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CONTENTS

INSTRUCTIONS TO AUTHORS

ORIGINAL ARTICLES

- Serum Bilirubin Level and Associated Factors in Patients of Self Reporting Jaundice without Evidence of Clinical Jaundice** 01
Madhusudan Saha^{*1}, Sadhu Uttam Kumar², Shasanka Kumar Saha³, Md Abdul Mumit Sarkar⁴, Bimal Chanda Shil⁵
- Spectrum of Haematological & Non Haematological Disorder Diagnosed by Bone Marrow Examination: A Study of 115 Cases** 06
Samira Taufique Reshma^{*1}, Salina Haque², Zulfia Zinat Chowdhury³, Mohammad Iqbal Kabir⁴, Mohammad Golam Rabbani⁵, Md. Atiqul Islam Rabby⁶
- Bacteriology and Antibiotic Sensitivity Pattern of Sputum in Patients with Acute Exacerbation of Chronic Obstructive Pulmonary Disease** 12
Md. Mahabubul Islam Majumder^{*1}, Pinki Shaha², Mostaque Ahmed³, Mohammad Nazim Uddin⁴, Mahabubur Rahman⁵, Tarek Ahmed⁶
- Bacteriological Profile of Suspected Neonatal Septicaemia and Its Relationship with Selected Risk Factors** 17
Md. Shamsul Alam^{*1}, Sanaul Haque Mia², Md. Belal Uddin³
- Study on Seasonal Variation in Stroke** 22
Md. Lokman Hossain Talukder¹, Md. Sakhawat Hossain^{*2}, Asadullahil Galib³, Md. Daharul Islam⁴, Nadia Nasrin⁵, Badal Kumar Saha⁶
- Stroke and Coronary Heart Diseases, Global and Asian Trend and Risk Factors -A Perspective** 27
Sk. Mamun-Ar-Rashid^{*1}, Sk. Moazzem Hossain²
- Laparoscopic versus Open Appendicectomy in a District Hospital** 36
Md. Rafiqul Islam^{*1}, S M Golam Azam², Md. Showkat Ali³, Md. Ridwanul Islam⁴
- Outcome of Laparoscopic Cholecystectomy in Acute Calculous Cholecystitis – Analysis of 100 cases** 39
Md Ahad Ali Mahalder^{*1}, Md Joynal Abeden², Rehnuma Karim³, Md Rafiqul Islam⁴
- Effects of Exposure of Cement Dust on Platelet Count in Workers of a Cement Mill** 44
Rahnuma Ahmad^{*1}, Qazi Shamima Akhter², Mahmuda Abira³, Farhana Rahman⁴, Suparna Bhowmik⁵, Farhana Hussain Sadia⁶, Tahmina Akter⁷
- Thyroid Function Status during Different Trimesters in Bangladeshi Women** 47
Shyamal Chandra Banik^{*1}, Mahmuda Begum², Farjana Ahmed³, Md. Shamsuzzaman⁴, Kartick Chandra Saha⁵
- Bacteriological Profile and Their Antimicrobial Susceptibility Pattern of Urinary Tract Infection Patients Attending at the Nephrology Department of Enam Medical College and Hospital, Savar, Dhaka.** 51
Md. Shamimur Rahman¹, Mejbah Uddin Ahmed², Bhuiyan Mohammad Mahtab Uddin³, Rezaul Karim Chowdhury^{*4}, Harun Ur Rasid⁵, Amina Begum⁶
- Prevalence of Oral Candidiasis among Children Caused by Different Candida Species** 57
Tanzila Rawnuck^{*1}, Md Selim Reza², Rajib Ahmed³, Mohammad Fatteh-UI- Islam⁴, A.B.M. Iftexhar Hossain⁵, Negar Sultana⁶, Shabiha Monwar⁷
- Laboratory Parameters of Dengue Infection in a Medical College Hospital** 61
Sabikun Nahar Chowdhury^{*1}, Md Nazrul Islam², Md Mahabubur Roshed³, Md Mokter Hossain⁴, Sukumar Saha⁵
- Common Microorganisms Present in Diabetic Foot Infection and It's Spectrum of Antibiotic Sensitivity** 65
Md. Ziaur Rahman^{*1}, Mir Jalal Uddin², Abdul Hamid Mollah³, Himika Hasan Khan⁴, A.K.M. Ziaul Kabir⁵
- Antibiotic Sensitivity in Complicated and Uncomplicated UTI in Potuakhali Medical College Hospital** 70
F. M Atiqur Rahaman^{*1}, Sheikh Anika Rahman², Tohfatur Nesa Nitu³, Faria Sharif⁴, Jamil Khan⁵
- Sonological Evaluation of Ectopic Pregnancy-an Analysis of 50 Cases** 75
Dipu Das^{*1}, Sandip Kanungo², Shahina Akhter³, Natia Rahnuma⁴
- Contraceptive Methods Used by the Selective Rural Tea Garden Workers of Sylhet** 79
Rifat Jahan^{*1}, Md Monjurul Habib Choudhury², A.S.M Mashrurul Haque³, Md. Oliur Rahman Chowdhury⁴, Shah Ferdous Chowdhury⁵, Progya Laboni Tina⁶

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Serum Bilirubin Level and Associated Factors in Patients of Self Reporting Jaundice without Evidence of Clinical Jaundice

Madhusudan Saha^{*1}, Sadhu Uttam Kumar², Shasanka Kumar Saha³,
Md Abdul Mumit Sarkar⁴, Bimal Chanda Shil⁵

Abstract

Introduction with objective: This study was done to see the serum bilirubin level of patients with self reporting jaundice without clinical jaundice. **Materials and Methods:** This study was done from January 2019 to January 2020 at Popular Medical Centre, Sylhet. Consecutive patients claiming to have jaundice without clinical icterus were included. Demographical information and presenting symptoms were noted. Serum bilirubin and relevant laboratory investigations were done and results were noted. Statistical analysis was done using SPSS 20. **Results:** Total 177 patients, age varying from six years to 80 years (mean 28.54) were included. Of them 134 (75.7%) were male. Common symptoms for were anorexia (90; 50.8%), pain abdomen (76; 42.9%), weakness (49; 27.7%), nausea (45; 25.4%), fullness of abdomen (35; 19.8%), gas (34; 19.2%) and vomiting (16; 9%). Of them 164 (92.7%) initially visited kabiraj. Serum bilirubin level of them varied from 0.04 mg/ dl to 2.67 mg / dl (mean 0.814 ± 0.577) and ALT level varied from 10 iu/ dl to 2944 iu/ dl (mean 71.55 ± 270.09). In this series 143 (80.0%) patients had no jaundice biochemically. Among others, 08 (4.52%) were case of acute hepatitis and 13 (7.34%) were possible cases of Gilbert's syndrome. Patients' attitude regarding informal caregivers significantly differed with education level. **Conclusion:** Most of patients claiming to have jaundice without icterus had no evidence of liver disease. Consulting kabiraj they are wasting money and sometimes inviting health related disasters. So mass education and motivation may increase awareness of people regarding liver disease and prevent health hazards.

Keywords: Jaundice, Kabiraj and traditional healers, Self reporting jaundice, Serum bilirubin.

Number of Tables: 06; **Number of References:** 21; **Number of Correspondence:** 03.

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Introduction:

Jaundice or icterus is yellow discoloration of skin, sclera and mucous membrane due to accumulation of bilirubin in tissue^{1,2}. Tissue accumulation of bilirubin occurs in presence of hyperbilirubinaemia². It is not a disease but usually a sign of either liver or biliary tract disease or haemolytic disorder². Serum bilirubin level varies from laboratory to laboratory. It is taken as normal up to 1.0 (17 mcml/l) or 1.2 mg per deciliter¹. But it is not clinically evident at good light below the level of 3.0 mg / dl (50 mcml/l)^{2,3,4}. Jaundice is associated with yellow colouration of urine due to excretion of conjugated bilirubin through kidneys². It may be confused with yellow skin due to carotenemia, use of drugs quinacrine and excessive exposure to phenol^{5,6,7,8}. Carotenemia may lead to yellow colouration of skin sparing sclera⁹.

Serum bilirubin may rise due to a number of pathological conditions. In adult commonest cause is hepatitis, may be viral, drug induced or toxins or alcohol induced. Other common causes are haemolytic diseases, congenital hyperbilirubinaemic conditions like Gilbert's syndrome, and biliary obstruction. Patients usually come for consultation due to symptoms of underlying conditions or noticing yellow colouration of urine of eyes ie, sign of liver disease requiring further investigations. Patients may presents with nonspecific flu like symptoms, fever, abdominal pain, anorexia, weight loss, pruritus and change of colour of urine, skin and mucous membrane^{9,10}.

But in our country, specifically in rural areas, perception of people as well as informal care givers (without formal certification) ie, kabiraj, traditional healers and village doctors, regarding jaundice sometimes differs from medical definition^{11,12,13,14}. Our people claims to have jaundice (mete holmi in sylhet region) for any sorts of illness including hepatitis, hepatitis like illnesses¹⁴ and symptoms not consistent with liver diseases. Among them a good number of patients consults with informal caregivers ie, kabiraj and also with doctors. Most of times patients' views are also supported by informal care givers without clinical jaundice and biochemical reports. Some of these patients consult with physicians being referred by kabiraj with or without complications. Some patients also consult doctors directly claiming to have jaundice without clinical or biochemical evidence.

With this background, this study was designed to see the symptoms and symptom complexes and serum bilirubin levels of clinically anicteric patients claiming to have jaundice.

Materials and Methods:

Consecutive clinically anicteric patients consulting at a private medical centre in Sylhet, Bangladesh, claiming to have jaundice with or without history of consulting with kabiraj and traditional healers coming to doctors of both sexes were included. After taking informed consents their demographic information, symptoms for consultation were noted. After clinical examination, their blood samples were taken for estimation of serum bilirubin and ALT levels. Further investigations were done considering clinical findings and initial blood reports. Full work up for diagnosis in every patient were not possible due to lack of full logistic support.

This study was done from January 2019 to January 2020 at Popular Medical Centre, Sylhet.

Statistical analysis:

Data were analysed using SPSS version 20. Mean and SD were calculated for linear data. Percentages were calculated for categorical data. Chi square test was done to see relations between variables and P value <0.05 was taken as significant.

Results:

Total 177 patients, age varying from six years to 80 years (mean 28.54 SD12.15) were included. Of them 134 (75.7%) were male and 43 (24.3%) were female. In this series 137 (77.4%) and 40 (22.6%) were from rural and urban community respectively. Among them 57 (32.2%) were students, 29 (16.4%) were business man, 27(15.3%) were housewife, 18(10.2%) were service holders and 16(9.0%) were farmers (Table I).

In this series 78 (44.1%), 24(13.6%), 30 (16.9%) and 35 (19.8%) respectively had up to primary level, secondary level, higher secondary level, and higher level of educational background. Of them 133 (75.2%), 43 (24.3%) were from poor to lower middle class and middle class economic group. Among them 59(33.3%), 32 (18.1%) and 40 (22.6%) respectively had habit of smoking, taking Zarda and tobacco leave, and betel leave chewing (Table I).

Table-I: Demographic features.

Age	Number	Percentage
up to 25 years	83	46.9
26 - 40 years	76	42.9
above 40 years	18	10.2
Sex		
Male	134	75.7
Female	43	24.3
Address		
Urban	40	22.6
Rural	137	77.4
Occupation		
Student	57	32.2
Service	18	10.2
Business	29	16.4
Housewife	27	15.3
Farmer	16	9.0
Abroad	8	4.5
Others	22	12.4
Education		
Illiterate	10	5.6
Primary	78	44.1
SSC	24	13.5
HSC	30	16.9
Above	35	19.8
Economic status		
Poor and lower middle	133	75.2
Middle class	43	24.3
Rich	1	0.6
Habit		
Smoking	59	33.3
Zarda and tobacco	32	18.1
Pan	40	22.6
Faith to informal caregivers		
Faithful	164	92.7
Doubtful	13	7.3

Almost all patients had more than one symptom. Common symptoms for presentation were anorexia (90; 50.8%), pain abdomen (76; 42.9%), weakness (49; 27.7%), nausea (45; 25.4%), fullness of abdomen (35; 19.8%), gas (34; 19.2%), sleep disturbance (22; 12.4%), loose motion (18; 10.2%), constipation (17; 9.6%) and vomiting (16; 9%) (Table II).

Table-II: Symptoms.

Symptoms	Number	Percentage
*Pain abdomen	76	42.9
weakness	49	27.7
*Nausea	45	25.4
Sleep disturbance	22	12.4
*Anorexia	90	50.8
Gas	34	19.2
Fullness of abdomen	35	19.8
Loose motion	18	10.2
Constipation	17	9.6
*Vomiting	16	9
Backpain	9	5.1
Heart burn	13	7.3
*Fever / feverishness	5	2.8
*Yellow urine	46	26
Noisy bowel	5	2.8
Muscle cramp	12	6.7
headache / head discomfort	15	8.4
Limb pain	6	3.4
*Bad smell of food	4	2.3
cough	6	3.4
Palpitation	3	1.7
Excess flatus	1	0.6
weight loss	15	8.5
burning abdomen	5	2.8
Burning micturition	5	2.8
Belching / eructation	16	9.1
vertigo	13	7.3
Yellow eyes	None	00

- *Symptoms consistent with hepatitis of them 164 (92.7%) believed that they have jaundice and first consulted with kabiraj (informal care givers) while remaining only 13 (7.3%) directly came to physician for consultation. Serum bilirubin level of them varied from 0.04 mg/ dl to 2.67 mg / dl (mean 0.814 ± 0.577) and ALT level varied from 10 iu/ dl to 2944 iu/ dl (mean 71.55 ± 270.09). In this series 143 (80.0%) patients had serum bilirubin level within normal limit (up to 1.2 mg/ dl) (Table III).

Table-III: Serum bilirubin and ALT levels.

	Range	Number	Percentage
S. bilirubin	up to 1.20 mg/dl	143	80.8
	1.21 to 2.00	21	11.9
	>2.00	13	7.3
ALT	up to 40 iu/ l	121	68.4
	41-80	43	24.3
	81-120	5	2.8
	121-199	3	1.7
	200 and above	5	2.8

Out of 21 patients undergoing calorie deprivation test, 13 (7.34%) showed significant increase of serum bilirubin at second sample may be possible cases of Gilbert's syndrome. In this series, five patients had ALT raised more than five folds of normal (2.8%). Haemoglobin electrophoresis was done in four patients yielding one case of beta-thalassaemia minor (0.56%) and one Hb E-trait (0.56%). All patients underwent ultrasonography. Among them nonalcoholic fatty liver disease (NAFLD) was found in 9 (5.08%) patients, cholelithiasis was found in 7 (3.95%) patients. Among 48 patients undergoing test of HBV surface antigen, three (1.7%) were found positive. Stool antigen for *H. pylori* was positive in 11 (6.11%) patients out investigated 25 patients (Table IV).

Table- IV: Other Investigations.

USG (177)	N	% among investigated patients	% among total
Normal	143	80.79	
NAFLD	9	5.08	
Cholelithiasis	7	3.95	
Others (not related to liver)	18	10.17	
Endoscopy of UGIT (17)			
Normal	5	29.41	2.87
EAG	2	11.76	1.1
NEAG	6	35.29	3.38
Gastritis	1	5.88	0.56
DU	1	5.88	0.56
Barrett's	1	5.88	0.56
S. Ceruloplasmin (2)			
Normal	2	100	1.13
HBsAg (48)	N	% among investigated patients	% among total
Positive	3	6.25	1.69
Anti-HCV (9)			
Negative	9	100	5.01
Hb-electrophoresis (4)			
Beta- thal (minor)	1	25	0.56
Hb-E trait	1	25	0.56
Normal	2	50	1.13
Stool <i>H. pylori</i> antigen (25)			
Positive	11	44	6.21
Negative	14	56	
Calorie deprivation test (21)			
Significant rise of bilirubin	13	61.9	7.34

Significant difference was seen between level of serum bilirubin and rise of ALT ($p=0.001$) (Table V).

Table-V: Relation between serum bilirubin and ALT.

Bilirubin	ALT up to 40 N (%)	ALT 41-80 N (%)	ALT 81-120 N (%)	ALT 121-199 N (%)	≥200 N (%)	P
up to 1.2 mg (143)	103 (72.03)	30 (20.97)	5 (3.49)	3 (2.0)	2 (1.40)	
1.21- 2.0 (21)	12 (57.14)	9 (42.86)	0	0	0	0.001
≥2.01 (13)	6 (46.5)	4 (30.77)	0	0	3 (23.07)	

In this series history of consultation with informal care givers regarding jaundice significantly differed with education level ($P=0.015$), but no statistically significant differences was seen within age, sex, residency and economic groups (Table VI).

Table-VI: Relation between patients' attitude and variables.

Variables		Visted kabiraj		P value
		Yes (%)	No (%)	
Age group	up to 25 y (83)	75 90.36	8	0.546
	26 -40 y (76)	72 94.74	4	
	>40 y (18)	17 94.44	1	
Sex	Male (134)	123 91.79	11	0.436
	Female (43)	41 95.35	2	
Residence	Urban (40)	36 90.00	4	0.464
	Rural (133)	128 96.24	9	
Education	illiterate (10)	10 100.0	0	0.015
	Primary (78)	76 97.43	2	
	SSC (24)	23 95.83	1	
	HSC (30)	27 90.0	3	
	Above (35)	28 80.0	7	
Economic group	Poor (15)	15 100.0	0	0.066
	Lower middle (118)	112 94.91	6	
	Middle class (43)	36 83.72	7	
	High (1)	1 100.0	0	
Occupation	Student (57)	49 85.96	8	0.457
	business (29)	28 96.55	1	
	Housewife (27)	26 96.29	1	
	service (18)	16 88.88	2	
	Farmer (16)	16 100.0	0	
	Abroad worker (8)	7 87.5	1	
	others (20)	20 100.0	0	

Discussion:

Jaundice, a clinical condition, is usually related to liver disease. And one report from Pakistan shows that about 70% of patients with liver disease suffer from anxiety and or depression¹⁶. So people become panicked hearing message of having jaundice. In our country anecdotal experience shows jaundice also creates some anxiety among people. For this, good number of people seek health care for jaundice ie liver disease. In our country, specially in rural areas people visits to traditional healers - kabiraj with any sorts of illnesses due to easy accessibility, cheap and flexible payment scheme¹⁵. Most of the time kabiraj and traditional healers diagnose them having jaundice without clinical and biochemical evidence. In our series all patients were clinically anicteric. Common symptoms of our patients were anorexia, nausea, vomiting, abdominal pain which may occur in many diseases including hepatitis a common cause of jaundice¹¹. But gas, fullness of abdomen, sleep disturbance and many other presenting symptoms or complaints could not be well explained by hepatitis.

Serum bilirubin level below 3 mg/ dl is not clinically detectable. Even in early hepatitis, bilirubin may be below the above mentioned level and only biochemical tests may be diagnostic^{3,4}. So clinical jaundice is not mandatory for hepatitis. In this series all patients were anicteric and highest level of bilirubin was 2.67 mg/ dl. In case of acute hepatitis or liver disease jaundice is usually associated with derangement of serum enzymes ALT, AST, alkaline phosphatase. In our series five patients (2.8%) had more than five times rise of ALT¹⁷.

In this series most of the patients claiming to have jaundice visited informal care givers (kabaraj) who supported their views without having biochemical reports. Their faith to informal caregivers (kabaraj) was very strong. In one report from Matlab, Bangladesh also showed that people's belief to informal care givers were very strong¹⁶.

In our study around 90% of patients claiming to have jaundice visited kabarajs for treatment with statistically significant difference with education level. But one report from Matlab, Chandpur, Bangladesh also showed that about two third of patients claiming having jaundice consulted with kabaraj¹⁸. This difference may be due to difference in study design, and in education level.

The report from Matlab showed that People had some idea that informal care givers can better treat jaundice and medical science has no good remedy for it. Social tradition, lower education level, and lower economic status influenced them to this belief¹⁸. Probably this type of attitude of our series also attracted majority of patients towards informal care givers.

In this series, a small number of patients had features of acute hepatitis, Gilbert's syndrome and haemoglobin related diseases – thalassaemia and haemoglobin E trait. Gilbert's syndrome, an autosomal recessive disorder usually presents with hyperbilirubinaemia triggered by stress, strain, dehydration, fasting, infection or exposure to cold. And patients may experience nonspecific symptoms like anorexia, nausea, abdominal pain, tiredness and weakness may be confused with symptoms of hepatitis. These symptoms are usually related to triggering factors rather than liver disease^{19,20}. Beta thalassaemia trait and Hb-E trait are autosomal recessive diseases prevalence of which is about 4% and 1% respectively in our country²¹. But in our series it is very low. Our sample size is low and very small amount of patients were investigated in our study.

Informal care givers uses different modalities of treatment ie, Hat dhola, Jhara, voron – application of sticky herbal paste on shaved scalp, Mala (special necklace), Herbal drugs etc. consumption of blessed water, banana, etc. as treatment. Some of the treatment modalities of kabaraj may be potentially deleterious for health¹⁸. So educational motivation of community people including informal caregivers regarding jaundice, hepatitis and hepatitis like illnesses and explanation of common symptoms may be beneficial for community health.

Conclusion:

Most of the patients claiming to have jaundice without clinical icterus had no evidence of liver disease and even no other significant illness. Consulting kabaraj they are wasting money and sometimes inviting health related disasters. So mass education and motivation may increase awareness of people regarding liver disease and thereby sometimes prevent health hazards.

Further well designed and well funded study with large sample size may be done to overcome limitations and to make a definite conclusion.

Conflict of Interest: None.

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Spectrum of Haematological & Non Haematological Disorder Diagnosed by Bone Marrow Examination: A Study of 115 Cases

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Abstract

Introduction: Haematological and nonhaematological diseases affecting the bone marrow may be primarily or a secondarily spread to the marrow. In most of the cases, diagnosis can be arrived at by a detailed history, physical examination and few simple investigations. Bone marrow examination is a very useful tool in the diagnosis of hematological and non-hematological diseases. **Materials and Methods:** This retrospective study was done in the department of haematology, in a specialized diagnostic centre from July 2018 to July 2021. A total of 115 cases were included in this study. Clinical parameters were assessed, peripheral blood smear along with necessary haematological investigations were done. **Results:** Majority patient were male (70%). In total cases 44.4% patients were under 30 years of age. Among them 23(20%) were under 10 years. The most common indication for bone marrow examination was diagnosis & management of Acute Leukaemia 27(23.48%), Major presenting complaints were fever 49(42.61%), fatigue 46(40.0%) & bleeding manifestation 22(19.13%). On systemic examination, pallor was found in majority of the cases. Hematological malignancies were found in 77(66.96%) cases, non-malignant haematological disorders were found in 33(28.70%) cases. Acute leukaemic condition (ALL, AML) were the most common malignant conditions, 22(19.13%) & 17(14.78%) respectively. Most common nonmalignant haematological conditions were hypocellular marrow 17(14.78%). **Conclusion:** Acute Leukemia is a major indication of BME. Among the pathological condition malignant condition are commonly seen. And male are predominantly suffering more from haematological disorders than female. In majority cases acute leukaemic condition are seen in BME.

