–2.33	<0.05 (0.000)
Low status	72 (48.0)	43 (28.7)			
Lower middle	42 (28.0)	86 (57.3)			
Middle-middle	2 (1.3)	1 (0.7)			
Upper-Middle	0 (0.0)	6 (4.0)			
High status	0 (0.0)	3 (2.0)			
Monthly income					
Ultra low status	9 (6.0)	1 (0.7)	1.04	1.00–1.07	<0.05 (0.01)
Low status	78 (52.0)	46 (30.7)			
Lower middle	38 (25.3)	62 (41.3)			
Middle-middle	14 (9.3)	24 (16.0)			
Upper-Middle	7 (4.7)	10 (6.7)			
High status	4 (2.7)	7 (4.7)			

Table II: Association between cases and risk factors (n=300)

Variables	Cases (n=150) N (%)	Controls (n=150) N (%)	Odds ratio	95% CI
Crowding status				
Crowded	111 (74.0)	103 (68.7)	1.29	0.78 – 2.14
Not Crowded	39 (26.0)	47 (31.3)	1	
Ventilation Status				
Poor ventilation	64 (42.7)	56 (37.3)	1.14	0.68 – 1.98
Moderate ventilation	30 (20.0)	38 (25.3)	0.79	0.42 – 1.99
Well ventilation	56 (37.33)	56 (37.3)	1	
Cooking Area				
Inside bed room	16 (10.7)	9 (6.0)	1.87	0.79 – 4.39
Outside bed room	134 (89.3)	141 (94.0)	1	
Parent's smoking				
Yes	89 (59.3)	92 (61.33)	.91	0.57 – 1.46
No	61 (40.7)	58 (38.66)	1	
Air Pollution				
Polluted	64 (42.7)	53 (35.33)	1.53	0.92 – 2.56
Moderate Pollution	31 (20.7)	27 (18.0)	1.46	0.78 – 2.74
Not polluted	55 (36.7)	70 (46.66)	1	
PEM (Protein energy malnutrition)				
Severe malnutrition	10 (6.7)	12 (8.0)	1.44	0.50 – 4.07
Moderate	44 (29.3)	52 (35.66)	1.41	0.69 – 2.92
Mild	72 (48.0)	66 (44.0)	1.10	0.56 – 2.18
Healthy	24 (16.0)	20 (13.33)	1	

Family history of Asthma				
Yes	48 (32.0)	43 (28.7)	1.15	0.69 – 1.88
No	102 (68.0)	107 (71.3)	1	
Family history of TB				
Yes	14 (9.3)	16 (10.7)	1.17	0.54 – 2.56
No	136 (90.7)	134 (89.3)	1	

Table III: Pneumonia status in three different major groups of socioeconomic status (n=300)

Socioeconomic status	Cases (n=150) N (%)	Controls (n=150) N (%)	Odds ratio	95% CI	p-value
Low status	78 (52.0)	41 (27.0)	11.41	3.32–39.19	0.000 (<0.05)
Middle status	68 (45.0)	85 (57.0)	4.80	1.53–14.96	(>0.05)
High status	4 (3.0)	24 (16.0)	1	3.69–4.31	(>0.05)

Table IV: Multivariate analysis for the association of socioeconomic status (SES) and pneumonia (n=150)

SES and Pneumonia	Odds ratio & 95% CI
Unadjusted odds ratio	1.75 (1.43–2.15)
Adjusted*	2.22 (1.54–3.18)
Age	1.76 (1.36–2.27)
Age & Father's education	2.16 (1.51–3.010)
Age Mother's education	2.17(1.52–3.09)

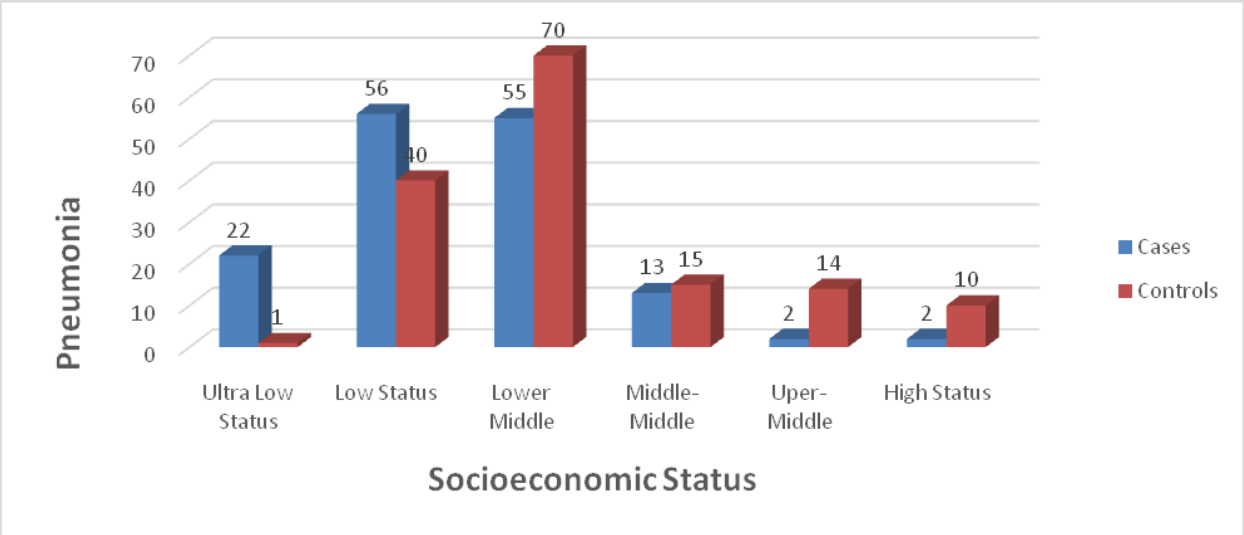

Figure I: Distribution of pneumonia and socioeconomic status among cases and controls (n=300)