Keywords: Haematological, Non haematological disorders, Bone marrow examination.

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Introduction:

Bone marrow examination (BME) plays an important role in diagnosis of hematological as well as non-hematological disorders. It is a simple and safe procedure and the particularly useful in the investigation of pyrexia of unknown origin as it leads to an etiological diagnosis in most of the cases¹.

Haematological and nonhaematological diseases affecting the bone marrow may be primarily or a secondarily spread to the marrow. In both cases the normal marrow cellular architecture is damaged or displaced. The pattern of disorders affecting the marrow is quite different in developing countries than from developed countries². In most of the cases, diagnosis can be arrived at by a detailed history, physical examination and few simple investigations. But in certain cases bone marrow examination is required for the confirmation of diagnosis.

Bone marrow is involved in variety of hematological and non-hematological disorders. The hematological disorders include acute leukemia, myeloproliferative neoplasm (MPN), hemato-lymphoid neoplasm, nutritional deficiency diseases. On the other hand nonhematological disorders include infectious diseases infiltrating the bone marrow such as tuberculosis, parasitic infections and metastatic deposits³.

Haematological disorders usually presents with anemia in any age group. Anemia is common worldwide and particularly so in developing countries⁴. The spectrum of haematological disorders is relatively different in developing world than the developed countries⁵. There is a wide spectrum of diseases revealing bone marrow changes. Majority of these disorders present with vague clinical symptoms and poses difficulty for clinicians in the diagnosis based on complete

blood picture and peripheral film only; necessitating the use of bone marrow aspiration and examination for diagnosis⁶.

BME evaluation may either confirm clinically suspected diseases or may provide the previously unsuspected diagnosis⁷. It is usually sufficient individually to diagnosed nutritional anemia, Acute leukemia's, myelodysplasia, myeloma and parasitic infections⁸. It allows excellent morphologic evaluation of cells, differential count and myeloid to erythroid ratio. It gives an assessment of hematological activity; deviation from the normal may be qualitative with abnormal cellular morphology or quantitative with presence or absence of iron stores as evaluated by Prussian blue staining⁹.

BME is an invasive procedures performed by trained individuals using standard techniques and allow cytologic, immunophenotypic, cytogenic, molecular assessment and other specialized investigations. It should be done with great care in infants and neonates¹⁰. Before performing bone marrow aspiration full thorough study of tests already performed should be made^{11,12}. For proper diagnosis along with BME complete clinical history, careful physical examination for clinical findings, complete haemogram (complete blood count, peripheral blood picture), and other laboratory investigations are required^{13,14}. These results might be helpful for clinicians in selecting cases of bone marrow biopsy as numbers of patients are referred by them in a tertiary care hospital¹⁵.

Rationale of the study was to find out the common indications, in addition ascertain the etiological spectrum of disorders on bone marrow examination which will guide the clinicians about the frequency of hematological and non-hematological disorders and their management in a clinical setup.

Materials and Methods:

This retrospective study was done in the department of haematology, in a specialized diagnostic centre from July 2018 to July 2021 at Chattogram. A total of 115 cases were included in this study. Clinical parameters were assessed, peripheral blood smear along with necessary haematological investigations were done. Bone marrow aspiration was done thereafter. Patient's age, sex, clinical details including history, physical examination findings & investigation findings were taken from report sheet.

Peripheral Smear Preparation and Staining

Peripheral Smear was prepared and stained according to the guidelines in Practical Hematology, Dacie and Lewis, 10th Edition¹⁶.

Bone Marrow aspiration¹⁷

Under aseptic measures aspiration was done through posterior iliac crest. The patient was placed in a prone position, a pillow under their head. Lidocaine was used as the anaesthetic, providing the patient has no history of an allergic reaction to this medication. During this process, local anaesthetic is first infiltrated into the skin and subcutaneous tissue to anaesthetize an area approximately 1 cm. in diameter. After the skin is numb, lidocaine is infiltrated directly over the periosteum to numb an area approximately 2-3 cm in diameter. Salath needle is

advanced with steady pressure and a slight twisting motion to the center of the posterior iliac prominence. The needle was rotated back and forth (90o-180o) and careful pressure was applied to advance the needle through the cortical bone. A decreased resistance indicated penetration of cortex and entry into the marrow cavity. Needle was advanced about 1 cm into the marrow cavity. The obturator was unlocked and slowly removed 0.3 ml of marrow fluid was aspirated into a 10 ml syringe and specimen slides were prepared. A folded piece of gauze was placed over the site with a pressure bandage. The patient was asked to lie supine for at least 30 minutes.

Steps of preparing aspirated smear and staining methods¹⁶

Aspirate slides were stained with leishman stain. Perls stain for iron stores was done in all cases. Complete blood count (CBC), peripheral smear examination (PBF) was done in all cases.

Inclusion & Exclusion Criteria

All the cases that were referred for bone marrow examination and also for staging of haematological malignances and staging were included in this study. Children below 1 year of age were excluded.

Method of data processing & statistical analysis

Statistical analysis using descriptive statistic was done. All quantitative values were presented as mean $\pm$ SD for continuous data and as percentages for categorical data. Qualitative data were presented as frequency and percentage. Quantitative data was analyzed by student's t-test. All tests were two-tailed and statistically significant results will be considered when p value < 0.05. All statistical operations were analyzed by SPSS version 20 and Micro-soft Excel 10.

Results:

A total of 115 patients, aged between 2 to 80 years. Majority patient were male 80(70%) with M:F ratio of 2.3:1 (figure 1).

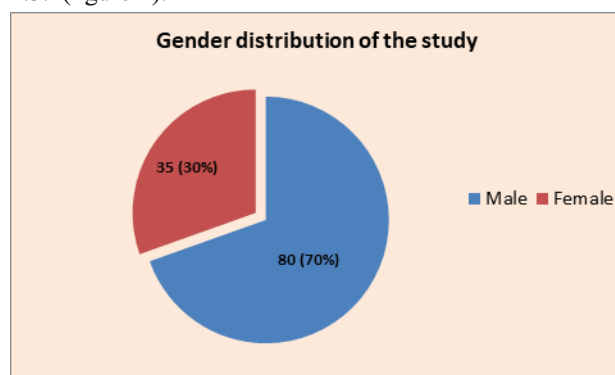


Figure 1: Gender Distribution of the study.

Mean age of the study population was 38.23 ± 25.18 , and there was no statistically significant difference of ages between male & female ($p=0.442$). In this present study, the age group of the patients was from 2 to 80 years. The Maximum numbers of the cases (20%) were in the age group of 1-10 years. In total cases 44.4% patients were under 30 years of age (Table I).

Table-I: Distribution of the cases according to age & sex.

Age	Male	Female	Total	%
1-10	17	6	23	20.0
11-20	11	3	14	12.2
21-30	10	4	14	12.2
31-40	4	3	7	6.1
41-50	7	5	12	10.4
51-60	11	5	16	13.9
61-70	12	5	17	14.8
71-80	8	4	12	10.4
Total	80	35	115	100.0
Mean±SD	37.03±25.46	40.97±24.66	38.23±25.18	P= 0.442
Min-Max	2-80	3-80	2-80	

The most common indication (according to PBF findings) for bone marrow examination was diagnosis & management of Acute Leukaemia 29(25.22%). Other findings were anaemia for evaluation 24(20.87%) & Pancytopenia 21(18.26%) cases, Bicytopenia 14(12.17%). Haematological findings are summarized in table II.

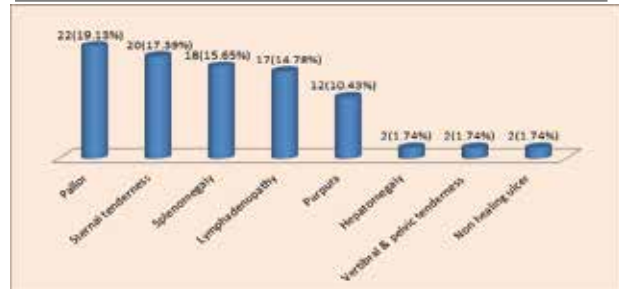
Table-II: Indication of bone marrow study (according to PBF findings).

Indication for Bone Marrow Examination	n	%
Diagnosis & management of Acute Leukaemia	29	25.22
Anaemia for evaluation	24	20.87
Pancytopenia	21	18.26
Bicytopenia	14	12.17
Diagnosis & management of CML	9	7.83
Leuko erythroblastic blood picture	7	6.09
Diagnosed Leukaemia with remission status	3	2.61
Thrombocytopenia	2	1.74
Leukocytosis	1	0.87
Multiple Myeloma	1	0.87
Myeloproliferative disorders	1	0.87
Rouleaux formation	1	0.87
Eosinophilia	1	0.87
Cutaneous T-cell lymphoma	1	0.87
Total	115	100.00

The clinical presentation of the cases varied from fever, fatigue and bleeding manifestation to non-specific symptom like neck swelling (Table III).

Table-III: Clinical presentation of the cases including in the study.

Indication for Bone Marrow Examination	n	%
Fever	49	42.61
Fatigue	46	40.00
Bleeding manifestation	22	19.13
Body ache/Bone pain	20	17.39
Generalized weakness	18	15.65
Back pain	14	12.17
Abdominal pain/Distention/Discomfort	11	9.57
Weight loss	7	6.09
Cough/Breathless	4	3.48
Vomiting/diarrhea	2	1.74
Lower limb pain	2	1.74
Neck swelling	1	0.87

**Figure 2: Clinical findings of the cases including in the study.**

Major presenting complaints were fever 49(42.61%), fatigue 46(40.0%), Bleeding manifestation 22(19.13%), Body ache/Bone pain 20(17.39%), Generalized weakness 18(15.65%). Other minor presenting complaints included back pain, abdominal pain/distention/discomfort, weight loss, Cough/Breathless. On systemic clinical examination, pallor was the commonest finding, seen in 22(19.13%). Other significant findings were sterna tenderness in 20(17.39%), splenomegaly in 18(15.65%), lymphadenopathy in 17(14.78%) (Figure 2).

On bone marrow examination, hematological malignancies were found in 77(66.96%) cases, non-malignant haematological disorders were found in 33(28.70%) cases. Acute leukaemic condition (ALL, AML) were the most common malignant conditions, 22(19.13%) & 17(14.78%) respectively. The next common malignancies in this study were Chronic myelogenous leukaemia (CML) and Plasma cell dyscrasia (PCD) both were 11(9.57%), there was 4(3.48%) cases of ALL under remission. Most common nonmalignant haematological conditions were hypocellular marrow 17(14.78%), Erythroid hypoplasia 6(5.22%) and myeloid hyperplasia 5(4.35%). All haematological findings are seen in table IV.

Table-IV: Distribution (Bone marrow examination) of haematological disorders according to age & sex.

Malignant Haematological Disorders											
	1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	M:F	Total Cases	%
ALL	8	6	5	3	-	-	-	-	13:9	22	19.13
AML	4	3	1	1	1	4	3	-	12:5	17	14.78
CML	2	-	3	-	3	2	1	-	8:3	11	9.57
PCD	-	-	-	-	1	4	3	3	8:3	11	9.57
MDS	1	1	-	-	2	-	2	1	6:1	7	6.09
AL	1	-	-	-	-	-	1	-	2:0	2	1.74
MPD	-	-	1	-	-	-	-	1	1:1	2	1.74
Cutaneous T-cell lymphoma	-	-	-	-	-	-	-	1	1:0	1	0.87
ALL in remission	4	-	-	-	-	-	-	-	4:0	4	3.48
Total no. of cases										77	66.96
Non-Malignant Haematological Disorders											
	1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	M:F	Total Cases	%
Hypocellular Marrow	1	3	1	1	2	4	3	2	12:5	17	14.78
Erythroid Hypoplasia	-	-	2	-	1	-	1	2	4:2	6	5.22
Myeloid Hyperplasia	-	-	1	1	1	1	-	1	2:3	5	4.35
Megaloblastic erythroid hyperplasia	1	-	-	-	-	-	1	-	1:1	2	1.74
Megakaryocytic hyperplasia	-	1	-	-	-	-	-	-	1:0	1	0.87
ITP	1	-	-	-	-	-	-	-	1:0	1	0.87
Active marrow with dysplastic change	-	-	-	1	-	-	-	-	1:0	1	0.87
Total no. of cases										33	28.70

Total 3(2.61%) of non-haematological cases were seen in this study, all were Secondary metastatic deposition (Table V).

Table-V: Distribution (Bone marrow examination) of non-haematological disorders according to age & sex.

Non Haematological Disorders											
	1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	M:F	Total Cases	%
Secondary (Metastatic deposition)	-	-	-	-	1	1	1	-	3:0	3	2.61

The present study also encountered a single case of Normal study and inadequate sample respectively (Table VI).

Table-VI: Distribution of other haematological conditions according to age & sex.

Distribution of other haematological conditions											
	1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	M:F	Total Cases	%
Normal study	-	-	-	-	-	-	1	-	0:1	1	0.87
Inadequate Sample (Blood tap only)	-	-	-	-	-	-	-	1	0:1	1	0.87

Pictograms of different findings of bone marrow studies are shown in figure 3.

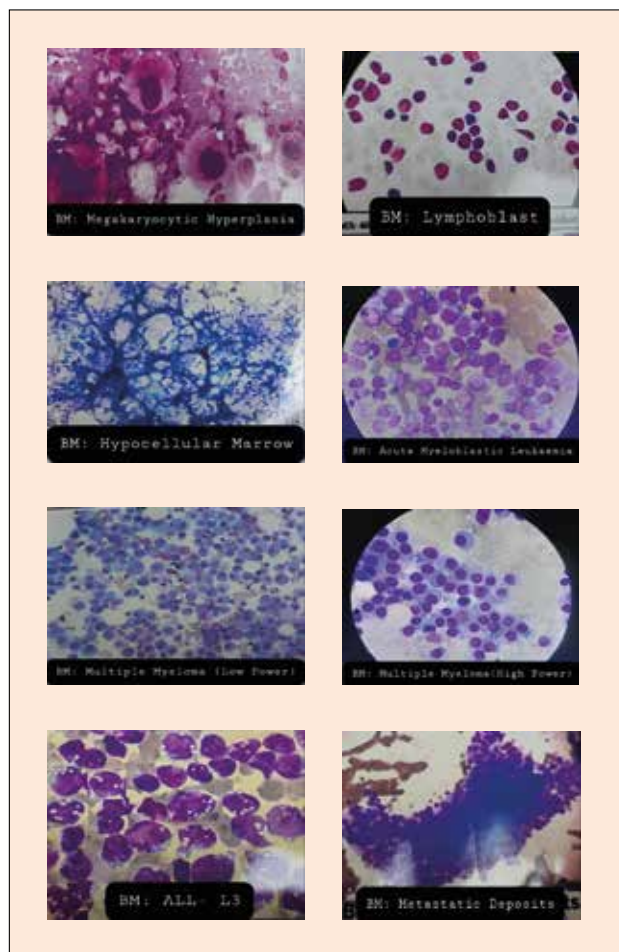


Figure-3: Pictograms of different findings of Bone Marrow examination.

Discussion:

Bone marrow is one of the most widely distributed organs of the body. It is the principle site of haematopoiesis. BME is safe invasive procedure that can be done to arrive at a final diagnosis in certain haematological disorders. It helps to evaluate cytopenias, thrombocytosis, leukocytosis, anemia and iron status. It is also a diagnostic tool in nonhaematological disorders such as storage disorders and systemic infections. It is an ambulatory procedure performed under local anaesthesia with minimum morbidity.

In the present study, out of 115 cases there were 80(70%) males and 35(30%) females. Male: Female was 2.3:1. Which was almost similar to the study of Kumar V et al.¹ In most of the studies we found that, male are predominantly suffering more from haematological disorders than female^{1,8,13-15,18-20}. But in the study of Munir AH et al. that was conducted in Peshawar- majority patients were female¹¹. The age of the patients who underwent BME ranged from 2-80 years which is similar with the study of Chowdhury MRK². The mean age of the study population was 38.23 years, almost similar with Atchuta M et al.¹⁸ In our study commonest group of patients were very young 1-10 years (20%), instead in other studies commonest patient were in above 30 years group (between 31-50)^{2,13,18}.

In our study most common indications for BME examination were Diagnosis & Management of Acute Leukaemia (n-27, 23.48%), Anaemia (n-24, 20.87%) pancytopenia (n-21, 18.26%) and Bicytopenia (n14, 12.17%). This is also similar to that of the studies done by Chowdhury MRK et al.² Qahtani AS¹⁵ Pudasaini S²¹. However pancytopenia was the first common indication in the study done by Sudhakar G¹³.

Major presenting complains of this study were fever 49(42.61%), fatigue 46(40.00), Bleeding manifestation 22(19.13), Body ache/Bone pain 20(17.39%), Generalized weakness 18(15.65%). Fever was also the prime symptom of the study of Kumar V¹. On systemic clinical examination, pallor was the commonest finding seen in 22(19.13%) cases. Which is also similar with the study of Ali I⁹. Instead splenomegaly was the commonest finding in the study of Kumar V¹.

In the present study 113(98.261%) of the marrow was pathological and 2(1.793%) were normal. Among the pathological condition malignant condition was more common 80(69.57%) than non-malignant 33(28.70%). Malignant haematological conditions were 77(66.96%). In the study of Chowdhury MRK² 33.55% of their patients had non-malignant haematological conditions while 47.37% had haematological malignancies. From our study we found that in comparison with non malignant haematological disorders, malignant haematological conditions are more common, among these Acute leukaemia is predominant^{8,10,11,15,18,21-22}. But in the study of Sudhakar G¹³ malignant haematological disorders were present in 20.05% cases and non-malignant haematological disorders were present in 70.18% cases. Erythroid hyperplasia was the

commonest diagnosis in the study of Bashir N et al¹⁴. Out of 77 malignant haematological conditions acute leukaemia was 41(35.65%). Among the acute leukemia, acute lymphoblastic leukaemia (ALL) was 22(19.135) and acute lymphoblastic (AML) was 17(14.78%). Chowdhury MRK et al² also reported 14.47% of AML, that is almost similar with our study. The common age group among AML group were 1-10 years and 51-6- years with M:F ratio of 2.4:1. In ALL common group was 1-10 years with M:F ratio of 1.44:1. In CML common group was 21-30 years and 41-50 years with M:F ratio of 2.67:1. In the study of Atchyuta M et al.¹⁸ the common age group in AML was 51-60 years with M:F ratio of 1.1:1; the common age group in ALL was 1-14 where all are male. In CML the common age group was 31-40 years with M:F ratio of 1:1.5. We also found 4(3.48%) cases of ALL in remission stage, all were male & under 1-10 years. Where in the study of Atchyuta M 2.67% were under remission with M:F ratio of 6:4.

Among the non malignant condition, Hypocellular marrow was seen in 17(14.78%) majority cases with the common age group between 51-60 years (M:F=2.4:1) in our study, similar with Chowdhury MRK². When compared to other studies, megaloblastic anaemia was commonest (17.5%) in Sudhakar et al¹³ and (26.5%) in Bashir N et al¹⁴ studies. In the study of Atchyuta M¹⁸ in megaloblastic anaemia commonest age group was 21-30 years with M:F ratio of 1.2:1. Hypocellular marrow was also reported as 5.3%, 19% and 29%^{21,22,23}. In the present study ITP was seen in only one case (0.87%), a male patient under 10 years. In the study done by Pudasani et al.²¹ ITP was seen in 10.5% cases and also reported as 6.21% and 14.5%^{5, 25}. In this study Erythroid hypoplasia were seen in 6(5.22%) cases with M:F ratio of 2:1. Instead majority studies Erythroid hyperplasia were commonly seen. Erythroid hyperplasia were also reported as 34%(M:F 1.1:1), 21% and 19.6%^{18,21,24}.

In our study metastatic depositions were in 3(2.61%) cases, and the entire patients were male. Where metastatic deposition were also reported as 3.1%, 1.75%, 3.6%, 1.2% and 0.8%^{8, 13-15,18}. There was only one (0.87%) normal study & inadequate sample (0.87%) were in our study. Instead 10.4% and 12% normal study was reported by Atchyuta M¹⁸ and Bashir N¹⁴ respectively. Inadequate sample were moreover reported as 0.8% and 2.94%^{10,18}. Like others study our inadequate sample case was female.

Conclusion

Bone marrow examination is a useful tool in the diagnosis of various hematological and non-hematological disorders. Acute Leukemia is a major indication of BME. Among the pathological condition malignant condition are commonly seen. And male are predominantly suffering more from haematological disorders than female. In majority cases acute leukaemic condition are seen in BME.

Conflict of Interest: None.

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Bacteriology and Antibiotic Sensitivity Pattern of Sputum in Patients with Acute Exacerbation of Chronic Obstructive Pulmonary Disease

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Abstract

Introduction: Chronic obstructive pulmonary disease (COPD) is a major cause of chronic morbidity and mortality worldwide. Nowadays investigators need culture studies for proper selection of antibiotic, but it is a time consuming process. The choice of the antibiotic should be constituted on the bacterial sensitivity and resistance pattern.

Objective: To identify the causative bacteriology and antibiotic sensitivity of sputum of chronic obstructive pulmonary disease patients with acute exacerbation. **Materials and Methods:** It was a prospective study in department of medicine Cumilla Medical College Hospital during the period of July 2019-2020. All the patients included in this study were above 37 years of age, diagnosed as acute exacerbation of COPD (AECOPD) were included in this study. Those patients were on antibiotic was advised to stop antibiotic for 48 hours and were included in this study. Fresh spot specimen as well as overnight collection of sputum samples were collected from each 257 patients of different age and sex groups in a sterile screw capped universal container. The specimen was labeled and transported to the microbiology laboratory for processing and cultured within half an hour of collection. Antibiotic susceptibility pattern was done following Kirby-Bauer disc diffusion method of clinical laboratory science (CLS) program. **Results:** Majority (45.5%) of the patients had growth of *Klebsiella pneumoniae*. All the isolated organisms except *Acinetobacter* are mostly sensitive to Meropenem, Imipenem and Amikacin. In vitro sensitivity pattern against these antibiotics was more than 85%. **Conclusion:** Male is predominating and majority of them are older age group. *Klebsiella pneumoniae*, *Pseudomonas* and *E. coli* are common isolated organisms.

Keywords: COPD, AECOPD, Isolated organism, Antibiotics, Sensitivity pattern.

Number of Tables: 04; **Number of References:** 20; **Number of Correspondence:** 05.

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Introduction:

COPD is a major cause of morbidity and one of the predominant causes of the death across the world, characterized by a worsening in the patient's respiratory symptoms which is beyond normal day-to-day variations and eventually leads to a change in the medication¹. Exacerbations of Chronic Obstructive Pulmonary Disease (AECOPD) are a common cause of hospitalization. It could have either an infective or non-infective etiology. Primary line of treatment is administration of empirical antibiotic therapy². Chronic obstructive pulmonary disease (COPD) is a major cause of chronic morbidity and mortality worldwide. Acute exacerbation is an acute and sustained worsening of a patient's condition from a stable state (beyond normal day-to-day variations) and it is caused in majority by infectious agents, particularly bacteria³. In AECOPD cases due to infection, three classes of pathogens have been found: respiratory viruses, aerobic gram-positive and gram-negative bacteria, and atypical bacteria⁴. Current data on bacteriology related to AECOPD are mainly obtained from the western countries⁵. The spectrum of organisms in India might be different from those of other countries or regions making it crucial to examine the bacteriology responsible for AECOPD, which is important for the choice of empirical antibiotic treatment⁵. It has been observed that the use of antibiotics used to treat AECOPD has an impact on the failure rate⁶. More than 90% of patients with AECOPD are treated with antibiotics, due to the emergence of resistant strains⁷. Nowadays investigators need culture studies for proper selection of antibiotic, but it is a time consuming process. The choice of the antibiotic should be constituted on the local bacterial resistance pattern. The aim of this study is to identify the causative bacteriology and antibiotic sensitivity of

sputum of chronic obstructive pulmonary disease patients with acute exacerbation.

Materials and Methods:

It was a prospective study in department of medicine Cumilla medical college hospital during the period of July 2019-2020. All the patients included in this study were above 37 years of age, presented with AECOPD diagnosed either clinically or by investigations were included in this study. Those patients were on antibiotic advised to stop drug for 48 h and were included in this study. Fresh spot as well as overnight collection of sputum samples were collected from each 257 patients of different age and sex groups in a sterile screw capped universal container. The specimen was labeled and transported to the microbiology laboratory for processing and cultured within half an hour of collection. A modified semi-quantitative technique using a standard calibrated bacteriological loop was performed to transfer 0.001 ml of sample on blood agar and MacConkey agar media. After allowing the sample to be absorbed into the agar, the plates were then inverted and incubated aerobically at 37°C for 24 h. The plates were then examined macroscopically for bacterial growth. The colony count was done using semi quantitative method. Number of colonies obtained was multiplied by 1000 to obtain the colony forming units (CFU)/ml. A significant growth is considered if the number of colony is 105 CFU/ml. Colonial appearance and morphological characters of isolated bacteria was noted and gram staining was done for identification of the isolated organisms. The characteristic bacteria on the culture media were aseptically isolated. Antibiotic susceptibility pattern was done following Kirby-Bauer disc diffusion method of clinical laboratory science (CLS) program. It was carried out by disc diffusion technique using Muller Hinton Agar. Interpretation of results was expressed in sensitive and resistant depending upon the size of the zone of inhibition. The antibiotics used for susceptibility testing in our study were amoxycillin, amoxycylav, cefotaxime, ceftriaxone, cephalixin, nalidexic acid, nitrofurantoin, mecillinum, amikacin, cefixime, ceftazidime, cefuroxime, cephradine, ciprofloxacin, cotrimoxazole, gentamycin, tazobactam, meropenem, and imipenem.

Results:

Table I shows the baseline characteristics of included patients in the study with AECOPD. The study population of 257 consecutive patients with bacterial CAP comprised 166 men (64.6%) and 91 women (35.4%), ranging in age from 38 years to 80 years, mean 76 [standard deviation (SD) 20.37] years. Most frequent distribution of the isolates in the sputum was found in the age group 49 to 60 years. Out of total 257 isolates, 137 belongs to this age group of which male and female were 88 and 49 respectively. Among the study population of 257 consecutive patients, Rural was 157 (61.09%) and Urban was 100 (38.91%). Out of total 475 subjects married 466 (98.10%) and unmarried 9 (1.90%), Illiterate 148 (31.16%), Primary 176 (37.05%),

Secondary 98 (20.63%), Higher secondary 48 (10.11%) and Graduate 5 (1.05%). Occupation of the study population, Business 57 (12%), Farmer 24 (5.05%), House holder Workers 285 (60%), Service Holder 50 (10.53%) Laborer was 59 (12.42%). History of tobacco user 425 (89.47%) & Non-tobacco user was 50 (10.53%). History of hospitalized 215 (45.26%) & Not hospitalized 260 (54.74%).

Table I: Baseline Characteristics.

Table 1. Baseline Characteristics.		
Age (years)	Male	Female
37-48	46	27
49-60	88	49
>60	32	15
Total	166	91
Marital Status		
Married - n (%)	466 (98.10)	
Unmarried - n (%)	9 (1.90)	
Residence, n (%)		
Rural	157 (61.09)	
Urban	100 (38.91)	
Qualification, n (%)		
Illiterate	148 (31.16)	
Primary	176 (37.05)	
Secondary	98 (20.63)	
Higher Secondary	48 (10.11)	
Graduate	5 (1.05)	
Occupation, n (%)		
Business	57 (12)	
Farmer	24 (5.05)	
Housewife	285 (60)	
Service Holder	50 (10.53)	
Laborer	59 (12.42)	
History of Tobacco use, n (%)		
Tobacco user	425 (89.47)	
Non-tobacco user	50 (10.53)	
History of Hospitalization (Past 1 year), n (%)		
Hospitalized	215 (45.26)	
Not Hospitalized	260 (54.74)	

Table II shows the growth status of the organisms in sputum culture of AECOPD patients. Out of total 475 subjects' female and male were 292 (61.5%) and 183 (38.5%) respectively. This table also displays out of 475 only 257(54.1%) samples yield bacterial isolates, on the other hand total 218(45.9%) samples fails to demonstrate growth of any bacteria.

Table II: Overall prevalence of growth of pathogen and their sex distribution.

Sex	Subjects (%)	Growth (%)	Not growth (%)
Male	292 (61.5)	166 (34.95)	126(26.53)
Female	183 (38.5)	91 (19.15)	92(19.37)
Total	475 (100.0)	257 (54.1)	218(45.9)

Table III shows that majority (45.5%) of the patients had growth of Klebsiella followed by Pseudomonas 76(29.6%), E. coli 32(12.5%), Staphylococcus aureus 16(6.2%), Acinetobacter 8(3.1%) and Streptococcus 8(3.1%).

Bacterial growth in sputum culture	Frequency	Percentage
Klebsiella	117	45.5
Pseudomonas	76	29.6
E.coli	32	12.5
Stapylococcus aureus	16	6.2
Acinetobacter	8	3.1
Streptococcus	8	3.1
Total	257	100.0

Table IV: Antibiotic sensitivity pattern of organisms isolated from sputum.

Organism isolated	Number of Isolate	Sensitivity pattern (%)																		
		Meropenum	Imipenum	Netimycin	Amikacin	Teicoplanin	Gentamycin	Piperacilin / Tazobactum	Levofloxacin	Ciprofloxacin	Cefepinme	Cefuroxime	Cotrimoxazol	Ceftriaxone	Cefixime	Colistine	Tobramycin	Azythromycin	Amoxyclave	Ceftazime
Klebsiella	117	111 (95)	110 (94)	106 (90)	103 (88)	100 (85)	98 (80)	94 (80)	88 (75)	86 (72)	80 (68)	58 (50)	58 (50)	55 (47)	54 (46)	52 (44)	50 (42)	48 (41)	35 (30)	32 (27)
Pseudomonas	76	74 (94)	69 (91)	65 (85)	69 (91)	61 (80)	57 (75)	61 (80)	68 (89)	67 (88)	22 (45)	53 (70)	62 (81)	49 (64)	34 (45)	61 (80)	61 (80)	53 (70)	19 (25)	54 (71)
E. coli	32	30 (94)	29 (91)	29 (91)	27 (84)	28 (87)	26 (81)	28 (87)	24 (75)	26 (81)	13 (41)	15 (47)	24 (75)	16 (50)	20 (62)	21 (66)	26 (81)	23 (72)	11 (34.4)	16 (50)
Staphylococcus aureus	16	16 (100)	16 (100)	16 (100)	15 (94)	12 (75)	15 (94)	16 (100)	5 (31)	14 (84)	15 (94)	14 (87)	13 (81)	14 (87)	15 (94)	14 (87)	14 (12 (75)	3 (19)	12 (75)	5 (31)
Acinetobacter	8	7 (87)	6 (75)	6 (75)	5 (62)	7 (87)	6 (75)	6 (75)	5 (62)	5 (62)	2 (25)	3 (37)	3 (37)	3 (37)	3 (37)	5 (62)	5 (62)	2 (25)	3 (37)	2 (25)
Streptococcus	8	8 (100)	8 (100)	8 (100)	7 (87)	8 (100)	8 (100)	7 (87)	3 (38)	7 (87)	7 (87)	7 (87)	6 (87)	8 (100)	7 (87)	6 (75)	5 (62)	1 (12)	6 (75)	2 (25)

Out of total 475 subjects' female and male were 292 (61.5%) and 183 (38.5%) respectively. This table also displays out of 475 only 257(54.1%) samples yield bacterial isolates, on the other hand total 218(45.9%) samples fails to demonstrate growth of any bacteria. Shashibhushan et al.⁸ reported 122 (76.3%) males and 38 (23.7%) females with a male: female ratio of 61:19. Sputum culture positivity was observed in 78 cases (48.7%). Patel et al.⁹ observed culture was positive was found in 41 (82%) patients. Abraham et al.¹⁰ observed out of which 103 (42.9%) were positive for pathogenic bacteria and 137 (57.1%) were normal flora. Out of 240 patients with acute exacerbation of COPD, 184 (76.67%) were males and 56 (23.3%) were females. In this study observed that the study population of 257 consecutive patients with bacterial comprised 166 men (64.6%) and 91 women (35.4%), ranging in age from 37 years to 80 years, mean 76.0 [standard deviation (SD) 20.37] years. Most frequent distribution of the isolates in the sputum was found in the age group 49 to 60 years. Out of total 257 isolates, 137 was belongs to this age group of which male and female were 88 and 49 respectively. Shashibhushan et al.⁸ reported the mean age of patients was 63.18 years (40-81) which comprises of 84% of males and 16 % of female patients. Maximum numbers of patients were in the age group of 61- 70 years. Sharma et al.¹¹ also reported maximum patients (32.05%) belonging to the age group of 51-60 years. Rashid and Ahmed³ the age of the patients ranged from 46-88 years with most of the patients (56%) in the age group 55-65 years. Abraham et al.¹⁰ reported maximum number (178) belonged to the age group of 60-79 years. Common organisms responsible for AECOPD, like *S. pneumoniae*, *H. influenzae* and *M. catarrhalis*, were sensitive to commonly used antibiotics, fluoroquinolones, cephalosporin, amino glycosides and piperacillin-tazobactam. Sharma et al.¹¹ In this study observed that the majority (45.5%) of the patients had growth of *Klebsiella pneumoniae* in followed by *Pseudomonas* 76(29.6%), *E. coli* 32(12.5%), *Staphylococcus aureus* 16(6.2%), *Acinetobacter* 8(3.1%) and *Streptococcus* 8(3.1%). Shashibhushan et al.⁸ reported the commonest pathogenic bacteria isolated in sputum culture was *Streptococcus pneumoniae* 42 (42%), followed by *Pseudomonas aeruginosa* 23 (23%), *Klebsiella* 15 (15%), *E. coli* 12 (12%), gram-negative non fermenting bacteria (GNMF) 7 (7%) and *Citrobacter* 1 (1%). But other Indian study has reported different strain *Pseudomonas aeruginosa*¹². Madhavi et al.¹³ had found *Klebsiella pneumoniae* was the most common organism. Rashid and Ahmed³ reported Bacteriological profile: *Klebsiella pneumoniae* were the commonest (16 cases) bacteria isolated followed by *Staphylococcus aureus* (9 cases). *Streptococcus pneumoniae* was isolated in seven cases and *Pseudomonas aeruginosa* in three cases. Majumder et al.¹⁴ observed among 198 culture positive samples, *E. coli* was ranked highest 171 (86%). Growth of *Klebsiella pneumoniae* and *Enterococcus* was

found in 17 (9.6%) and 10 (5%) samples respectively. It was also observed from this table that the maximum numbers of isolates were distributed among the females 123 (62%). Patel et al.⁹ reported streptococcus pneumoniae (32%) was the most common pathogen isolated followed by Streptococcus pyogenes (16%) and Pseudomonas (12%). Abraham et al.¹⁰ reported the most common pathogenic bacteria isolated in sputum culture was Klebsiella pneumoniae 31 (30.09%), followed by Pseudomonas aeruginosa 30 (29.1%), Acinetobacter 15 (14.56%). In this study showed all the isolated organisms except Acinetobacter are mostly sensitive to Meropenem, Imipenem and Amikacin. In vitro sensitivity pattern against these antibiotics was more than 85%. It can also be noted from this table that Klebsiella, Pseudomonas, E. coli and Acinetobacter are less sensitive to Azithromycin, Amoxycylate, Cefazime, Cefixime, Cefepime and Ceftriaxone. In vitro sensitivity pattern against these antibiotics is less than 50%. Shashibhushan et al.⁸ reported streptococcus pneumoniae which was the commonest isolate in the culture was sensitive to ceftriaxone - a third generation cephalosporin, and only few strains of streptococcus pneumoniae were sensitive to piperacillin-tazobactam, cefotaxime and azithromycin. Pseudomonas aeruginosa, prevalent gram-negative isolate was sensitive to piperacillin-tazobactam, amikacin and levofloxacin, while Klebsiella and E coli both were sensitive to ceftriaxone. Beside this gram-negative non-fermenting bacterium was sensitive to amikacin and another strain Citrobacter which was least isolated, sensitive to quinolone group ciprofloxacin. Patel et al.⁹ which found that piperacillin-tazobactam was most effective against Streptococcus pneumonia. Sharma et al.¹¹ observed antibiogram of isolated organisms revealed that usual organisms considered responsible for AECOPD, like S. pneumoniae, H. Influenzae and M. catarrhalis, were sensitive to commonly used antibiotics fluoroquinolones, cephalosporin, amino glycoside and Piperacillin-tazobactam. However, GNB showed significant resistance ($p < 0.05$) to the above antibiotic groups. Among gram negative organisms, E. coli which was the most common isolate were mainly sensitive to carbapenems, colistin and Polymyxin-b followed by aminoglycosides and Piperacillin-tazobactam. E. coli were found to be significantly resistant to levofloxacin and third generation cephalosporin. Acinetobacter species were sensitive to mainly colistin and polymyxin-b with significant in vitro resistance to carbapenems, fluoroquinolones, cephalosporin and Piperacillin-tazobactam. Rashid and Ahmed³ reported antibiotic sensitivity patterns of the isolates: Klebsiella pneumoniae, which was the most common isolate, was sensitive to gentamicin, meropenem, followed by ceftriaxone, moxifloxacin, levofloxacin, ciprofloxacin and azithromycin. Few authors¹⁵⁻¹⁷ has found higher incidence of pseudomonas and enterobacteriaceae in patients with more severely compromised lung functions. Groeneweg et al.^{15,18,19} had also included more severe patients but found hemophilus influenza (45%) as most frequent organism²⁰ followed by streptococcus pneumonia (27%).

Conclusion

Male is predominating and majority of them are older age group. Klebsiella pneumonia, Pseudomonas and E. coli are common isolated organism. Most sensitive antibiotics were Meropenem, Imipenem and Amikacin and less sensitive to Azithromycin, Amoxycylate, Cefazime, Cefixime, Cefepime and Ceftriaxone.

Conflict of interest: None.

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Bacteriological Profile of Suspected Neonatal Septicaemia and Its Relationship with Selected Risk Factors

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Abstract

Introduction: Neonatal septicaemia is one of the major problem in neonatology with a high case fatality rate. Manifestations of neonatal septicaemia are subtle & non-specific. Blood culture is the “gold standard” in the diagnosis of neonatal septicaemia, a high index of suspicion with or without laboratory evidences of infection is the key for early diagnosis. Early diagnosis & introduction of antibiotic may reduce mortality and morbidity. **Objective:** To explore the bacterial organisms among the suspected neonatal septicaemic cases and its relationship with selected risk factors. **Materials and Methods:** A Cross sectional descriptive type of study was carried out on all suspected cases of neonatal septicaemia patients admitted in the paediatric wards of Rajshahi Medical College Hospital during the period of July 2008 to June 2010. Total 60 sixty cases who had non-specific symptoms of septicaemia were enrolled in this study. After a clinical evaluation and management of the patient blood culture was performed on all neonates with risk factors or signs suggestive of sepsis. **Results:** Out of sixty cases of suspected neonatal septicaemic newborns 18.33% were culture positive for bacteria. Both gram negative and gram positive bacteria were responsible for neonatal septicaemia. Majority of the organisms were gram negative (54.5%) and most common organisms was *E.coli* (54.5%). Other gram-positive organisms were *Streptococcus* spp (27.3%) and *Staph aureus* (18.2%) respectively. Among blood culture positive cases 82% were early onset neonatal septicaemia & 18% were late onset septicaemia. Gestational age, Low birth weight, Low socioeconomic status of mother, mode of delivery and birth asphyxia were risk factor for both early onset neonatal sepsis & late onset neonatal sepsis. **Conclusion:** Septicaemia is one of the major causes of death & its manifestations are subtle and non specific. Both gram negative & gram positive bacteria are responsible for neonatal septicaemia. Most isolated bacteria *E.coli*. Risk factors may be the factor for NNS. Although blood culture is the “gold standard” in the diagnosis of NNS, a high index of suspicion with or without laboratory evidences of infection is the key for early diagnosis. If we can avoid risk factors for NNS by antenatal check up of pregnant mother and thereby number of septicaemia could be reduced.

Keywords: Bacterial profile, Septicaemia, Risk Factors.

Number of Tables: 04; **Number of References:** 29; **Number of Correspondence:** 04.

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Introduction:

Neonatal septicaemia is an important cause of mortality and morbidity among infant. Neonatal septicaemia is best defined as a clinical syndrome characterized by signs of systemic infection and documented by a positive blood culture in the first few weeks of life¹. Despite considerable progress in hygiene, anti microbial therapy and supportive treatment septicaemia is an important cause of morbidity and mortality in neonatal period². Reduction of neonatal mortality is a special important task of modern pediatrics. Unfortunately morbidity & mortality due to neonatal septicaemia is still continuing. The mortality rate from bacterial sepsis has not changed substantially since the early 1970s³. Primary site of invasion is most often the blood stream. Case fatality rate varies from 20 to more than 75 percent and substantial percentage of surviving infants have neurological handicapped⁴. There is variation depending on geographical area and also changes in the same area with time⁵. Comparable figure much higher in Bangladesh. Risk factors for infection may be multiple vaginal examinations, umbilical catheterization for >5 days, mechanical ventilation for >5 days, birth weight <2500 gm, transfer from other hospital, total parenteral nutrition and nasogastric tube. These risk factors are independently associated with neonatal sepsis⁶. Neonatal septicaemia has been

categorized into early onset disease (EOD), occurring during the first week of life, and late onset disease (LOD), between 7 and 28 days of life⁷. There are no definitive criteria for diagnosis of septicaemia in newborn. It is based mainly on consideration of clinical and laboratory parameters, but without positive culture from central body fluid the diagnosis of septicaemia remains unconfirmed. Clinical presentation in neonatal septicaemia is non-specific and common symptoms are lethargy irritability, respiratory distress, fever, hypothermia, apnoeic spell, cyanosis, poor feeding, diarrhea, vomiting, convulsion and abdominal distension⁸. Bacterial organisms causing neonatal sepsis may differ among countries. Group B streptococcus (GBS; streptococcus agalactiae) is the most frequent cause of serious neonatal infection in North America⁹. However, in most developing countries, Gram-negative bacteria remain the major source of infection¹⁰. The result of epidemiological study from the developed and developing countries may not be same. Furthermore, the epidemiology of neonatal septicaemia within the geographical location may change with time¹¹. The incidence of neonatal sepsis in neonatal intensive care unit (NICU) have been ranged from 5.2-to 30.4 per 100 patients¹². Neonatal septicaemia is still a life threatening emergency and any delay of diagnosis and treatment with appropriate antibiotics may have devastating consequences. It is necessary, therefore, to continue epidemiological surveillance to identify the common pathogens causing neonatal septicaemia and their antibiotic sensitivity in particular area for best choice of empirical antibiotic therapy.

Material and Methods:

This cross sectional descriptive study was carried out in the paediatric department of Rajshahi Medical College from July 2008 to June 2010. During the period 60 cases of were diagnose clinically and enrolled in the study. Diagnosis was made on the basis of some clinical manifestations like lethargy, irritability, respiratory distress, jaundice, fever, poor feeding, abdominal distention, apnoeic spell, hypothermia, cyanosis, convulsion and diarrhea. Mothers were informed regarding the study, sample collection and its purpose. Perinatal history was taken carefully from mother for the identification of risk factors of neonatal septicaemia. Special emphasis were given on socioeconomic status, gestational age, residence and time of disease, maternal chorioamnionitis, urinary tract infection, unclean vaginal examination and prolonged rupture of membrane, place of delivery, birth weight, and any birth asphyxia along with feeding history. Thorough examinations were done and all findings were recorded in the specific questionnaire. Blood culture is the only investigation done to confirm the diagnosis. Blood culture done at the microbiology department of Rajshahi Medical College. However, diagnosis was based on a combination of high degree of suspicion, clinical feature and positive blood culture. The

feature of NNS were studied and analyzed.

Results:

60 cases were enrolled in this study during the period of July 2008 to June 2010. Majority of the cases were male and Male female ratio M:F=2.7:1. Rural patient were predominance than urban patients. Symptoms of septicaemia developed within 1-7 days in 63.3% of the male babies. Most of the babies delivered of in hospital than home and private clinic. Normal delivery was more than caesarian section 76.66%, 23.33% respectively. Early onset of symptoms (<7 days) were 82% and late onset (8-28 days) of symptoms were 18%. 81.67% were culture negative and only 18.33% were culture positive. E.coli was more common in low birth weight, early onset neonatal septicaemic babies than normal weight babies in case of term and preterm there are no difference of E.coli infection, whereas in streptococcus infection low birth weight babies were more affected & in case of Staph Aureus infection normal weight babies were more affected. Babies of low socioeconomic groups of parents (Monthly income 5000taka or less) were more affected than middle or high income group of parents. Among the culture group babies came from rural area were hundred percent culture positive term and preterm, low birth weight and normal weight, asphyxiated and non asphyxiated babies were almost equally affected but statistically not significant.