DISCUSSION

This case control study was carried out with an aim to explore low socioeconomic status is a risk factor for developing pneumonia. The majority of control are suffering from typhoid, UTI, viral hepatitis, dysentery, meningitis and rheumatic fever. The present study findings were discussed and compared with previously published relevant studies. The study results showed cases were more likely to associated with low socioeconomic status than controls. Similar to other studies, cases are more likely to expose in low educated and low income families than control.[11,12] This study found a

strong association between pneumonia and younger age, which had already been detected in previous studies.[13-15] Though previous studies reported that low housing status, and a child's bed room shared with four or more people as risk factors for development of pneumonia (perhaps due to transmission of pathogens through respiratory droplet in crowded environment at home), our study could not establish this association. In this community children of low socioeconomic status were more exposed to indoor air pollution which is a risk for any infectious disease. Although previous studies already have established the association of severe malnutrition with pneumonia, this study did not identify this associations, which may have been due to the low power of the study. Further longitudinal prospective study could help to assess the relationship of risk factors associated with pneumonia .In summary, childhood pneumonia in Bangladesh is associated with low SES and those with lower SES had a greater association with indoor air pollution (64, 43% vs 53, 35%). This study reported that younger age is a major risk factor for pneumonia. Likewise, children who living in crowded environment increases the risk of development of pneumonia is another important finding. The general population should be made aware about the effect of indoor pollution, and that it increases the risk of pneumonia. Ensuring the education both males and females would improve the economic status as well as over all living condition and decrease the risk to children of pneumonia. Further longitudinal cohort study could help to get the more details information by increasing the power of the study.

CONCLUSION

This study was undertaken to determine the low socioeconomic status is a risk factor for development of pneumonia. The study finding revealed that there was a significant association between low socioeconomic status and development of pneumonia. Compare to middle and higher socioeconomic status, lower socioeconomic status have 2 times more chance of developing pneumonia. The study findings showed that young children (<24 months) are more susceptible to develop pneumonia. From this study findings important information was identified that the parents of children with pneumonia were less educated than parents of children with non-pneumonia.

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REFERENCES

1. Bryce J, Boschi-Pinto C, Shibuya K, Black RE. Group WCHER. WHO estimates of the causes of death in children. Lancet. 2005; 365(9465): 1147–52.
2. Wardlaw, Tessa M, Johansson, Emily White, Hodge, Matthew. World Health Organization & United Nations Children's Fund (UNICEF). Pneumonia : the forgotten killer of children. World Health Organization, 2006. https://apps.who.int/iris/handle/10665/43640.
3. In This Month's Bulletin. Bull World Health Organ. 2004; 82(12): 891.
4. Rudan I, Boschi-Pinto C, Biloglav Z, Mulholland K, Campbell H. Epidemiology and etiology of childhood pneumonia. Bull World Health Organ. 2008; 86(5): 408-416. Doi:10.2471/blt.07.048769.
5. UNICEF and the World Health Organization (WHO). MDGs goal, 2000.
6. Margolis PA, Greenberg RA, Keyes LL, et al. Lower respiratory illness in infants and low socioeconomic status. Am J Public Health. 1992; 82(8): 1119-1126. doi:10.2105/ajph. 82.8.1119.
7. Loda FA, Clyde WA Jr, Senior RJ, Sheaffer Cl, Conley WG, Denny FW. Epidemiologic patterns of acute lower respiratory disease of children in a pediatric group practice. J Pediatr. 1971; 78(3): 397–406.
8. Baqui AH, Black RE, Arifeen SE, Hill K, Mitra SN, al Sabir A. Causes of childhood deaths in Bangladesh: results of a nationwide verbal autopsy study. Bull World Health Organ. 1998; 76(2): 161-171.
9. Brooks W, Abdullah & Goswami, Doli & Rahman, Mustafizur & Nahar, Kamrun & Fry, Alicia & Balish et al. Influenza is a Major Contributor to Childhood Pneumonia in a Tropical Developing Country. The Pediatric infectious disease journal. 2010; 29: 216-21.

10. Health and demographic surveillance system-Matlab. Volume thirty nine. Registration of health and demographic events 2005. Scientific report no. 97, february 2007.
11. Gray D, Zar HJ. "Childhood Pneumonia in Low and Middle Income Countries: Burden, Prevention and Management". The Open Infectious Diseases Journal. 2010; 4: 74-84
12. Bradford DG, Chimonas R, Sue CG. It takes a village: community education predicts paediatric lower-respiratory infection risk better than maternal education, J Epidemiol Community Health 2010; 64: 130e-135. Doi:10.1136/jech.2009.087981.
13. Abdullah Brooks W, Terebuh P, Bridges C, Klimov A, Goswami D, Sharmeen AT et al. Influenza A and B infection in children in urban slum, Bangladesh. Emerg Infect Dis. 2007; 13(10): 1507-1508. doi:10.3201/eid1310.070368.
14. Puffer RR, Serrano CV. "Patterns of mortality in childhood." Health Transition Review. 1973; 1: 1–20.
15. Victora CG, Vaughan JP, Barros FC. The seasonality of infant deaths due to diarrheal and respiratory diseases in southern Brazil, 1974–1978. Bull Pan Am Health Organ. 1985; 19: 29–39.