Table-I:

Distribution of suspected neonatal septicaemia cases by sex, time of onset of symptoms, residence & mode of delivery (n=60).

Distribution of the neonates	frequency	Percentage (%)	Total
Male	42	70%	60 (100%)
Female	18	30%	
1-7 days (Early onset)	38	63.3 (%)	60 (100%)
8-28 days (Late onset)	22	36.7 (%)	
Rural	50	83.3 (%)	60 (100%)
Urban	10	16.7 (%)	
NVD	46	76.66 (%)	60 (100%)
LUCS	14	23.33 (%)	

Table-II:

Distribution of Organisms detected in culture by birth weight, gestational age & time of appearance of symptoms.

	Organisms detected in culture			Total	Total
	E.coli	Streptococcus spp	Staph Aureus		
Birth wt Less than 2.5kg	4(66.7%)	2(33.3%)	0(0%)	6(54.5%)	11(100%)
Birth wt 2.5kg and above	2(40.0%)	1(20.0%)	2(40.0%)	5(45.5%)	
Preterm	3(27.27%)	1(9.09%)	1(9.09%)	5(45.5%)	11(100%)
Term	3(27.27%)	2(18.18%)	1(9.09%)	6(54.54%)	
EONS	6(54.54%)	2(18.18%)	1(9.09%)	9(81.81%)	11(100%)
LONS	0(00%)	1(9.09%)	1(9.09%)	2(18.18%)	

EONS:Early onset neonatal septicaemia,(EONS): Late onset neonatal septicaemia(LONS)

Table-III:

Showed distribution of Organisms detected in culture positive cases according to socioeconomic status of their parents.

Monthly income group	Organisms detected in culture			Total
	Ecoli	Streptococcus spp	Staph Aureus	
5000taka or less	4(57.1%)	2(28.6%)	1(14.3%)	7(63.6%)
5001-10000taka	1(33.3%)	1(33.3%)	1(33.3%)	3(27.3%)
>10,000taka	1(100%)	0(00%)	0(00%)	1(9.1%)
Total	6(54.5%)	3(27.3%)	2(18.2%)	11(100%)

$\chi^2=1.57, df=4, (p>.05)$

Table-IV:

Distribution of culture positive & negative cases by their birth weight, gestational age, residence, mode of delivery, presence or absence of birth asphyxia & jaundice.

	Blood culture		Total		
	positive	negative			
Birth -wt<2.5kg 2.5kg & above	6(28.6%)	15(71.4%)	60(100%)	$\chi^2=2.26, df=1, (p>.05)$	$p>.05$
	5(12.8%)	34(87.2%)	39(65%)		
Term preterm	6(16.2%)	31(83.8%)	60(100%)	$\chi^2=0.289, df=1, (p>.05)$	$p>.05$
	5(21.7%)	18(78.3%)	23 (38.34%)		
Rural Urban	11(22%)	39(78%)	60(100%)	$\chi^2=2.69, df=1, (p>.05)$	$p>.05$
	0	10(100%)	10(16.7%)		
Normal(NVD) Caesarean section	10(21.7%)	36(78.3%)	60(100%)	$\chi^2=1.52, df=1, (p>.05)$	$p>.05$
	1(7.1%)	13(92.9%)	14(23.3%)		
Birth asphyxia Present Birth asphyxia Absent	5(27.8%)	13(72.2%)	60(100%)	$\chi^2=1.53, df=1, (p>.05)$	$p>.05$
	6(14.3%)	36(85.7%)	42(70%)		
Jaundice Present Jaundice Absent	3(25%)	9(75%)	60(100%)	$\chi^2=0.445, df=1, (p>.05)$	$p>.05$
	8(16.7%)	40(83.3%)	48(80.0%)		

Discussion:

A total of sixty (60) suspected cases of neonatal septicaemia were enrolled in this study. 18.33% cases (11) were culture positive for bacteria. Similar culture positivity was found in Nigerian study¹³ but in contrast to another study the incidence of positive blood culture is 47.5% of neonatal septicaemia¹⁴. Low culture positivity in early onset septicaemia (EOS) might be due to over diagnosis in this age group because of more nonspecific symptomatology. However negative blood culture does not rule out septicaemia. We have done a single culture utilizing 2 ml blood.

The number of positive cases in early onset septicaemia (EOS) was 9 (81.8%) in comparison to 2(18.2%) in the late onset septicaemia (LOS). In this study, we found that early onset septicaemia (EOS) was more common than late onset septicaemia (LOS), which had the similarity to other studies¹⁵. Early onset sepsis was indistinguishable from that of perinatal asphyxia and respiratory distress syndrome. Although males have been reported 2-5 fold more likely than females to develop septicaemia¹⁶. Male female ratio of infant in our study was 2.66:1. The majority of neonates with septicaemia have one or more risk factors. In our study 45.5% (5) cases of neonatal septicaemia were preterm (<37 wks of gestation) and LBW (<2.5k). It was also found in some previous studies^{17,18}. Maternal fever during delivery presents in 2 cases (18.2%) and 1(9.1%) of two also had prolonged rupture of membranes for more than 24 hours before delivery. So PROM might be one of the risk factors. It was comparable with the rates reported by others, ranging from 7.8% to 12.0%¹⁹.

A significant number of study cases were delivered at home, largely in the hand of untrained birth attendants. Home delivery is common in Bangladesh²⁰. Repeated examinations increase the chance of introducing bacteria from the external environment into the birth canal²¹. Home deliveries related to birth asphyxia as reported in a dissertation²². In our study (45.5%) cases of the culture positive neonatal septicaemia had birth asphyxia. In this study commonly, observed clinical features were poor feeding(68.3%), Fever (48.3%), Lethargy (46.7%), Respiratory distress (38.3%), Convulsion (25%), Jaundice (20.00%), Abdominal distention (13.3%) and Cyanosis (6.7%). These observations showed similarity with findings of other investigator²³. We found majority of the organisms were gram-negative 54.5%. E. coli was the most common pathogen isolated (54.5%). Similar organisms have been reported in the study in Nigeria¹³ and in Nepal²⁴. This could be due to most deliveries were conducted in poor standard of hygiene and newborn infants usually lack antibody mediated protection against E. coli. Other common organisms were streptococcus spp. Which was found 27.3% of cases and staph aureus was found in 18.2% of cases. GBS was not found in this study. This might be attributed to low prevalence of GBS in genitalia of pregnant mother in this area²⁵. Increasing prevalence of gram-negative septicaemia has been reported from other studies in India, Pakistan and

Bangladesh^{16,25,26}. Some studies^{25,26} showed that bacteriological profile of neonatal septicaemia differs in EOS and LOS and it also differs in developing and developed countries. In developing countries gram-negative (-ve) organisms were predominant in EOS & LOS but *E.coli* was predominant in EOS^{27,28}. In our study we found that EOS 81.8% (9/11) was more common than LOS and mortality in culture positive cases was 27% (3/11). The mortality rate in the Iranian study was 19.8%²⁹.

Conclusion:

The present study showed that neonatal septicaemia was one of the major problem in neonatology with a high case fatality rate. Manifestations of neonatal septicaemia are subtle & non-specific. Both gram-negative and gram-positive bacteria were responsible for neonatal septicaemia. Majority of the organism were gram-negative (54.5%). *E.coli* was the commonest bacteria isolate responsible for septicemia in neonates. Although blood culture is the "gold standard" in the diagnosis of neonatal septicaemia, a high index of suspicion with or without laboratory evidences of infection is the key for early diagnosis. History, clinical examination and laboratory data can minimize the therapy for those neonates who have no infection. Prompt institution of antibiotic therapy and supportive care will save most of the cases of neonatal sepsis. The pattern of antibiotic usage must be reviewed periodically and it must be started as possible in suspected cases and their combination should be changed according to response. If we can avoid risk factors for neonatal septicaemia by antenatal check up of the pregnant mother and thereby the number of neonatal septicaemia can be reduced.

Conflict of Interest: None.

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Study on Seasonal Variation in Stroke

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Abstract

Introduction: After coronary artery disease and cancer, stroke is the third commonest cause of death in the developed countries. There have been descriptions of a seasonal variation in the frequency of different types of stroke. This variation may be related to a variation in the frequency of risk factors of stroke. **Objective:** To find out the seasonal variation of different type of strokes. **Materials & methods:** This cross sectional observational study was carried out at the department of medicine, mymensingh medical college hospital, mymensingh over a period of one year between June 2011 to May 2012. A total 292 patients of CT scan proven acute stroke of both sexes who were hospitalized within one weeks of acute stroke were included in this study within this period. data were processed and analyzed by computer software SPSS. Level of significance was considered as p value less than 0.05. **Results:** The frequency of ischaemic stroke during summer (62.4%) was significantly greater than that during winter (37.8%). The frequency of haemorrhagic stroke during winter (62.2%) was significantly greater than that during summer (37.6%). Hypertension was the most important risk factor and other risk factors were smoking, diabetes mellitus, tobacco chewing, ischemic heart disease, dyslipidemia, oral contraceptive pill, alcohol consumption, atrial fibrillation and past history of stroke. **Conclusion:** This study found stroke is influenced by the variation of seasons. The frequency of ischaemic stroke during summer was significantly greater than winter. The frequency of haemorrhagic stroke during winter was significantly greater than summer.

Keywords: Stroke, Variation, Haemorrhagic Stroke, Ischaemic Stroke.

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Introduction:

Stroke results from either ischemia due to arterial occlusion or stenosis, or haemorrhage due to leakage or rupture of an artery. Cerebral ischemia caused by reduction in the blood flow that lasts longer than few seconds. If the cessation of flow lasts longer than few minutes, than infarction of brain tissue results¹. After coronary artery disease and cancer, stroke is the third commonest cause of death in the developed countries. Among all neurological diseases of adult life, only stroke clearly ranks first in frequency and importance. At least 50% of neurologic disorders in a general population are of this type². Our hospital statistics also reveals that stroke is the third major cause of death in adult³. The incidence of stroke increases with age and affects many elderly people. It is uncommon below the age of 40 years and more common in male. Yearly incidence of stroke is 15 million worldwide. One third of those patients die secondarily to their strokes, and another third experience permanent disability⁴. Worldwide, stroke is also a leading cause of death, the mortality being particularly high in Eastern Europe and Asia⁵.

The morbidity and mortality from cerebrovascular diseases has been diminishing in recent years, due largely to better recognition and treatment of underlying risk factors including hypertension⁶. While the overall incidence of stroke is declining in developed countries, the absolute number of stroke is increasing secondary to overall increase in life expectancy⁴. In the under developed world, with better control of infectious diseases and with increase in life expectancy as well as relative growth of elderly population, the incidence of stroke is likely to increase. Thus stroke remains as a major cause of mortality, morbidity and great burden to the family members, society and hospital manpower. Non

modifiable risk factors of stroke include age, sex, family history, race & ethnicity. Modifiable risk factors are hypertension, diabetes mellitus, cardiac diseases (particularly atrial fibrillation), hyperlipidemia, smoking, transient ischemic attacks, asymptomatic carotid artery stenosis, alcohol abuse and physical inactivity⁷. It is important to find out the etiologic factors and to treat them adequately to prevent stroke.

Many studies have found a definite association between season and rate of stroke. Usually there was higher rate in colder months⁸. Christie (1981) found similar seasonal variation of stroke which was likely to be associated with average daily temperature⁹. Pan, Li & Tsai.(1995) opined that observations made by other authors in western countries regarding correlation between temperature and stroke may not be similar in subtropical countries like Taiwan, where 95 percent of temperature lies between 13⁰-30⁰C¹⁰. These observations may be rather more appropriate in tropical countries like Bangladesh. Owing to its geographical location, very hot and humid climate prevails throughout most of the year. There is significant difference of temperature between summer and winter. This marked temperature difference during summer and winter in our country may affect the haemorrhheological mechanisms and blood pressure which may contribute to the causation of different kinds of stroke. Due to socio economic conditions, a large percentage of population is exposed to extremes of temperature during summer and winter in Bangladesh. They are thus vulnerable to stroke. This variation in prevalence of different type of stroke may be related to a variation in the frequency of risk factors of stroke. So the study was planned to prospectively document the seasonal variation of stroke sub-types and to describe the seasonal variation in the frequency of risk factors among the stroke sub-types.

Materials and Methods:

This Cross sectional observational study was carried out at the Department of Medicine, Mymensingh Medical College Hospital, Mymensingh Over a period of one year between June 2011 to May 2012. A total 292 patients were taken by purposive way who were admitted in Medicine ward male or female. Patients were admitted in Medicine wards with acute (<7 days) development of focal or global disturbance of neurological function like hemi-paresis, monoparesis, dys-arthritis, dysphasia or impaired consciousness with or without previous history of stroke and who also had confirmed changes suggestive of stroke demonstrated by CT scan of brain. Patients admitted with features of stroke but who could not avail CT scan of brain or who died within 24 hours of hospitalization were excluded. Both descriptive and inferential statistics were used. Data were processed and analyzed by Computer software SPSS (Statistical Package for Social Science). Descriptive statistics were used for grouping and organizing of demographic variables and inferential (Chi-square and Fisher exact Test) statistics were used to see the association between seasons and types of stroke Level of significance was considered as p value< 0.05.

Results & Observations:

This study intended to observe the seasonal variation in types of stroke and description of the common risk factors included a total of 292 stroke patients admitted during June 2011 to May 2012. CT scan was done to confirm the diagnosis of stroke and its types. The findings of the study obtained from data analysis are documented below:

The age category 70 years or more than 70 years and male patients were predominant in the both groups. Ischemic stroke was found higher in farmer, day labour and other professions and haemorrhagic stroke was higher in housewife, service holder and businessman. There were no significant difference between two groups (p > 0.05) (Table I).

Table-I: Comparison of demographic variables between groups.

Demographic variables	Group		P-value
	Ischaemic (n = 158)	Haemorrhagic (n = 134)	
Age (Years)#			
<40	11(7.0)	9(6.7)	0.163
40 – 50	18(11.4)	27(20.1)	
50 – 60	33(20.9)	17(12.7)	
60 – 70	42(26.6)	37(27.6)	
≥70	54(34.2)	44(32.8)	
Sex#			
Male	103(65.2)	80(59.7)	0.334
Female	55(34.8)	54(40.3)	
Occupation#			
Housewife	55(34.8)	54(40.3)	0.614
Farmer	57(36.1)	46(34.3)	
Service	10(6.3)	11(8.2)	
Business	14(8.9)	12(9.0)	
Day labour	1(0.6)	00	
Others	21(13.3)	11(8.2)	

Data were analyzed using Chi-square Test.

Regarding seasons of occurrence of stroke observed that 194 (66%) of the patients presented in summer (March – November) and 98(34%) in winter season (December – February). Total ischemic stroke was 158 (54.1%) and total haemorrhagic stroke was 134 (45.9%) (Table II).

Table-II: Distribution of subjects by Season of occurrence and types of stroke (n = 292).

Seasons	Total Stroke	Ischemic Stroke	Haemorrhagic Stroke
Summer	194 (66%)	121(62.4%)	73 (37.6%)
Winter	98 (34%)	37(37.8%)	61(62.2%)
Total	292	158 (54.1%)	134 (45.9%)

The association between type of stroke and seasons depicts that ischaemic stroke was observed to be significantly higher in summer season (62.4%) than that in winter season (37.8%) (P< 0.001). Similarly haemorrhagic stroke was significantly higher (62.2%) in winter season than that of summer season (37.6%)(Table III).

Table-III: Frequency of ischaemic and haemorrhagic stroke during summer and winter.

Type of stroke	Season		P-value
	Summer (n = 194)	Winter (n = 98)	
Ischaemic	121(62.4)	37(37.8)	<0.001
Haemorrhagic	73(37.6)	61(62.2)	

Chi-square (2) Test was employed to analyze the data (Chi-square (2) value = 15.9, df = 1)

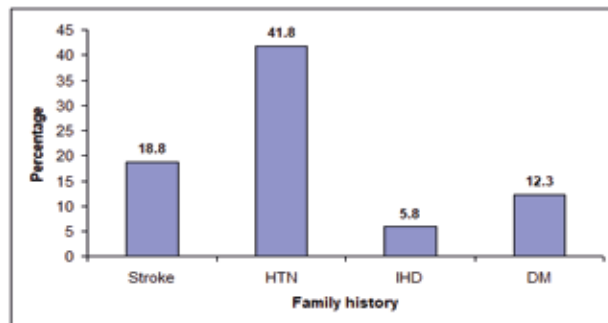


Fig. 1: Distribution of patients by family history (n = 292).

About 20% of patients had family history of stroke, 41.8% hypertension, 5.8% ischaemic heart disease (IHD) and 12.3% diabetes (Figure 1).

Comparison of risk factors between ischemic and haemorrhagic group depicts that all the risk factors except hypertension were homogeneously distributed between two groups. Majority (84.3%) of the patients in haemorrhagic group had hypertension compared to ischemic group (51.3%) ($p < 0.001$) (Table IV).

Table-IV: Comparison of risk factors between ischaemic and haemorrhagic stroke.

Risk factors	Group		P-value
	Ischemic (n = 158)	Haemorrhagic (n = 134)	
Hypertension#	81(51.3)	113(84.3)	<0.001
Smoking#	50(31.6)	38(28.4)	0.163
Alcohol*	2(1.3)	2(1.5)	0.625
Tobacco chewing#	22(13.9)	17(12.7)	0.757
Oral contraceptive#	11(7.0)	11(8.2)	0.687
Diabetes#	26(16.5)	13(9.7)	0.091
IHD*	2(1.3)	1(0.7)	0.562
AF*	5(3.2)	1(0.7)	0.150
Past H/O stroke*	3(1.9)	1(0.7)	0.375

Data were analyzed using Chi-square Test. * Fisher Exact Test was done to analyze the Data

The risk factors like hypertension, smoking habit, alcohol, oral contraceptive, AF and past history of stroke were homogeneously distributed between summer and winter seasons (67.5% vs. 64.3%, $p = 0.580$; 32.5% vs. 25.5%, $p = 0.221$; 1% vs. 2%, $p = 0.483$; 7.2% vs. 8.2%, $p = 0.772$; 1% vs. 4.1%, $p = 0.083$ and 1.5% vs. 1%, $p = 0.715$ respectively). However, habit of tobacco chewing, diabetes and ischemic heart disease (IHD) were statistically significant between summer and winter seasons (5.7% vs. 28.6%, $p < 0.001$; 16% vs. 8.2%, $p = 0.044$ and 0% vs. 3.1%, $p = 0.014$ respectively) (Table V).

Table-V: Comparison of risk factors between summer and winter.

Risk factors	Season		P-value
	Summer (n = 194)	Winter (n = 98)	
Hypertension#	131(67.5)	63(64.3)	0.580
Smoking#	63(32.5)	25(25.5)	0.221
Alcohol*	2(1.0)	2(2.0)	0.483
Tobacco chewing#	11(5.7)	28(28.6)	<0.001
Oral contraceptive#	14(7.2)	8(8.2)	0.772
Diabetes#	31(16.0)	8(8.2)	0.044
IHD*	00	3(3.1)	0.014
AF*	2(1.0)	4(4.1)	0.083
Past H/O stroke	3(1.5)	1(1.0)	0.715

Data were analyzed using Chi-square Test. * Fisher Exact Test was done to analyze the Data

Discussion:

This Hospital based descriptive cross sectional study found that the frequency of ischaemic stroke during summer was significantly greater than that during winter. The frequency of haemorrhagic stroke during winter was significantly greater than that during summer. Hypertension was the most important risk factor for both type of stroke and other risk factors were smoking, diabetes mellitus, tobacco chewing, ischemic heart disease, dyslipidemia, oral contraceptive pill, alcohol consumption, atrial fibrillation and past history of stroke. The prevalence of common risk factors of stroke were homogeneously distributed between two seasons and between the two sub-type of stroke except hypertension which was significantly higher in haemorrhagic stroke patients.

Masood, Maqsood & Qadri (2006) demonstrated a higher number of stroke patients in summer (April to September) than that in winter (October to March) bearing consistency with findings of the present study¹¹. The seasonal variation of ischaemic and haemorrhagic stroke of the present study is in conformity with that of Rothwell et al. (1996) who found increased incidence of ischaemic stroke in summer and increased incidence of ICH in winter¹². Pan, Li & Tsai (1995) found that the risk of cerebral infarction at 32°C was 66 percent higher than the risk of at 27.29°C¹⁰.

Sang-Pil Yun et al. (2008) in a study showed mean age of the patients to be 63.5 ± 11.3 years which was similar to the present study¹³. Anwarullah et al. (1993) found that 34% patients in the sixth decade and 27 percent in the seventh decade, with an age range of 26-84 years¹⁴. Sarker et al. (1993) observed highest percentage (37.5%) of patients in the sixth decade. The higher percentage above seventh decade in this study may be due to increase in life expectancy over the last decade¹⁵. Demographic variables were identically distributed between ischemic and haemorrhagic groups in our study.

In a study Sang-Pil Yun et al. (2008) reported that hypertension was the most common (50%) among the risk factors of stroke followed by diabetes (27.9%), IHD (5.3%), hyperlipidemia (3.5%), and AF (0.9%)¹³. Goldstein et al. (2006) also addressed that the stroke incidence is affected by risk factors such as hypertension, diabetes mellitus, cigarette smoking, and alcohol intake¹⁶. Anwarullah et al. (1993) found hypertension in 65% smoking in 44%, family history of stroke in 26%, diabetes mellitus in 21%, IHD in 27%, past history of stroke in 22%, rheumatic heart disease (RHD) with atrial fibrillation (AF) in 6%, lone AF in 2% and use of OCP in 2% cases¹⁴. Results were similar with those of the present study. Hypertension accelerates atherogenesis in cerebral arteries. Longstanding hypertension causes formation of small aneurysm (Bouchard's aneurysm) and aneurysm of circle of Willis. Hannan et al. (2001) reported that hypertension was significantly more associated with haemorrhagic stroke than with ischaemic stroke irrespective of season¹⁷. This is also in conformity with the statement of Liu and Chia (1991) and

Thrift (1996)^{18,19}. This finding is also similar with that of present study.

Rozenthal et al. (1996) found smoking (53.6%), hypertension (43.4%), hyperlipidaemia (22%) and diabetes mellitus (21%) as main risk factors for stroke²⁰. Liu & Chia (1991) found that cerebral thrombosis was significantly associated with hypertension, diabetes and smoking. Cerebral embolism was associated hypertension, atrial fibrillation and TIA. Cerebral haemorrhage was associated with hypertension only¹⁸.

In Bangladesh, where average life-expectancy is 67 years, age more than 60 years may be considered as increasing age. Thus, increasing age as risk factor was present in 60.7 percent cases in this study. Carrieri et al. (1994) showed that old age, high diastolic blood pressure and smoking had strong association with stroke. Smoking was the third commonest risk factor (30.1%) in the present study²¹. Silvestrini et al. (1996) stated that there was failure in cerebrovascular regulation after smoking resulting in increased risk of cerebrovascular disease in current smokers. Smoking initiates atherosclerosis²². Graffagnino et al (1994) however, reported 47% of the patients with a family history stroke sharply contrasting to the findings of the present study²³. Liao et al (1997) reported an increased risk of stroke among persons with positive family history of stroke is consistent with the expression of genetic susceptibility, a shared environment or both²⁴.

Javanovic (1996) found 77.34 percent ischemic stroke, 20.12 percent intra cerebral haemorrhage (ICH) and 2.54 percent subarachnoid haemorrhage (SAH)²⁵. Yano et al. (1994) found 74 percent ischemic stroke, 20 percent ICH, 6 percent SAH and 2 percent unknown type²⁶. The cause of increased haemorrhagic stroke in the present study may be explained by hypertension, which was the principal risk factor. On the other hand, stroke patients having severe sign symptoms and unconsciousness were mostly hospitalized in a tertiary level hospital. Severe sign symptoms and unconsciousness were mostly related to haemorrhagic stroke. Comparison of risk factors between summer and winter shows homogenous distribution of hypertension, smoking habit, alcohol, OCP, AF, past history of stroke but habit of tobacco chewing, diabetes mellitus and IHD were significantly different. There is no previous data to compare such difference of risk factors of stroke during summer and winter.

Conclusion:

The study demonstrated that the type of stroke is influenced by the variation of seasons. Hypertension was the main risk factor for stroke and other risk factors were smoking, diabetes mellitus, tobacco chewing, ischemic heart disease, dyslipidemia, oral contraceptive pill, alcohol consumption, atrial fibrillation and past history of stroke. Increasing age was also noted as a risk factor (60.7% > 60 years). Ischaemic stroke appears to be predominant during summer, whereas haemorrhagic stroke appears to be predominant during winter. Distribution of the risk factors

during summer and winter did not show significant difference. Also all the risk factors were homogeneously distributed between ischemic and haemorrhagic group except hypertension which was significantly higher in haemorrhagic stroke patients.

Conflict of Interest: None.

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Stroke and Coronary Heart Diseases, Global and Asian Trend and Risk Factors -A Perspective

Sk. Mamun-Ar-Rashid^{*1}, Sk. Moazzem Hossain²

Abstract

Introduction: Cardiovascular disease (CVD) is the leading cause of death in the world, accounting for 30% of deaths globally. CVD is a group of conditions affecting the functions of the heart, blood vessels or both. The major cardiovascular diseases include coronary heart disease (CHD), stroke, hypertension, heart failure and peripheral vascular diseases. Distribution of CHD and stroke is different in different regions of the world, especially western high-income, Asian and other countries. The Asian prevalence also not homogenous. Estimated number of deaths due to CVD worldwide will projected to 23.4 million, comprising 35% of all deaths in 2030. Significant increase in prevalence of coronary heart diseases (CHD) have been observed in the Asia including Bangladesh, but stroke in some regions of the world. **Objectives:** (1) Identification of cases and risk factors in different geographical area (2) Reduction of morbidity and mortality by proper treatment and management of modifiable risk factors. **Materials and Methods:** This observational study was done through using evidence from the published study articles of CVD in national and international journals, electronic databases such as MEDLINE, EMBASE and PUBMED. We also manually checked references of relevant publications of stroke and CHD. **Study period:** Jan2019-Dec2019. **Results:** Approximately 940 million people in the high income countries, where CHD is the dominant form of CVD which is 2–5 times higher than stroke. In the USA, Canada, Australia, New Zealand, Italy, France and Spain CVD death rates are very low. The highest death CHD rate is in Finland, Ireland, Scotland, Norway, Sweden of the European countries. In Eastern Europe and most of the Asia, the rate of coronary arterial diseases are rapidly increasing. Japan the Asian high income country the death ratio of stroke and CHD is 3:1. The East Asia and the Pacific including China CVD is the major cause of death, where stroke dominating. People in South Asia including India and Bangladesh the coronary diseases are increasing alarmingly, where CVD death increase 30% over the preceding decade and the dominant form is CHD. In the central Asia, specially Uzbekistan, Kazakhstan, Tajikistan both CHD and stroke are very high. In Latin America death from CHD (35%) higher than stroke (29%). In the Middle East and North Africa, CHD responsible for 17% and stroke 7% of all death. **Conclusion:** Asian countries have disproportionately high morbidity and mortality from stroke with increasing tendency to CHD, but CHD in Western countries which may be due to complex interaction of genetic and environmental factors, smoking, hypertension and metabolic abnormalities. Death rate is higher in male sex from both CHD and stroke worldwide.

Keywords: Cardiovascular diseases (CVD), Stroke, Coronary heart diseases (CHD).

Number of Figures: 06; **Number of References:** 39; **Number of Correspondence:** 02.

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Introduction:

Cardiovascular Diseases (CVD) is the leading cause of death in the world, accounting for 30% of death globally¹. The major cardiovascular diseases include coronary heart diseases, Cerebrovascular disease or stroke, hypertension, heart failure (CHD), rheumatic, non rheumatic heart diseases and other vascular

diseases. Before 1900, infectious diseases and malnutrition were common causes of death when CVD was only <10%². Now a days CVD accounts for nearly 40% in high-income and 28% in low income countries². The estimated number of deaths from CVD in 2008 was 17.3 million and it was 20 million in 2015 throughout the world³. Further, global CVD deaths are projected to increase to 23.4 million, comprising 35% of all deaths in 2030⁴. Stroke and CHD are most common causes of mortality and morbidity among CVD cases throughout the world. CVD mortality rate is declining in high income countries like USA, western European countries and Japan but increasing in the developing world, including most Asian countries³. Asian countries have disproportionately high morbidity and mortality from stroke compared with western countries⁵. The relationship between traditional risk factors and CVD is different in Asian than Western societies, and there are some unique features about risk factors and metabolic abnormalities for CVD in Asia⁶. There are three main risk factors – smoking, hypertension, serum cholesterol and regional variations of CHD and stroke based on differences in conventional risk factors. Hypertension plays an important role in the development of heart diseases and stroke in Asia than in Western countries. The prevalence of obesity, overweight due to lifestyle changes resulting from industrialization

and economic development have been increasing in Asia for the last two to three decades³². The rate of type-2 DM or Insulin resistance syndrome and dyslipidaemia are progressively increasing in most of the Asian countries and Bangladesh. In Bangladesh this trend have been dramatically increasing for last two decades³⁹. Mean serum cholesterol levels are lower for adults in most Asian countries than in Western countries, but an increasing trend have been observed¹. The genetic predisposition, race, awareness, secular trends of stroke and CHD and interaction between genetic and environmental factors may also contribute to the difference in CVD pattern between Asians and people living in other countries¹. Not only the mortalities, nearly 18% in high income and 10% in low income countries suffers from disability adjusted life year (DALY) resulting from coronary arterial diseases only³.

East Asian countries have lower mortalities from CHD, but central Asian countries have higher mortality from both stroke and CHD⁵. Because more than half of the world's population lives and half of the CVD burden is estimated to occur in the Asia, so prevention of CVD is a critical issue here⁷. Japan, China, Korea, Thailand, Singapore and some other Asian countries have adequate disease specific mortality data, but very limited in most other Asian countries. In Bangladesh both stroke and CHD are progressively increasing³⁹. By 2030 in the world of all death and disability, 14.9% men and 13.1% female death will be due to CHD and Stroke will be responsible for 14.4% of all male and 11.8% of all female death⁴. So prevention and management of stroke and coronary heart disease is essential to reduce morbidity and mortality.

Materials and Methods:

This observational study was done through using evidence from the published study articles of CVD in national and international journals, electronic databases such as MEDLINE, EMBASE and PUBMED. We also manually checked references of relevant publications of stroke and CHD. Study period: Jan 2019-Dec 2019.

Brief Vascular pathology in relation to different profiles of CHD and stroke:

It is the risk factors and genetic interactions causing variable presentation of CHD and stroke at different regions of the world, but vascular pathology is very important. There are 2 major types of vascular pathology leading to stroke, stroke subtypes and CHD. One is atherosclerosis and other is arteriosclerosis^{34,35}. Major risk factors for atherosclerosis are dyslipidaemia, glucose abnormality, hypertension and smoking³⁴. Arteriosclerosis, a small vascular pathology typically occurring in small penetrating arterioles, especially basal ganglions of brain, resulting from necrosis or apoptosis of smooth muscle cells of tunica media of blood vessels leading to micro-aneurysm formation causing intraparenchymal haemorrhage and fibrous proliferative changes to lacunar stroke. Risk factors for arteriosclerosis are primarily hypertension and secondarily glucose abnormality and metabolic syndrome^{34,35}. Aging is a common risk factor for arteriosclerosis throughout the world.

Results: Data obtained from different sources presented as bar and dot diagram in relation to region, country to time for CHD and stroke used for descriptive observational study.

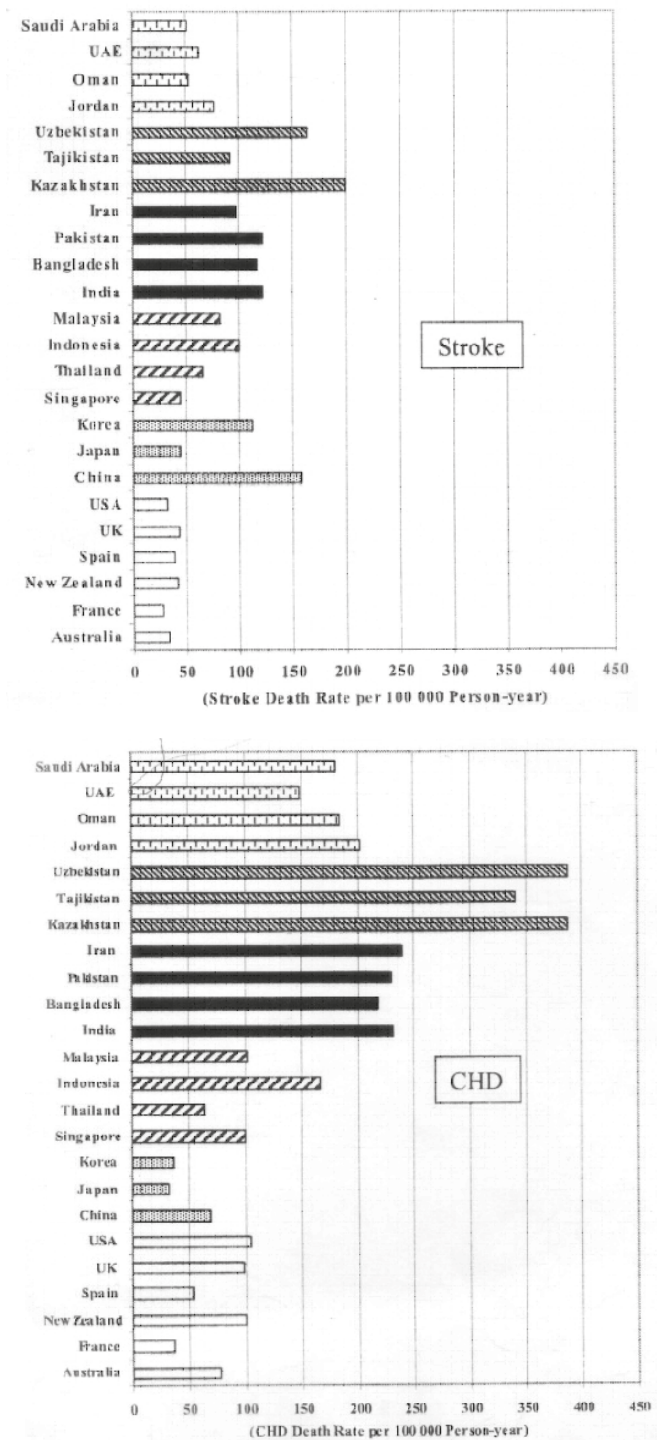


Figure 1: Age-standardized death rates per 100 000 for stroke (left) and CHD (right) across countries in different regions of Asia in 2002. Data from the World Health Organization, Department of Measurement and Health Information. Patterns on the bars represent different regions: Middle Eastern countries (□), Central Asian countries (▨), South Asian countries (■), Southeast Asian countries (▩), East Asian countries (▤), and non-Asian countries (open bars). USA indicates United Arab Emirates; USA, United State of America; and UK, United Kingdom.

The Bar diagram shows---Japan, the high income country of Asia the diagram shows 45 deaths due to stroke and nearly 30 deaths from CHD. 100 deaths from stroke and 45 deaths from CHD respectively in South Korea.

Philippines had 65 stroke death and 130 in CHD. Thailand had nearly 100 in stroke and 50 in CHD in 2004, which was nearly 60 both stroke and CHD in study result of 2002. Singapore, another rich country of Asia the age standardized death rate shows 100 for CHD, but less than 50 deaths due to stroke. China, the highest populated country of Asia as well as in the world the age standardized death rate due to stroke was nearly 160 and 70 in CHD shown in 2002, which was almost same in the study result 2004. The distribution of death rate due to stroke and CHD in central Asian countries are-- In Kazakhstan it was 225 due to stroke and nearly 410 in CHD in 2004 which was 200 and nearly 380 in 2002. 150 deaths from stroke and approximately 370 death occurred in CHD in Uzbekistan in the year 2004 in relation to 165 and 380 deaths respectively in 2002. In Tajikistan death rate from stroke was >100 and 280 from CHD in 2004 which was nearly 90 and 340 respectively in 2002. In the Middle East countries of Asia, the result shows Jordan, Oman, Saudi Arabia and United Arab Emirates had >200, 180, 175 and < 150 deaths respectively due to CHD, whereas 80, >50, 50 and >60 deaths from stroke in 2002. Kuwait had death rate of 100 for coronary heart disease and 40 for stroke in the study result of 2004. The bar diagram result in age standardized death rates in Iran was 220 from CHD and 99 in stroke shown in 2004 and it was 290 due to CHD and nearly 100 due to stroke in 2002.

In Pakistan >235 death in CHD and 120 due to stroke, in India 238 in CHD and 125 in stroke, but in Bangladesh 215 in CHD and 115 stroke death in the result 2002. Indian death trend shown almost unchanged in the study result of 2004 in relation to 2002. Among the South East Asian countries Indonesia, Malaysia is nearly 165, >100 in CHD and 100, 80 in stroke respectively in the data in 2002. In 2004, Malaysia had nearly same mortality pattern. In Mongolia nearly 195 death from stroke, whereas >100 death of CHD in the study result in 2004.

Cardiovascular Disease Epidemiology in Asia

1647

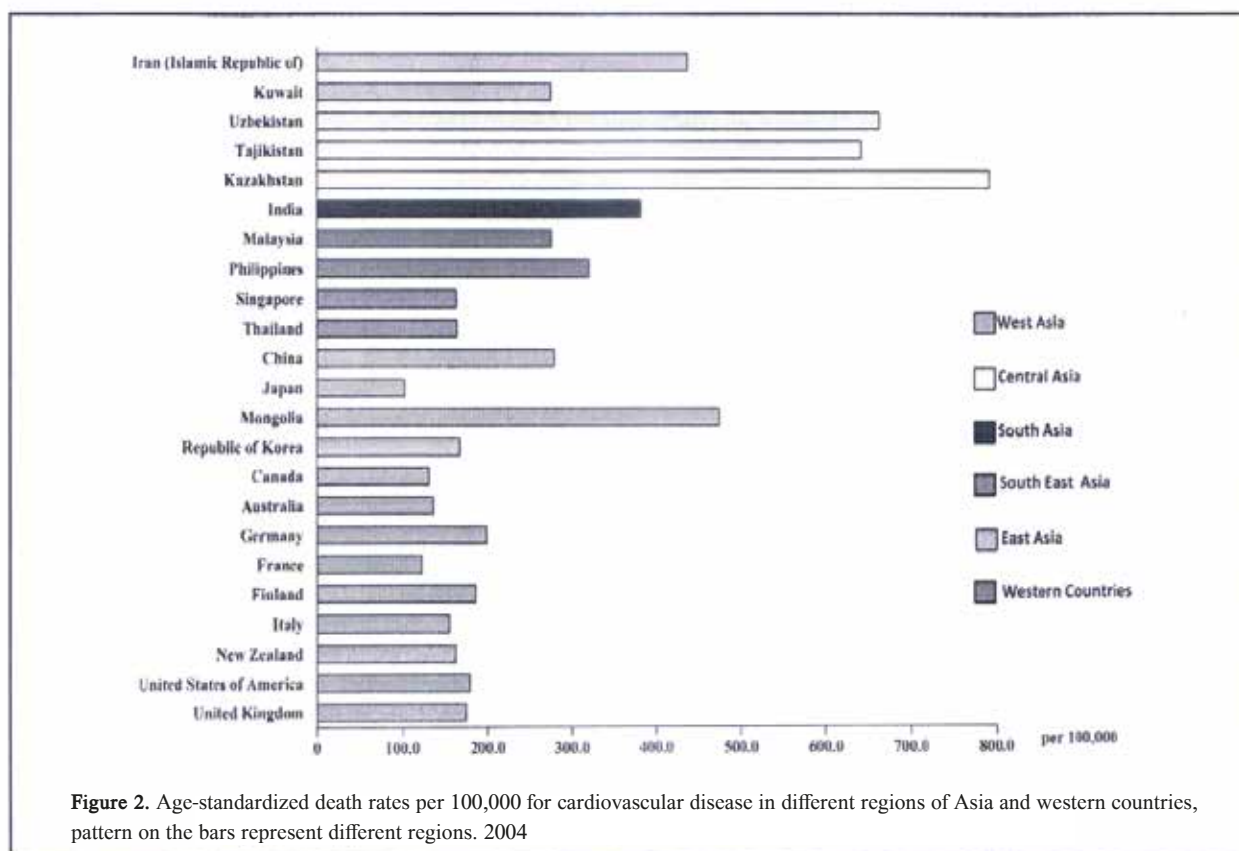


Figure 2. Age-standardized death rates per 100,000 for cardiovascular disease in different regions of Asia and western countries, pattern on the bars represent different regions. 2004

Source: Adopted from Cardiovascular Disease Epidemiology in Asia; circulation: 2013.

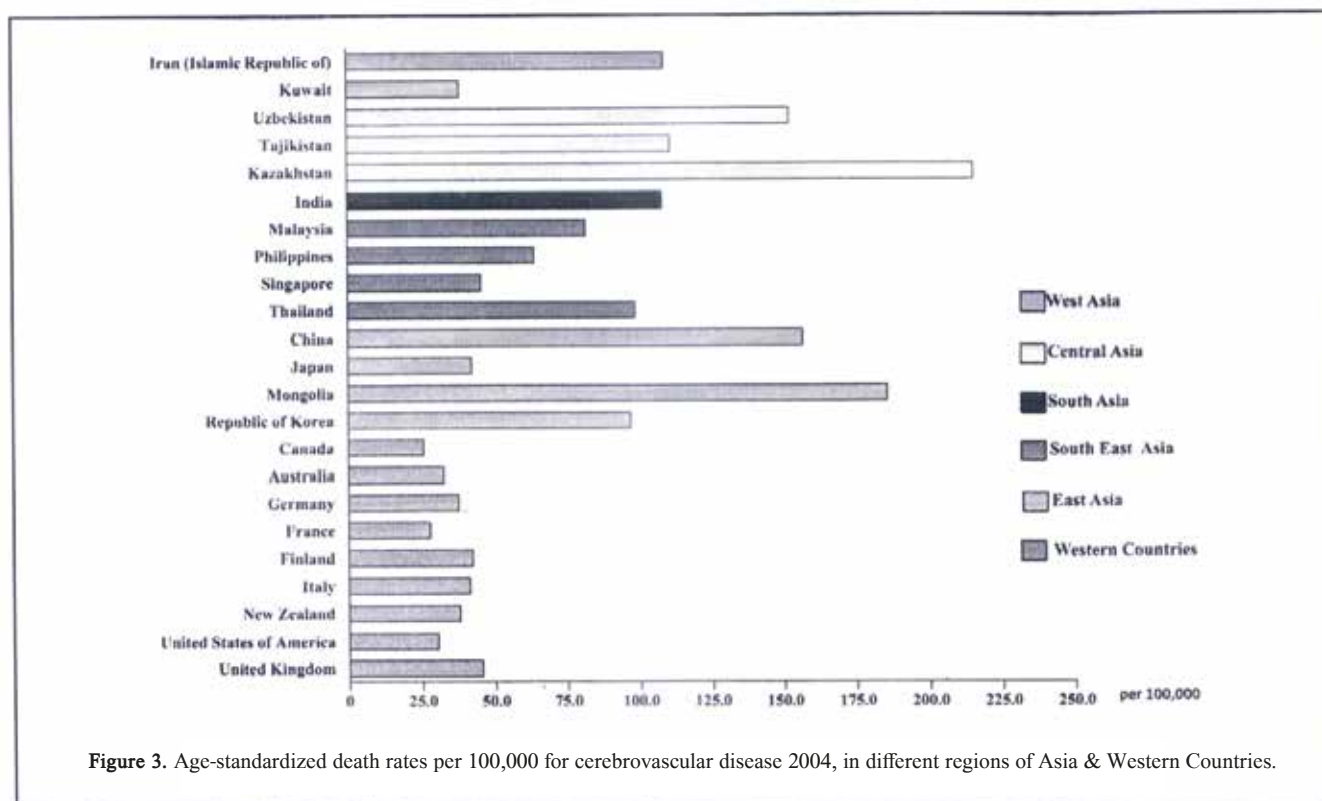


Figure 3. Age-standardized death rates per 100,000 for cerebrovascular disease 2004, in different regions of Asia & Western Countries.

Source: Adopted from Cardiovascular Disease Epidemiology in Asia; circulation: 2013.

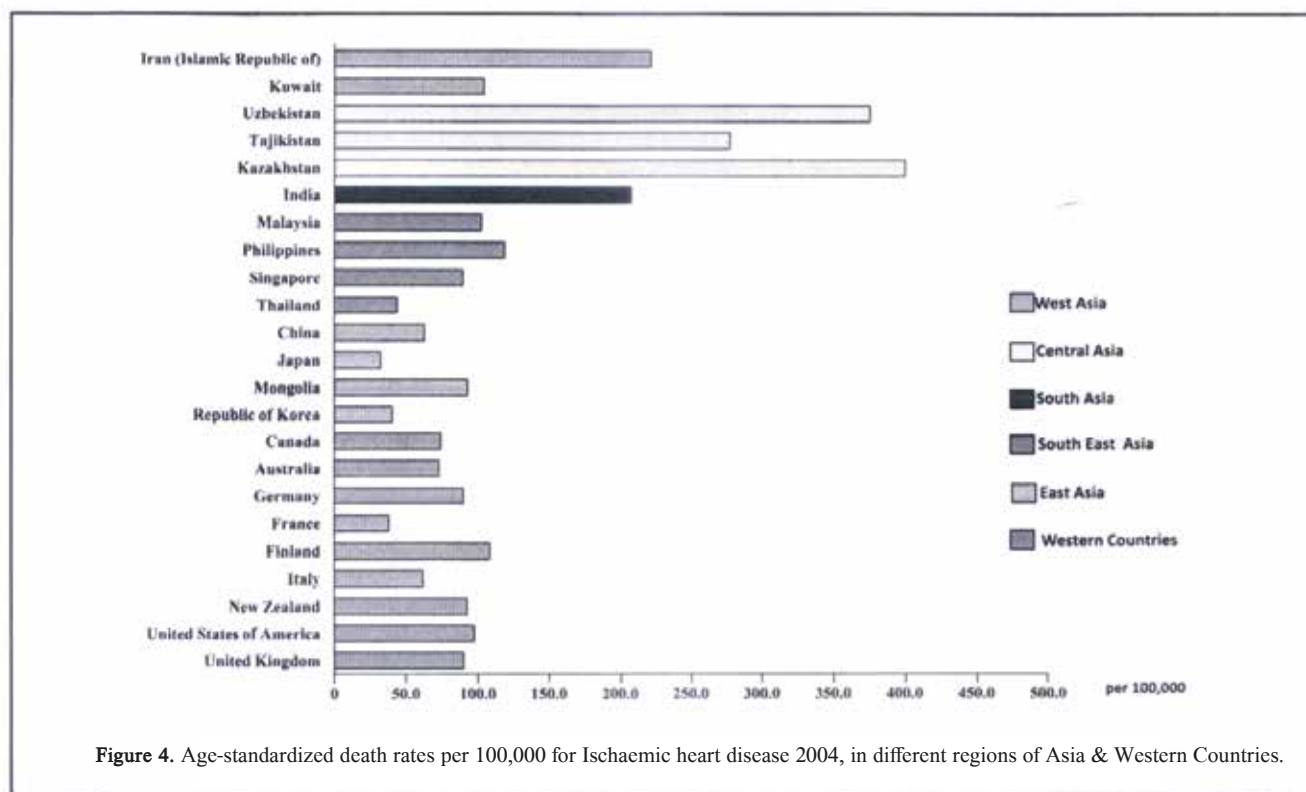


Figure 4. Age-standardized death rates per 100,000 for Ischaemic heart disease 2004, in different regions of Asia & Western Countries.

Source: Adopted from Cardiovascular Disease Epidemiology in Asia; circulation: 2013.

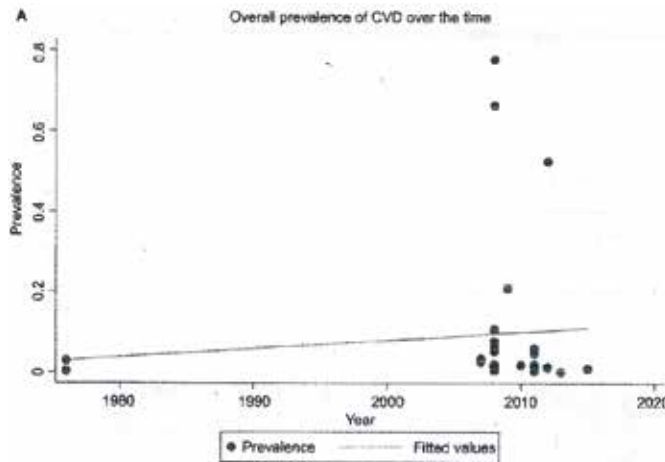


Figure 5: Prevalence of CVD in Bangladesh over the time. (1980-2020)

Courtesy: "Prevalence of cardiovascular disease among Bangladeshi adult population: a systematic review and meta-analysis of the studies." Chowdhury et al.

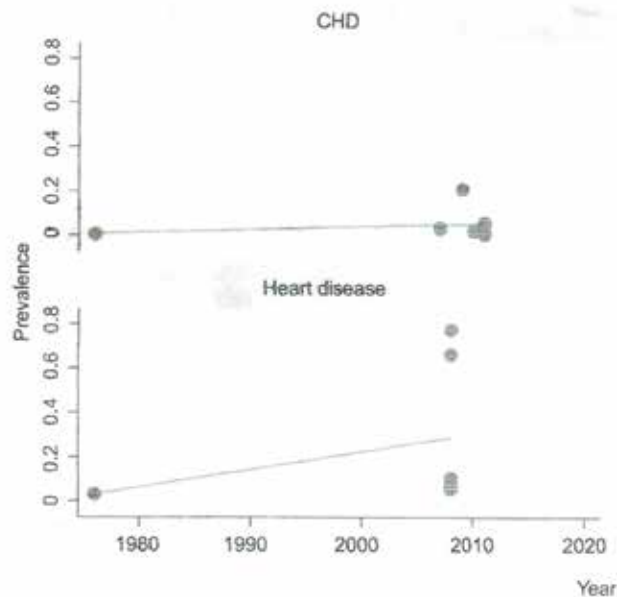


Figure 6 : Prevalence of CHD and heart diseases in Bangladesh over the time.

Courtesy: "Prevalence of cardiovascular disease among Bangladeshi adult population: a systematic review and meta-analysis of the studies." Chowdhury et al.

In UK, 45 death due to stroke and nearly 100 in CHD in 2002, in 2004 nearly same death rate from stroke, 90 in CHD.

In France age standardized death from stroke was 25 and 30 from CHD shown in 2002 and it was nearly same in the study of 2004.

In Spain around 40 death from stroke and 52 deaths from CHD.

In Italy in 2004 the age standardized death from stroke was 45 and 52 in CHD.

In Germany 43 death from stroke and near about 95 death from CHD.

In Finland 45 death due to stroke, but nearly 110 death due to CHD in the study of 2004.

Australia had nearly 30 death resulting from stroke and 70 in CHD in age standardized death rates in 2004. In another study in 2002 the pattern was nearly same there.

In New Zealand, the age adjusted death rate from stroke was approximately 40 and more than 95 from CHD in 2004, but 46 in stroke and 100 death due to CHD in the study result of 2002.

In the USA, the richest and most health facilitated country of the world the bar diagram shows 27 death from stroke, more than 102 due to CHD shown in 2002. Nearly 30 death from stroke and 98 death recorded from CHD in 2004. In Canada only 23 death from stroke and nearly 80 death due to CHD recorded in 2004.

Death rate in some other European countries not shown in bar diagram have much regional variations. Russia, Poland, Sweden, Denmark and Iceland had death rate much more higher in CHD than stroke per 100000/yr.

Discussion

Cardiovascular diseases (CVD) accounts for approximately 30% death worldwide, nearly 40% in high income countries and about 28% in low and middle income countries¹. The global rise of CVD is the result of unprecedented transformation in the cause known as epidemiologic transition and this shift is driven by industrialization, urbanization and associated life style changes which are taking place in every part of the world. Data from 2002 and 2004 reflects stroke and CHD in Asian regions and Western country.

Japan, the high income country of Asia between 1951–1980 stroke was the leading cause of death, it is now 4th⁵. In Japan stroke rates increased dramatically, but CHD did not rise sharply over the last century².

Higher sodium, lower calcium and higher alcohol consumption may contribute to the higher prevalence of hypertension and stroke for Japanese^{36,37}. On the other hand, lower saturated fat (meat) and higher n-3poly-unsaturated fat (fish) intake may contribute to the lower prevalence of hypercholesterolemia and lower risk of CHD for Japanese^{22,28}. After 2010, the trend of stroke death in Japan is decreasing, may be due comprehensive hypertension prevention and control. Several Cohort studies reported that CHD increases in men living in urban and sub urban areas of Japan in the past decades¹¹. The age adjusted mortality from CVD in Japan is decreasing from 1984⁵.

In 1999, the age adjusted mortality from stroke for men and women was 41.6 and 42.8 respectively per 100000/yr in South Korea, accounting for approximately 40% decrease in stroke for men and approximately 25% decrease for women⁵. In South Korea death from stroke was more than double from CHD in 2002 and almost same in 2004. Hypertension, high salt intake and genetic factors may be responsible for stroke death here⁷. Smoking is strong risk factor for stroke and CHD. Recent trend in South Korea is to decrease of stroke, but increase tendency to CHD in both male and female⁸.

Philippines, another East Asian country age adjusted mortality from CHD was highest among East Asian countries.

In the Eastern Asian countries Japan and South Korea, the age adjusted mortality per 100000/yr. stroke dominating, whereas in Philippines CHD. Hypertension is more prevalent in East Asia than South and other regions of Asia³⁴.

In China stroke death was nearly two times than CHD. A Large Cohort study in China confirmed that age adjusted stroke mortality was 3 times higher than CHD³. Approximately 3 million Chinese died from CVD annually which accounted 41% of deaths from any causes in 2009⁹. The recent age adjusted stroke mortality rate in China is reported to be decreasing in Urban areas, whereas in rural areas it is increasing or is stable⁶. Hypertension, high salt and moderate cholesterol intake and

smoking may be responsible for stroke. In China, approximately 90% of urban population walks or rides a bi-cycle in their daily life³². Increase physical activities, low fatty diet and genetics may be responsible for decrease incidence of CHD in China.

The South East Asian country Indonesia, coronary heart disease death rate was higher than stroke, Malaysia had same death pattern in both study results, but much lower than Indonesia. Thailand another country of this region stroke death was much more higher than CHD.

In Singapore, there was a 3-5% decline in mortality from stroke annually from 1976 – 1994¹⁰. Among Asian countries intake of total and saturated fat is highest (31%) in Singapore²⁶. High fat intake, smoking and changes of life style results is increase CHD in Singapore but death rate reasonably lower due to better treatment facilities.

In south East Asian countries Singapore, Indonesia and Malaysia had higher death rate in CHD, but stroke in Thailand. Indonesia had highest death rate from CHD in this region.

Mongolia had much higher death rate in stroke and CHD.

In the central Asian countries prevalence of both stroke and CHD is very high. Increased death rate in Kazakhstan due to CHD, but unchanged in Uzbekistan and modest decline in Tajikistan.

Stroke death rate with increasing tendency both in Kazakhstan and Tajikistan, but was unchanged in Uzbekistan. Central Asian region with the highest death rates (58%) due to CVD in the world, nearly double the rate of high income countries³². Smoking, obesity, genetic and environmental factors may be responsible.

Islamic republic of Iran had high mortality due to CHD and relatively low due to stroke, but modest increasing in stroke rate.

In India, CVD accounted for 32% of all deaths in 2000 and 2 million death by CHD in 2010, representing 30% increase over the preceding decade and the dominant form was CHD⁴. The Urban prevalence is more than the rural areas⁴. India, the second most populated country of the world CHD is increasing alarmingly because of smoking, increasing tendency to fatty diet, lack of physical exercise and DM among urban populations.

Pakistan, another South Asian country CHD death rate is much more higher than stroke.

Bangladesh, the densely populated country CVD death rate is rising for previous 2-3 decades with prevalence of CHD death rate higher than stroke, but stroke death rate also rising⁷. CVD death rate is rising in Bangladeshi population and it is about 5% regardless of type for the last few years³⁹. Prevalence is higher in urban (8%) to rural areas (2%)³⁹. The high CVD prevalence along with an upward trend of both CHD and stroke here may be due to smoking, hypertension with poor drug compliances, DM or IGT and dyslipidaemia resulting from sedentation and high carbohydrate diet.

It is clearly evident that Iran, India, Bangladesh, Pakistan the south Asian countries CHD is the dominant form of CVD. The

south Asian regions has the highest overall prevalence of DM with a rate as high as 14%¹⁵.

The middle East countries of Asia Jordan, Oman, Saudi Arabia and United Arab Emirates CHD death rates are relatively high than stroke. Kuwait had low death rate in CHD and very low in stroke death.

Daily fat consumption increases ranging 13.6% in Sudan and 143.3% in Saudi Arabia³¹. Over 75% Egyptians are obese or over weight and 67% in Iraq and Jordan³¹. In the middle East and North Africa CVD death rates just below those of developed countries, CHD responsible for 17% of all deaths and stroke for 7%³. Traditional high fibre containing and low fatty diet changed to fatty diet recently. Fatty diet, lack of physical exercise and obesity are risk factors for coronary heart diseases over last few decades.

The most part of sub-Saharan Africa CVD is the leading cause of death (46%) among adults age more than 35 years³.

In USA, CVD death rate was low, but CHD was relatively high to stroke and upward trend is obvious. Better medical facilities, hypertension control and low salt diet results lower death from stroke. High total and LDL cholesterol are associated with CHD and 40% large artery atherosclerotic stroke in USA⁵. Obesity, smoking, alcohol and lack of physical exercise are common risk factors for CHD and stroke in USA.

Canada had the lowest stroke death rate and low death rate from CHD in 2004. Australia had reasonably low death rate both from stroke and CHD which was nearly unchanged in data shown 2004 and 2002.

In UK, CHD is much more prevalent than stroke and the trend is stable. Death from AMI is very high in male sex in Ireland and Scotland.

France, Spain, Italy the Mediterranean countries have both CHD and stroke lowest of the world and the trend is stable. France have lowest death rate both due to stroke and CHD.

Finland has the highest death rate from AMI in male sex in northern Western Europe then Belfast of UK followed by Norway and Sweden⁷.

In Germany both stroke and CHD death rate was reasonably low in study result of 2002 and 2004.

In a study conducted 1989 – 1993 Russia, Sweden, Denmark, Iceland had very high rate of coronary arterial death specially Acute myocardial infarction (AMI) and reasonably high stroke death.

The Eastern Europe and central Asia region with the highest death rates (58%) due to CVD in the world, nearly double the rate of high income countries³². Both stroke and CHD are common in Poland, Hungary, Czech Republic, Slovenia, and Slovakia. Age adjusted death rate is much more high in adult male than female. Obesity, dyslipidaemia, type-2 DM, smoking are common risk factors. In Poland, the age adjusted mortality of CVD decreased approximately 30% during 1990 and Slovenia, Hungary, the Czech Republic and Slovakia had similar decline^{32,4}.

In Latin America, approximately 28% of all deaths are attributable to CHD higher (35%) than stroke (29%). During

1970 – 2007 Mexico, Costa Rica, Venezuela continued an overall increase in age adjusted CHD mortality 3 – 10%, whereas Argentina, Brazil, Chile and Columbia rates have been declined by 2%/yr.

In North Africa coronary heart diseases (CHD) is responsible for 17% of all deaths and stroke for 7%. For the most part, Sub-Saharan Africa CVD is the leading cause of death (46%) among adults age more than 35 yrs.

85% of the world's population lives in low-medium income and only 15% people lives in high income countries³. In 2001, only 3 million CVD death occurred in high income countries compared to 13million in low-medium income countries³¹. People live in high-income countries, where CHD is the dominant from of CVD, which is 2-5 times higher than stroke². USA, Canada, Western European countries, Australia, New Zealand are high income countries where CVD rates are almost same. Atherosclerosis is very common in Western populations and is reflected in high CHD⁴.

The highest CVD death rate among high income countries are Finland, Ireland, and Scotland and low in the France, Spain and Italy².

In Latin America, approximately 28% of all deaths in this region are attributable to CVD with CHD higher (35%) than stroke (29%)³³. Mexico, Costa Rica, Venezuela continued on overall increase in age adjusted CHD mortality 3-10%, where as Argentina, Brazil, Chile and Colombia rates have been declined by 2%/yr between 1970-2002^{32,4}.

Similar to well established traditional risk factors for stroke and CHD in western countries hypertension, smoking and DM are main risk factors for stroke in Asia⁷. APCSC results show that the hazard ratios of DM for ischemic stroke and CHD are similar for both Asian and western countries¹⁸.

High BP was identified as a strong risk factor for CVD, especially for stroke, and both systolic and diastolic BP levels were associated with CVD risk in a dose response fashion¹³. Serum total cholesterol is a risk factor for CHD in Asian countries¹⁹. A consistent positive association of total and LDL cholesterol level and the risk of CHD is found in some Asian countries²⁰.

Smoking is a potent risk factor not only for CHD, but also for stroke²⁵. The impact of smoking is much stronger in men than women (13-27)% versus (2-7)% in respect to CHD²⁵. Although the prevalence of current smoking has declined from 82% in 1965 to 32% in 2010 for men and 16% to 8% for women, the prevalence among men is still higher in Japan and some other Asian countries than in Western countries²⁴.

Atherosclerosis is very common in Western populations and is reflected in high CHD⁵. Increased industrialization, mechanization and computerization have shifted physically demanding agriculture based work to sedentary office based works leads to overweight and obesity. Only 22% Americans engaging in sustained physical activities for at least 30minutes on 5 or more days in a week³². Consumption of calorie rich fatty food, specially saturated animal fat and hydrogenated plant fatty food resulting in atherosclerosis leads to CHD and stroke in

large arteries. In 1996-1999 fat intake in USA was 34% and 33% in the UK including Ireland and Scotland of the total calorie intake³. Genetic and environmental factors play an important role in atherosclerosis and CHD. Smoking, hypertension and dyslipidaemia causes endothelial injury and ultimately atherosclerosis in 2nd – 3rd decade of life, but clinical presentation may occur in sixth, seven or eight decade³². Age and increase life expectancy are common risk factors for CHD and stroke due to lacunar infarction in Japan and some regions of the world.

Serum total cholesterol, LDL or non High Density Lipoprotein (HDL) cholesterol levels or the LDL/HDL ratio have been positively associated with risk of IHD, whereas HDL cholesterol levels were inversely associated with the risk²³. Many epidemiological studies in the United States have reported a positive association between serum total and LDL cholesterol levels and the risk of ischemic stroke⁴. The Atherosclerosis risk in communities (ARIC) study reported that total cholesterol levels were positively associated with the risk of non Lacunar stroke, but not lacunar stroke²³.

Obesity with dyslipidaemia, lack of exercise, type-2 DM, smoking and hypertension are main modifiable risk factors for CHD and stroke in western Europe and USA. These are common risk factors though population attributable risk fraction (PAF) is variable in different regions of the world.

The global rise in CVD is the result of epidemiologic transition life style changes taking place in every part of the world among all races, ethnic groups and cultures. Global trend of CVD by 2001, was responsible for 29% of all deaths and 14% DALYS. By 2030, 33% of all deaths will be the result of CVD. Of these, 14.9% of deaths in man and 13.1% of deaths in women will be due to CHD¹². Stroke will be responsible for 10.4% of all male deaths and 11.8% of all female death¹². Evidence of coronary heart disease in premenopausal women is less than men, but almost same in post menopausal women.

The modest decline of CVD death rate specially stroke and CHD in high –income countries will continue, but the rate of decline will be slow. It is due to competing trends of common risk factors. In one hand well-recognized increase in the prevalence of diabetes mellitus and obesity, rate of decline of smoking and a leveling off in the rate of detection, treatment and control of hypertension are in the negative column. On the other hand, cholesterol levels continue to decline in the face of increased statin use.

Treatment of hypertension and elevated cholesterol along with wide spread Use of aspirin have contributed significantly reducing death from stroke and CHD. Public health campaigns promoting life style modifications, cessation of smoking also contributed to reduce death rates. Advance treatment facilities such as angioplasty, CABG, Implantable defibrillators and other invasive procedures reduces death rates specially due to CHD.

Improvement and availability of therapeutic approaches, follow up along with implementation of preventing measures effectively reduces death rates from CHD and stroke in the developed countries. Poor therapeutic approach, inadequate treatment and rehabilitations in the low-medium income

countries results in increase in death rates from stroke and CHD. Risk factors have potentiating rather than additive effect on stroke and CHD.

Nationwide approaches to hypertension management, smoking prevention, control of metabolic risk factors would be of value to reduce mortality from Asia, Africa, Eastern Europe and other low-medium income countries. Improvement of surveillance and aftercare of treatment of stroke and CHD in these regions will effectively reduce death rates.

Conclusion:

Asian countries have disproportionately high morbidity and mortality from stroke with increasing tendency to CHD, but CHD in Western countries which may be due to complex interaction of genetic and environmental factors, smoking, hypertension and metabolic abnormalities. Urbanization, industrialization, office based sedentary work lack of physical exercise and high fatty diet play important role causing CVD. Death rate is higher in male sex from both CHD and stroke worldwide.

Conflict of Interest: None.

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Laparoscopic versus Open Appendicectomy in a District Hospital

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Abstract

Introduction: Appendicitis is one of the most common clinical conditions requiring surgical intervention in day-to-day practice, which is indicated for both acute appendicitis and recurrent acute appendicitis. Appendicectomy can be performed using several surgical techniques like laparotomy (open), laparoscopic appendicectomy. **Materials and Methods:** We have done 110 cases in one year from July 2019 to June 2020. **Results:** Out of the 110 patients, 42 (38%) underwent laparoscopic surgery and 68 (62%) open appendicectomy. **Conclusion:** Female are predominant than male patients. Postoperative hospital stay, postoperative complications like wound infections are much less in laparoscopic procedure. The acceptance of laparoscopic appendicectomy gradually increases among the surgeons as well as the patients.

Keywords: Laparoscopic, Appendicectomy.

Number of Tables: 06; **Number of References:** 20; **Number of Correspondence:** 03.

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Introduction:

Appendicitis, which is the inflammation of the appendix is one of the most common conditions requiring surgical intervention. Since time immemorial the technique of choice for appendicitis has been Open Appendicectomy as described by Charles McBurney¹ in the year 1894 using Gridiron incision. It was only until 1983 that the concept of using Laparoscopy for the treatment of appendicitis was brought into light by a German gynaecologist Semm².

Aim: This is a study to compare the outcome of Open Appendicectomy and Laparoscopic Appendicectomy both complications and management.

Materials and Methods:

All (110 cases) patients with acute appendicitis or recurrent acute appendicitis admitted in district

hospital and some of private hospitals in Khulna city in one year (July 2019 to June 2020) were included in this study.

Results:

Out of the 110 patients, 42 (38%) underwent laparoscopic surgery and 68 (62%) open appendicectomy, distributed by gender and age as shown in Table I. We found a relationship of man to women.

Table-I: Prevalence of age and sex.

Type of Appendicectomy	Age	Male	Female	M:F Ratio	Total
Laparoscopic	25±11	18	24	1:1.33	42
Open	27±10	30	38	1:1.27	68
Total	26±10.5	48	62	1:1.29	110

Most of the patients present with fever, abdominal pain, vomiting, tenderness in right iliac fossa, leukocytosis (Table II).

Table-II: Presentations (Clinical signs and symptoms).

Diseases	Laparoscopic Appendicectomy	Open Appendicectomy	Total
Fever	37	55	92 (84%)
Abdominal pain	42	68	110 (100%)
Vomiting	26	34	60 (55%)
Tenderness in RIF	42	68	110 (100%)
Leucocytosis	24	42	66 (60%)

The onset of postoperative oral feeding, it was earlier in laparoscopic appendicectomy, where 20 (48%) patients received oral diet introduced in the first 12 hours, while in open surgery, the oral intake was introduced in 36 (53%) patients after 24 hours (Table III).

Table-III: Time for the beginning of postoperative oral feeding.

Surgery	12 h	24h	48h	72h	96h
Laparoscopic appendicectomy	20	14	6	2	0
Open appendicectomy	0	36	24	6	2

Mean operative time in laparoscopic surgery was 30 to 60 minutes in most 32 patients (76%). Open surgery lasting 30 to 60 minutes were performed in 44 patients (65%), significantly less when compared with laparoscopic surgery (Table IV).

Table- IV: Operative times (minutes).

Operations	30-60	61-90	90 - 120	>121	Total
Laparoscopic appendectomy	32	7	3	0	42
Open appendectomy	44	22	2	0	68

Most of the patients with Laparoscopic appendectomy leave hospital within 2-3 days. Patients with open appendectomy leave hospital on 5- 7 days.

Table- V: Hospital stays (days).

Operations	1-2	2 - 3	3-4	5 - 6	6-7
Laparoscopic appendectomy	5	35	2	0	0
Open appendectomy	0	0	24	32	12

Post-operative complications resulting from laparoscopic procedure occurred in 12 (2.8%) patients, 6 patients with wound infection. The remaining 6 patients who had complications were affected by urinary infection, internal haemorrhage, port site haemorrhage. Operative complications resulting from open procedure occurred in 15 (2.2%) patients. The surgical site infection was the most frequent complication, diagnosed in 10 patients, followed by urinary tract infection in 2 patients.

Table-VI: Post operative complications observed in patients undergoing laparoscopic and open appendectomy.

Complications	Laparoscopic appendectomy	Open appendectomy
Wound infection	6	10
Urinary infection	1	2
Internal haemorrhage	1	0
Port site haemorrhage	2	0
Respiratory infection	2	2
Subcutaneous emphysema	0	1
Total	12(2.8%)	15(2.2%)

Discussion:

Appendicitis is one of the most common clinical conditions requiring surgical intervention in day-to-day practice, which is indicated for both acute appendicitis and recurrent acute appendicitis. Appendectomy can be performed using several surgical techniques like laparotomy (open), laparoscopy, SILS (single incision laparoscopic surgery), transvaginal route. Of these open appendectomy and laparoscopic appendectomy are the more commonly being used techniques worldwide³⁻⁴⁻⁵. However, laparoscopic appendectomy, a relatively easy procedure, has not gained wide acceptance among surgeons and the conventional technique remains the procedure of choice in many centers³. In our study the difference in the mean age group of patients undergoing laparoscopic appendectomy and open appendectomy was not statistically significant. There was a female predominance amongst patients with acute appendicitis in our study. There was also female predominance in another study done by Dr. Ramanuj

Mukherjee et al⁶. Laparoscopic appendectomy has largely supplanted the open technique⁷. This is because of the benefits of laparoscopic appendectomy in respect of duration of postoperative hospital stay, shorter time of operative procedure, early recovery, less complications etc. In the present study, the duration of postoperative hospital stay for laparoscopic surgery was from 2 to 3 days in 35 patients (83.33%), and in open appendectomy was 5 – 6 days in 32 patients (47%). The hospital stay in open appendectomy is much more than laparoscopic procedure. Other studies showed the mean postoperative stay for an open appendectomy has been 4.27+1.29 days compared with the 2.10+0.35 days recorded for laparoscopy⁶. The operating time for an open appendectomy has been given as 30 to 60 minutes in 32(76%) cases, as opposed to 30 to 60 minutes in 44(64%) cases for the laparoscopic procedure. Both perioperative and postoperative complications are thoroughly dealt with in most studies that have compared open and laparoscopic appendectomy^{8,9,10}. Usually, complications are classified as wound infection, urinary infection, internal haemorrhage, port site haemorrhage, respiratory infection, subcutaneous emphysema. Post-operative wound infection is more in open procedure. In case of children laparoscopic appendectomy shows reduced complications¹¹. Laparoscopic appendectomy should remain an option in children with uncomplicated and complicated appendicitis¹². Laparoscopic appendectomy takes longer time than open procedure¹³. Laparoscopic appendectomy has significant advantages over open appendectomy with respect to length of hospital stay, rate of routine discharge, and postoperative in-hospital morbidity¹⁴. Another study shows, unlike other minimally invasive procedures, laparoscopic appendectomy did not offer a significant advantage over open appendectomy¹⁵. It also took longer time to perform. The choice of the procedure should be based on surgeon or patient preference^{16, 19}. A trend towards better physical activity was noted after the laparoscopic procedure^{17,20}. Another review finds that laparoscopic surgery for suspected appendicitis has diagnostic and therapeutic advantages as compared to conventional surgery¹⁸.

Conclusion:

Laparoscopic appendectomy offers the greatest benefits to patients; it was associated with a lower rate of postoperative complications, feeding earlier and shorter average hospital stay than open appendectomy. The operative procedures performed in government hospital were free of cost. The cost of laparoscopic appendectomy was about the same as those of the open conventional procedure in private hospital. The difference in cost was attributable to the considerably shorter postoperative stay after the laparoscopic procedure.

Conflict of interest: None.

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Outcome of Laparoscopic Cholecystectomy in Acute Calculous Cholecystitis – Analysis of 100 cases

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Abstract

Introduction: Gallbladder disease is one of the most common surgical problems worldwide. About 10-15% of the adult western population has gallstone diseases. More than half a million cholecystectomies are performed per year in United States alone. Laparoscopic cholecystectomy (LC) is currently the most widely used surgical procedure for the treatment of gallstones. **Aims and Objectives:** To observe the cause of difficulties, the sequelae, identify and find out the nature & rate of per operative complications and find out the type & frequency of early post-operative complications following laparoscopic cholecystectomy in acute calculous cholecystitis. **Materials and Methods:** This is a prospective interventional study which was conducted at Jashore Medical College Hospital & some clinics of the city from Sept 2019 to Feb 2020. A total of 100 patients underwent Laparoscopic cholecystectomy for acute calculous cholecystitis within 7 days of admission. **Results:** Among 100 patients, 80 females & 20 males with maximum age group were in the fourth decade, Laparoscopic cholecystectomy was done in 97 (97%) cases & in 3(3%) cases conversion were needed, none of the patients were developed major Per & postoperative complications. Peroperative complication rate was 22 (22%) with conversion was 03(3%) cases. All of the above complications were managed accordingly & successfully. **Conclusion:** Laparoscopic Cholecystectomy is a safe, effective procedure for the early management of patients with acute calculus cholecystitis. Meticulous dissection & good exposure of Callot's triangle, posterior clearance may prevent bile duct injuries.

Keywords: Acute calculous cholecystitis, Laparoscopic cholecystectomy, Postoperative complications.

Number of Tables: 06; **Number of Figure:** 01; **Number of Bibliography:** 20; **Number of Correspondence:** 04.

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Introduction:

Gallbladder disease is one of the most common surgical problems worldwide. About 10-15% of the adult western population has gallstone diseases. Between 1-4% become symptomatic in a year. More than half a million cholecystectomies are performed per year in United States alone. Regional differences exist in the cholecystectomy¹. Open cholecystectomy has been performed for more than 100 years throughout the world as the standard treatment modality for cholelithiasis and symptomatic gallstone disease. After a heated debate and often uncontrolled publicity

through the media, laparoscopic cholecystectomy was officially recognized in 1987¹ is now the preferred method of cholecystectomy¹. Though the mortality and morbidity rates of laparoscopic cholecystectomy are similar to those of open cholecystectomy, but laparoscopic cholecystectomy is less traumatic, fewer post operative complication and complaints, rapid recovery, shorter hospital stay and minimal cosmetic disfigurement^{3,5}. Initially, Acute calculous cholecystitis was considered a contraindication to laparoscopic cholecystectomy. This is due to the belief that the inflammation, edema & sometimes necrosis associated with distortion of anatomy, making identification & dissection of the ductal & vascular structure difficult & there by increasing the incidence of complications. Approximately 20% of patients requiring cholecystectomy present with acute calculous cholecystitis & therefore may not be offered laparoscopic cholecystectomy. However, with increase experience & refinement of the instruments, more surgeons are performing laparoscopic cholecystectomy in patients with acute calculous cholecystitis³. The purpose of this study was to evaluate the difficulties and spectrum of complications of laparoscopic cholecystectomy in acute calculous cholecystitis cases in peroperative and early postoperative period, technique of early recognition of complications and appropriate measures taken to combat those complications & association of other co-morbid systemic diseases with acute calculous cholecystitis. Here, special attention was paid to short-term and early post operative complications.

Materials and Methods:

This study "outcome of laparoscopic cholecystectomy in acute calculus cholecystitis – Analysis of 100 cases" operated between September 2019 to Feb 2020, is designed to achieve the following objectives: to observe the sequelae of, to identify the cause of difficulties,

to find out the nature & rate of peroperative complications, to find out the type & frequency of early post-operative complications following laparoscopic cholecystectomy in acute calculous cholecystitis done in one year in an academic hospital. This study was carried out in different surgical units of Jashore Medical College Hospital and some clinics of Jashore city with signs, symptoms & investigations findings which indicate that the patient suffering from acute calculus cholecystitis. Mode of patient evaluation was personal interview, systemic questionnaire. physical examinations and investigations- Special and routine. Patients were selected randomly having symptoms of gall stone diseases. Criteria of case selection was presence of more than two of the following symptoms indicating acute cholecystitis-a) Persisting right hypochondriac pain lasting more than 24 hours b) Temp > 37°C c) Leukocyte count > 10,000/cumm d) USG criteria of acute cholecystitis-oedematous gall bladder, distended gall bladder, pericholecystic fluid collection, sub-phrenic collection

Observations and Results:

Of the 100 patients, the demographic distribution of patients are the followings- Table I shows distribution of age 20-75 years. Highest number of patients was in the fourth decade.

Table-I: Distribution of patients by age (n=100).

Age group (years)	Number of patients	Percentage
Up to 20	01	1%
21-30	11	11%
31-40	58	58%
41-50	23	23%
51-60	04	4%
61-70	02	2%
71 and more	01	1%

Pie chart shows that female are 4 times more likely to suffer from gallstone diseases than male.

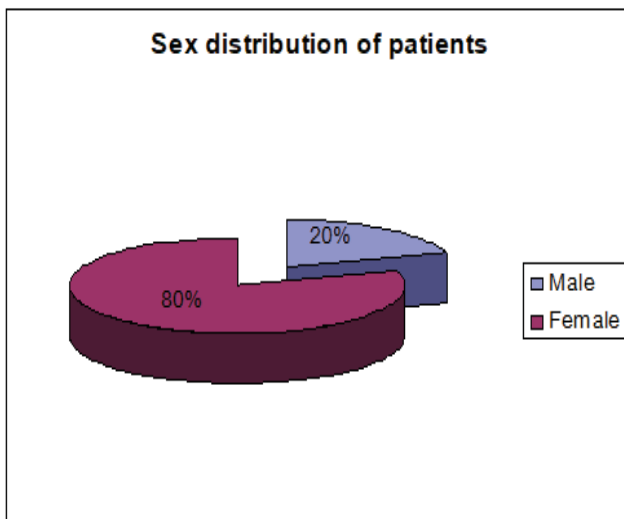


Fig-1: Pie chart of sex distribution of patients of acute gall stone.

Table-II: Peroperative complication (measures taken) of Patients at laparoscopy (n=100).

Type/ nature of problems (measures taken)	Number of Patients	Percentage
Minor complication	8	8
Gallbladder perforation with spillage of bile/pus (suction/-clipping required)	2	2
GB bed bleeding (Needs cautery, suction).	8	8
Splage of stones (picked up & remove using condoms).	2	2
Trocar site bleeding (Needs diathermy coagulation)	2	2
Bile oozing from GB bed (needs cleaning, suction drain).	00	00
Major complication:		
Injury to the gut	00	00
Injury to the common bile duct	00	00
Total complication	22	22
No complication	75	75
Conversion required	3	3

Table III shows that Laparoscopic cholecystectomy are successfully performed in 97(97%) cases & conversion in to open cholecystectomy needed in 3(3%) cases.

Table-III: Operative methods adopted (n = 100).

Procedure adopted	Number of Patients	Percentage
Laparoscopic cholecystectomy performed	97	97
Conversion to open needed	03	03

Table-IV: Immediate postoperative complication(n=100).

Complications	Number of Patients	Percentage
Postoperative Pain (shoulder tip & back)	4	4
Bile leakage through drain (up to 48 hours postoperatively)	1	1
Wound infection (seroma/hematoma/discharge)	2	2
Paralytic ileus	4	4
Chest infection	3	3
Sub hepatic collection	3	3
Postoperative intraabdominal biliary leakage due to slipped clip of cystic duct	0	0
Postoperative biliary peritonitis due to unrecognized common bile duct injury	0	0
Postoperative complications	17	17
Conversion required	03	03
No postoperative complication after lap chole	80	80

Table-V: Comparison of complications (per operative).

Study	Rate of complication		Bile duct injury %	Bowel injury %	Perforation of gall bladder %	Bleeding %	Spilled gallstones %
	Major	Minor					
Erfan. et al ⁸ 1997	1	20	1	-	10	4	6
Huang et al 1997 ⁹	3.50	0.50-1	0.50	-	10	-	-
Kondoker ¹¹	1	10	1	-	5	4	5
Akter Quamrul MS. 2004 ¹⁵	0	23	0	0	10	06	05
Present study 2000	0	22	0	0	8	2	8

Comparison of complications have shown that rate of complication is almost similar, but there is much improvement regarding major complications like bile duct injury which is the most grievous complication of Laparoscopic Cholecystectomy. In our study, there is no bile duct injury and no per-operative mortality.

Table-VI: Comparison of complications (post operative).

Study	Shoulder tip/back pain (%)	Subhepatic collection (%)	Wound infection (%)	Subcutaneous emphysema (%)	Prolonged ileus (%)	Chest Infection (%)
Erfan. et al ⁸ 1997	8	-	6	-	-	-
Huang et al 1997 ⁹	10.00	0.50	1.50	1.50	0.50	-
Kondoker ¹¹	6	-	1	2	1	-
Akter Quamrul MS. 2004 ¹⁵	5	2	3	0	2	2
Present study 2000	4	3	2	0	4	3

Comparison of post operative complication have shown that rate of complications are almost similar.

Discussion:

Laparoscopic cholecystectomy (LC) has rapidly emerged as the standard treatment for symptomatic gall stones⁴. It is less traumatic than open cholecystectomy resulting in fewer post operative complaints, rapid recovery, shorter hospital stay & minimal cosmetic disfigurement. Initially Acute Calculous Cholecystitis (ACC) was considered a contraindication to LC³. This is due to the belief that the inflammation, oedema & sometimes necrosis associated with ACC distort the anatomy, making identification & dissection of the ductal & vascular structures difficult & thereby increasing the incidence of complications. Approximately 20% of patients requiring cholecystectomy at presentation with acute calculous cholecystitis & therefore may not be offered LC. However, with increased experience & refinement of the instruments, more surgeons are performing LC in patients with ACC³. About 3-10 percent cases may need conversion into open cholecystectomy for successful completion of cholecystectomy or to overcome varying problems that a surgeon may encounter during the laparoscopic procedure^{9,10}. The present study

consisted of 100 patients of acute calculous cholecystitis selected on the basis of clinical, haematological & radiological criteria. They underwent laparoscopic cholecystectomy and the results were evaluated to show that laparoscopic cholecystectomy of acute calculous cholecystitis is safe and effective and enjoy the same benefits as compared with those undergoing elective laparoscopic cholecystectomy. The pain was significantly less and post operative recovery was early. Peroperative & early post operative complication was significantly less and manageable. Age distribution of 100 patients ranged from 20 to 75 years with highest number of patients in the fourth decade, which is accurate gallstone disease prone age. Females were 4 times more commonly affected than males. Every patients was investigated with white blood cell count, differential count, serum bilirubin, ultrasonography of HBS and pancreas, alkaline phosphatase, SGPT, PT etc of LFT for those patients given history of jaundice. Ultrasonogram of HBS and pancreas in 100 patients had shown oedematous gall bladder in 68 (68%), empyema gall bladder in 2 (2%), distended gall bladder in 10 (10%), oedematous gall bladder with biliary sludge 18%, pericholecystic fluid collection 2(2%) cases. All patients showed single or multiple echogenic strictures with in the lumen of gall bladder. Among the 100 patients, systemic illness were observed in 20 (20%) patients, out of which 5 (5%) were hypertensive, 15 (15%) were known diabetic. All these systemic co-morbid problems were successfully managed peroperatively. None of these patients developed peroperative and postoperative complications regarding associated co-morbid systemic disease. Out of 100 patients, laparoscopic cholecystectomy was done in 97(97%) cases, and in 3(3%) cases conversion was needed for some preoperative complications densely adhered gall bladder with preoperative bleeding from GB bed & perforated gall bladder. Peroperative problems were experienced in 65(65%) patients. Most common problems were tense gall bladder containing bile, pus or mucus in 35(35%). Aspiration was done before careful dissection. Densely omental adhesion present in 15 (15%) patients requiring slow and meticulous dissection. 2 of them required conversion as structures (gut, omentum, etc) were so densely adhered that they could not be identified properly. Too big gallstone was seen in 12(12%) cases and problems during passing through epigastric port was solved by enlarging the port by large artery forceps. In 3(3%) case, the gallbladder wall was found thick & gangrenous & difficult to grasp & required very careful dissection. Perforated gallbladder was found in one case, to whom conversion done immediately. Peroperative problems were more among recurrent and late admitted patients. Peroperative problems had overcome by efficient work of the operating surgeon. Morbidity for laparoscopic cholecystectomy was 23% this complications included those related to laparoscopic & those related to actual cholecystectomy. The most important complications related to laparoscopic cholecystectomy are bile duct injury, bile leakage, retained common bile duct stones, GB perforation, intra operative & post operative hemorrhage & wound

infection^{1,10}.

Common bile duct injury to the extrahepatic biliary tree remains one of the most devastating complications regarding long term morbidity. A bile duct injury subjects the patient to the immediate risk of a major biliary reconstruction as well as lifelong risk of recurrent stricture formation. The reported incidence of bile duct injury following laparoscopic cholecystectomy ranged from 0 to 0.5 percent^{1,8}. In the present series, common bile duct injury occurred in 0 (0%) cases, which is absolutely lower than reported range & other reports^{1,10}. Postoperative bileleakage have been reported to occur in 0.2 to 3.3 percent of the patients managed by Lap-chole^{3,5}. Such leakage usually originates from the cystic duct and may occur as a result of dislodgement of loosely packed haemoclip or necrosis of the cystic duct stump. Bile leakage may also originate from an unrecognized accessory hepatic duct or directly from liver bed⁶. Gallbladder Perforation was encountered in 8 (8%) cases in the present series which were managed by proper suction of bile, mucus pus from peritoneal cavity, clipping of perforation sites. The present value was much lower than other reports^{5,8}. But consistent with another report¹¹. The causes of gallbladder perforation in present series were during severe retraction or swift dissection of gallbladder from liver bed or during its removal through umbilical port. Sub hepatic collection was encountered in the present series was encountered 3 (3%) case. It was detected by abdominal pain, tenderness, persistent shoulder tip pain, fever & ultrasonogram, which was managed by conservative treatment with analgesics and antibiotics. Condition was improved by 7 days. The results of the present series is more than the reported value^{10,4}. Spillage of stone during LC was encountered in 08(8%) cases. The present value is higher than the reported values^{8,11}. Peroperative bleeding was found in the present series in 4 (4%) cases- bleeding from gallbladder bed in 2(2%) cases and trocar site bleeding in 2(2%) cases and managed by pressure and diathermy cautery. The result of the present series is higher than reported series⁴. Postoperative shoulder tip/back pain following laparoscopic cholecystectomy is not uncommon. In the present series, it was seen in 4 (4%) cases, which is lower than the reported series at the time of laparoscopic cholecystectomy, gallbladder perforation with leakage of bile and / or gallstone into abdominal cavity occurred frequently due to secondary to traction applied by grasping forceps or because of diathermy injury during dissection of gallbladder from its bed. This situation causes prolonging the operation time in variable lengths (due to time required for aspiration, cleaning of bile from abdominal cavity (Khondoker¹¹. Huan et al⁴. And Erfan⁸). They were self-limiting and in most of the cases, pain was relieved by usual analgesic.

The incidence of wound infection (seroma/haematoma/discharge) in the present series 3(3%) percent and higher than the reported series^{3,16}, but lower than the other series¹⁷. Paralytic ileus is one of the frequent complications following LC. In the present series, 4 (4%) case developed

paralytic ileus which was managed by conservative treatment, and which is comparable to Kondoker¹¹ but more than Huang⁴ et al. and Z'graggen K¹⁹. Chest infection occurred in 3(3%) case which was managed by chest physiotherapy and which is much lower than Watson et al¹⁴.

The conversion rate of the present series was 3 (3%) which is significantly lower than the reported 5.3 (5.3%) percent⁷. Average time required for laparoscopic cholecystectomy was 45 minutes with a range of 30-110 minutes. Longer time was required in cases of having severe adhesion. The result is significantly lower than other reported series². Average postoperative hospital stay 2.5 days which was lower than some study¹³. The overall complication rate in the present series is 17 (17%) and can be compared favorably with morbidity rate from conventional cholecystectomy rate (6-35%)¹⁸. There was no mortality in the present series, which is comparable to open cholecystectomy (0-4.8%)¹². By comparing and considering the spectrum of complications of laparoscopic cholecystectomy which are avoidable & manageable²⁰, if we had thorough knowledge of complications and had carefully follow the principle of Laparoscopic cholecystectomy.

Conclusion:

Careful & meticulous dissection of the critical callot's triangle is essential to avoid technical errors, and intraoperative cholangiography may further clarify anatomical relationship. Most cases of acute calculous cholecystitis can be safely managed by laparoscopic cholecystectomy. So, from present series we can say laparoscopic cholecystectomy is safe in early acute calculous cholecystitis admitted within 7 days of symptom appears and the complication rate is not higher than that for elective laparoscopic cholecystectomy or open cholecystectomy. Most of the complications are preventable by experienced team. Meticulous dissection, clear exposure of callot's triangle, judicious use of diathermy and appropriate clip application and the use of peroperative cholangiography can prevent late diagnosis of bile duct injury & management accordingly. To get better outcome, ensure safety & efficacy of laparoscopic cholecystectomy in acute calculous cholecystitis. The procedure should be performed by an experienced surgeon as soon as the diagnosis is established, in a well equipped centre preferably within 3 days of the onset of symptoms.

Conflict of Interest: None.

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Effects of Exposure of Cement Dust on Platelet Count in Workers of a Cement Mill

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Abstract

Introduction: Cement dust is emitted during the different steps of cement production. This dust is composed of chemical components that may have unfavourable effects on the haematological system. The workers in these factories are exposed daily to this toxic dust. Those exposed to the cement dust may suffer from changes in platelet count and eventually suffer from damaging effects on the cardiovascular system. **Objective:** Assess the effects of cement dust on platelet count of cement mill workers. **Materials and Methods:** Conduction of this cross sectional study took place in the Department of Physiology, Dhaka Medical College, Dhaka between July 2017 to June 2018. After fulfilling the ethical consideration, 46 apparently healthy male cement mill workers, working for 2 or more years in a cement mill, with range of age of 20 to 50 years (study group) and 46 BMI, age and socioeconomic condition matched apparently healthy male subjects from Dhaka city were control group. The platelet count was estimated using automated haematology analyzer in Dhaka Medical College Hospital, Dhaka. Data was collected in a pre-designed structured questionnaire form. Unpaired Student's 't' test and Pearson's correlation coefficient test were performed for statistical analysis. **Results:** In this study, the platelet count was significantly ($p < 0.05$) higher than those of control group. The platelet count was directly related with duration of cement dust exposure. **Conclusions:** This study concludes that the cement dust has harmful effect on the platelet count and the duration of exposure to cement dust also has an effect on this parameter.

Keywords: Cement dust, Thrombocytosis.

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Introduction:

Dust is classified as mineral dust which includes dusts containing free crystalline silica, cement dust; metallic dust such as lead, cadmium, nickel and beryllium; other chemical dust like many bulk chemicals, pesticides and organic dusts such as flour, wood, cotton and tea dust¹. The major components of cement dust generated from the process of grinding are calcium oxide, silicon dioxide, aluminium oxide, iron oxide^{2,3}. Exposure to this dust may lead to damaging effects to biological systems, tissues and organ. Harmful effects like dermatitis, laryngeal cancer, lung cancer, Gastrointestinal tumour have been reported in cement dust exposed individuals^{4,5}. Silicon oxide (SiO₂) is commonly found in nature as quartz. There are many crystalline forms of silica and alpha quartz is the most common form among them. Exposure to respirable crystalline silica occurs when materials containing crystalline silica are reduced to dust⁶. Chronic exposure to inhaled crystalline silica result in production of reactive oxygen species and enhanced inflammatory cytokine production, lipid peroxidation^{7,8,9}. Inflammation causes release of factors like Tumour Necrosis Factor alpha that may stimulate increased production of platelets from the bone marrow¹⁰. Several studies in different countries like Nigeria, India have indicated that cement dust exposure causes haematological changes that include Platelet count. A raised Platelet count may result in increased risk of cardiovascular disease in cement dust exposed workers. Previous studies in different countries have shown changes in the platelet count in cement factory workers^{11,12,13}. However, in Bangladesh, data is not adequate on this topic. The present study is designed to evaluate the effects of cement dust on platelet count of cement factory workers.

Materials and Methods:

This cross sectional study was conducted in the Department of Physiology, Dhaka Medical College, Dhaka from July 2017 to June 2018. Forty six

apparently healthy male cement factory workers, working in a cement factory for 2 years or more, with age ranging from 20 to 50 years were study group and forty six age, BMI and socioeconomic condition matched apparently healthy male subjects from different areas of Dhaka city were control group based on the inclusion and exclusion criteria. Subjects with history of respiratory disease, acute infection, cardiac disease, haematological disease, liver disease, renal disease, malignancies, hypertension; history of taking anticoagulant, chemotherapy, iron therapy and recent history of blood transfusion were excluded from the study.

After selection of the subjects informed written consent was taken from them. The research work was carried out after obtaining ethical clearance Ethical Review Committee of Dhaka Medical College, Dhaka. All the information were recorded in a pre-designed schedule. With aseptic precaution, 2 ml of venous blood were collected from ante-cubital vein, the blood sample was taken in a tube with EDTA anticoagulant for determination of platelet count. This parameter was determined using Horiba Pentra DX Nexus automated haematology analyzer. The collected blood sample was analyzed in the Department of Laboratory Medicine, Dhaka Medical College hospital, Dhaka. Statistical analysis was performed by using SPSS (Statistical Package for Social Sciences) Version 16. Data were presented as mean and standard deviation (mean $\pm$ SD). Unpaired Student's 't' test was done to compare between the groups and correlation was analyzed by Pearson's correlation co-efficient (r) test. p value of < 0.05 was taken as level of significance.

Results:

In this study no statistical differences were observed in age, BMI, socioeconomic condition, systolic and diastolic blood pressure (Table I).

Table- I: General characteristics of the subjects in both groups (N=92).

	Cement mill workers (n=46)	Control (n=46)
Age (years)	33.17 $\pm$ 8.27 ^{ns}	33.52 $\pm$ 7.87
BMI (kg/m ²)	23.14 $\pm$ 2.06 ^{ns}	23.71 $\pm$ 2.61
Socioeconomic condition		
Low	46 (100%)	46 (100%)
Systolic BP (mmHg)	117.72 $\pm$ 15.06 ^{ns}	113.04 $\pm$ 12.09
Diastolic BP (mmHg)	71.74 $\pm$ 9.51 ^{ns}	70.87 $\pm$ 9.11

Data shown as Mean $\pm$ SE, Statistical analysis was done by Unpaired Student's 't' test, ns = not significant, Control=Healthy adult subjects not exposed to cement dust, BMI=Body mass index, BP= blood pressure.

The platelet count was significantly higher in the cement dust exposed subjects in comparison to the control group (Table II, Figure 1).

Table-II: Study parameters of the subjects in both groups (N=92).

Parameters	Cement factory workers (n=46)	Control (n=46)
Platelet count ($\times 10^3/\mu\text{l}$)a	297.30 $\pm$ 92.65***	234.22 $\pm$ 61.76

Data were shown as mean $\pm$ SE. Statistical analysis was done by Unpaired Student's 't' test (a) for comparison between groups. N= total number of subjects. * = Total count of Platelet of cement mill workers vs control group, *** = p < 0.001, n= number of subjects in each group.

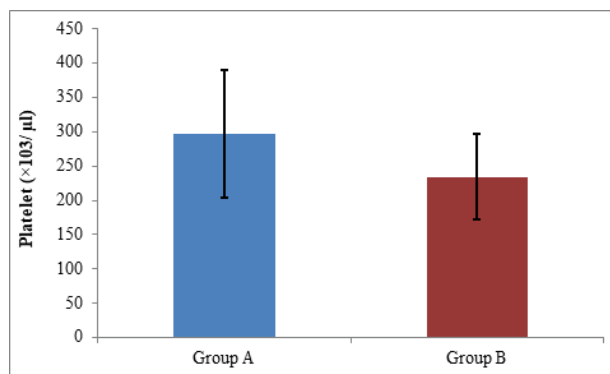


Figure-1: Mean total count of platelet in both groups (N=92).

Group A: Cement mill workers

Group B: Healthy control subjects.

N= Total number of subjects

The change in platelet count showed positive correlation with the duration of cement dust exposure (Figure 2).

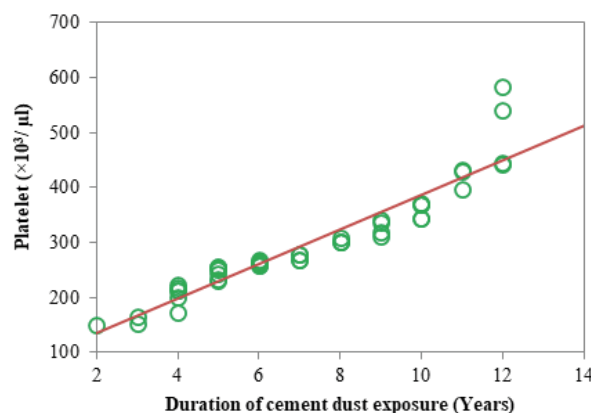


Figure-2: Correlation of duration of cement dust exposure with platelet counts in study group (n=46).

n = number of subjects in study group

Study subjects: Cement mill workers

r = + 0.943, p = <0.001***

Discussion:

In the present study, the platelet count was higher in subjects exposed to cement dust than that of controls and there was positive correlation between the platelet count with the duration of exposure to cement dust. This result is similar to others^{11,12,13}. Literature review suggested cement dust when inhaled cause neutrophils, macrophage and lymphocytes to increase in the lung and also the very small cement dust particle can enter the circulation^{14,15,16}.

Toxic components of cement dust causes alveolar epithelial cells, neutrophils, alveolar macrophage to release inflammatory mediators and cytokines such as tumor necrosis factor-alpha (TNF- alpha), interleukins (IL-1, IL-8). The inflammatory response is accelerated due to these transcription factors^{17,18}.

Transcription factors of GATA family that is, GATA-2 along with GATA cofactor (FOG 1) are involved in regulation megakaryopoiesis in the bone marrow. GATA-2 ensures

maintenance and proliferation of haematopoietic progenitor cells. Increased expression of GATA-2 results in megakaryocytic differentiation.

TNF alpha released by alveolar macrophage due to exposure to cement dust, result in activation of GATA-2. Overexpression of GATA-2 stimulates megakaryopoiesis. This may result in increase in platelet count^{19,20}.

Conclusion:

After analyzing the results of the study, it can be concluded that cement dust exposure has damaging effect on the platelet count. This is evidenced by significant increase in platelet count in cement dust exposed subjects. The change in platelet count is significantly related to the duration of exposure.

Conflict of Interest: None.

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Thyroid Function Status during Different Trimesters in Bangladeshi Women

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Abstract

Introduction: Gradual alteration of thyroid function occurs during different trimesters of gestation. **Objective:** To observe thyroid function status in normal pregnancy. **Materials and Methods:** This cross sectional study was conducted in the Department of Physiology, Sir Salimullah Medical College, Dhaka from July 2016 to June 2017. The study was approved by Institutional Ethical Committee. Total 120 female subjects, age ranged from 20 to 35 years were included in this study, among them 90 were healthy pregnant women and 30 were nonpregnant women. Serum TSH, FT4 & FT3 levels were measured. The statistical analysis was done by ANOVA test and Bonferroni test. **Results:** In this study, mean serum TSH level was lower in 1st & 2nd trimester and higher in 3rd trimester than that of nonpregnant group. Again it was gradually higher from 1st to 3rd trimesters of gestation and the difference was statistically significant ($p < 0.05$, $p < 0.001$, $p < 0.01$) in between the groups. Mean serum FT4 & FT3 levels were higher in 1st trimester and lower in 2nd & 3rd trimesters of gestation than that of nonpregnant group. Again, both these levels were gradually lower from 1st to 3rd trimesters of gestation and the difference was statistically significant ($p < 0.001$, $p < 0.001$, $p \leq 0.01$) in between the groups. **Conclusion:** Gradual alterations of thyroid function status were observed during pregnancy. Serum TSH level was gradually higher and both serum FT4 & FT3 levels were gradually lower from 1st to 3rd trimesters of gestation.

Key words: TSH, FT4, FT3, Trimester, Pregnancy.

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Introduction:

The continuous physiological adjustments of the body during pregnancy are often grouped by period of gestation in three trimesters of pregnancy¹. During pregnancy various physiological and biochemical changes including hormonal changes, increase nutritional requirements, increase metabolic demand

etc. take place to meet the demand of the growing fetus^{2,3}. Almost all endocrine glands of the mother react markedly to pregnancy due to increase metabolic load of the mother and also in response to placental hormones⁴. Among the hormonal changes during pregnancy, thyroid hormone change is a remarkable one⁵. The production, circulation and disposal of thyroid hormones are all altered during pregnancy⁶. Thyroid hormone is an important metabolic hormone, necessary for both mother and the fetus during pregnancy⁷. First trimester of pregnancy which is up to 12 weeks of gestation is the most important period, as organogenesis of fetus takes place at this stage⁸. During 1st trimester the fetus completely depends on transplacental passage of maternal thyroid hormone as fetal thyroid gland is not functional until 12 weeks of gestation⁹. In normal pregnancy, the higher concentration of hCG during 1st trimester stimulates the thyrocytes and increase the level of FT4, FT3 and decrease the level of TSH¹⁰. But after 1st trimester the concentration of hCG falls and reaches a plateau during mid gestation, where it persists until delivery^{2,4}. So, there is a tendency for serum FT4 and FT3 values to decrease progressively during later gestational stages¹¹. Serum TSH value which is lower during 1st trimester, is gradually increased in 2nd and 3rd trimester of gestation¹².

Materials and Methods:

This cross sectional study was carried out in the Department of Physiology, Sir Salimullah Medical College (SSMC), Dhaka from July 2016 to June 2017. The study protocol was approved by the Institutional Ethics Committee of SSMC. For this, 90 apparently healthy pregnant women aged 20-35 years of different trimesters were recruited as study group (group II). On the basis of gestational period, group II was further subdivided into groups 1st trimester of gestation (IIa), 2nd trimester of gestation (IIb) & 3rd trimester of

gestation (IIc) and each group was consisted of 30 different pregnant women of different trimesters. They were selected from Out Patient Department (OPD) of Obstetrics & Gynaecology of SSMC and Mitford Hospital by consecutive purposive sampling. For comparison, age matched 30 apparently healthy non-pregnant nulliparous (NPN) women were also studied as control group (group I). They were selected by personal contact. All the subjects were belonged to middle socioeconomic status. Subjects having history of any chronic or systemic diseases (hypertension, diabetes mellitus, cardiac disease, renal disease and tuberculosis), known thyroid abnormalities, other endocrine abnormalities, goitre, hyperemesis gravidarum, twin pregnancy, psychiatric illness etc. were excluded from the study.

After selection the aim, benefits, risks and the procedure of the study were explained to each subjects and a written consent was taken. Detailed personal, family, medical and occupational histories were taken and thorough physical examination of all subjects were done and recorded.

With all aseptic precautions, seven (7) ml of venous blood was drawn from antecubital vein. Serum TSH, FT4 and FT3 levels were measured by chemiluminescent microparticle immunoassay (CMIA) method¹³ in the laboratory of Department of Biochemistry, BSMMU, Dhaka. Data were expressed as mean $\pm$ SD (standard deviation). The statistical analysis was done by using SPSS version 22. ANOVA test and Bonferroni test were used to compare the data as applicable. p value <0.05 was considered as level of significance.

Results:

All the groups (subjects) were age matched. Whereas, mean ($\pm$ SD) body weight and BMI were increased during different trimesters (Table-I).

In this study, the mean ($\pm$ SD) serum TSH level was significantly lower in group IIa ($p<0.01$), non-significantly lower in group IIb and significantly higher in group IIc ($p<0.01$) in comparison to that of group I. Again, this value was significantly higher in group IIb and IIc ($p<0.05$, $p<0.001$) in comparison to that of group IIa and also significantly ($p<0.01$) higher in group IIc than that of group IIb (Table-II).

In this study, the mean ($\pm$ SD) serum FT4 level was significantly higher in group IIa ($p<0.01$) and significantly lower in group IIb and IIc ($p<0.05$, $p<0.001$) in comparison to that of group I. Again, this value was lower in group IIb and IIc in comparison to that of group IIa which was statistically highly significant ($p<0.001$, $p<0.001$) and also significantly ($p<0.01$) lower in group IIc than that of group IIb (Table-II).

In this study, the mean ($\pm$ SD) serum FT3 level was significantly higher in group IIa ($p<0.001$) and significantly lower in group IIb and IIc ($p<0.01$, $p<0.001$) in comparison to that of group I. Again, this value was significantly

($p<0.001$, $p<0.001$) lower in group IIb and IIc in comparison to that of group IIa and also significantly ($p<0.01$) lower in group IIc than that of group IIb (Table-II).

Table-I: Age, body weight and BMI of the subjects in different groups (N=120).

Parameters	Groups			
	I (n=30)	IIa (n=30)	IIb (n=30)	IIc (n=30)
Age (years)	24.23 $\pm$ 1.83 (21-28)	24.70 $\pm$ 2.34 (21-31)	24.03 $\pm$ 1.71 (22 - 29)	24.50 $\pm$ 2.05 (21 - 30)
Weight (kg)	53.37 $\pm$ 3.02 (49 - 62)	55.77 $\pm$ 2.56 (52-62)	61.87 $\pm$ 1.74 (59 - 67)	71.80 $\pm$ 2.68 (68 - 78)
BMI (kg/m ²)	20.27 $\pm$ 1.10 (18.75-24.22)	21.42 $\pm$ 1.11 (19.85-24.22)	23.60 $\pm$ 0.79 (21.99 -25.18)	28.14 $\pm$ 0.82 (25.94 -29.32)

Data are expressed as mean $\pm$ SD. Figure in parentheses indicate ranges.

Group I: Control group (Non-pregnant nulliparous), Group II: Study group

Group IIa: 1st trimester of gestation, Group IIb: 2nd trimester of gestation, Group IIc: 3rd trimester of gestation

N= Total number of subjects

Table-II: Serum thyroid stimulating hormone (TSH), free thyroxine (FT4) and free triiodothyronine (FT3) levels of the subjects in different groups (N=120).

Parameters	Groups			
	I (n=30)	IIa (n=30)	IIb (n=30)	IIc (n=30)
TSH (mIU/L)	2.33 $\pm$ 0.56 (0.56 - 3.35)	1.42 $\pm$ 1.47 (0.52 - 6.02)	2.16 $\pm$ 1.13 (0.85 - 5.91)	2.82 $\pm$ 0.71 (1.72 - 5.59)
FT4 (pmol/L)	14.44 $\pm$ 2.07 (9.85 - 17.75)	16.14 $\pm$ 1.45 (12.96 - 19.75)	13.12 $\pm$ 2.02 (9.56 - 17.24)	11.75 $\pm$ 1.48 (9.86 - 15.19)
FT3 (pmol/L)	4.09 $\pm$ 0.56 (2.84 - 5.18)	4.66 $\pm$ 0.58 (3.02 - 5.27)	3.66 $\pm$ 0.49 (2.88 - 4.85)	3.33 $\pm$ 0.40 (2.78 - 4.15)

Statistical analysis

Groups	p value		
	TSH	FT4	FT3
I vs IIa vs IIb vs IIc	<0.001***	<0.001***	<0.001***
I vs IIa	0.005**	0.002**	<0.001***
I vs IIb	0.875 ^{ns}	0.030*	0.009**
I vs IIc	0.007**	<0.001***	<0.001***
IIa vs IIb	0.040*	<0.001***	<0.001***
IIa vs IIc	<0.001***	<0.001***	<0.001***
IIb vs IIc	0.009**	0.006**	0.008**

Data are expressed as mean $\pm$ SD. For statistical analysis, ANOVA test was performed for comparison among the groups and then Bonferroni test to compare between two groups. Figure in parentheses indicate ranges. Group I: Control group (Non-pregnant nulliparous), Group II: Study group.

Group IIa: 1st trimester of gestation, Group IIb: 2nd trimester of gestation, Group IIc: 3rd trimester of gestation. ***= Significant at $p<0.001$, **= Significant at $p<0.01$, *= Significant at $p<0.05$, ns = Not significant, N= Total number of subjects.

Discussion:

In this study, the mean serum TSH level was significantly lower in 1st trimester and non-significantly lower in 2nd trimester in comparison to that of non pregnant women. But it was significantly higher in 3rd trimester compared to that of non pregnant women. These findings are in almost consistent with that of some other researchers of different countries¹¹. On the contrary, mean serum TSH level was lower in all trimesters as compared to that of non pregnant women¹⁴. This discrepancy might be due to variation of methodology implied, maternal age, number of non pregnant women, etc. Again, it was gradually higher from 1st to 3rd trimesters of gestation and the difference was statistically significant ($p < 0.05$, $p < 0.001$, $p < 0.01$) in between the groups. Similar findings were also reported by some other researchers of different countries¹⁵.

In this study, the mean ($\pm$ SD) serum FT4 level was significantly ($p < 0.01$) higher in 1st trimester in comparison to that of non pregnant women. But this value was significantly ($p < 0.05$, $p < 0.001$) lower in 2nd and 3rd trimester respectively in comparison to that of non pregnant women. Almost similar finding was also reported by different researchers¹⁶. On the contrary, the mean serum FT4 level was lower during the all trimesters in comparison to that of non pregnant women¹².

Again, mean serum FT4 level was significantly ($p < 0.001$) lower in 2nd and 3rd trimester in comparison to that of 1st trimester and also significantly ($p < 0.01$) lower in 3rd trimester than that of 2nd trimester. These findings are in agreement with those of some other researchers¹⁷. On the contrary, it has been found that, mean FT4 level was increased continuously with the increasing age of gestation¹⁸.

In this study, the mean ($\pm$ SD) serum FT3 level was significantly ($p < 0.001$) higher in 1st trimester in comparison to that of non pregnant women. But this level was significantly ($p < 0.01$, $p < 0.001$) lower in 2nd and 3rd trimester respectively in comparison to that of non pregnant women. These findings are in almost consistent with that of some other researchers¹⁹. On the contrary, mean serum FT3 level was significantly lower during different trimesters in comparison to that of non pregnant women¹⁶.

Again, mean serum FT3 level was significantly ($p < 0.001$) lower in 2nd and 3rd trimester in comparison to that of 1st trimester and also significantly ($p < 0.01$) lower in 3rd trimester than that of 2nd trimester. These findings are in agreement with those of other researchers of different countries^{15,16}. On the contrary, it has been found that, mean serum FT3 level showed no significant change between the trimesters²⁰. This discrepancy might be due to variation of methodology, sample size, etc.

The exact mechanism that is involved in alteration of serum TSH, FT4 and FT3 level during different trimesters of pregnant women are not yet clearly established. However, several investigators of different countries proposed various suggestions on these aspects. It has been suggested that,

higher concentration of serum human chorionic gonadotropin (hCG) during 1st trimester has thyrotropic activity due to its structural similarity with serum TSH by sharing of common alpha subunit with TSH & thereby directly stimulates maternal thyroid gland by binding with TSH receptor and ultimately causes higher thyroid hormone (FT4 and FT3) concentration and lower TSH concentration on that period^{10,21}. Again, it has been stated that, serum hCG concentration gradually lower in 2nd and 3rd trimester of pregnancy and thereby causes lowering of FT4 & FT3 level and rise in TSH level^{11,21}.

However, FT4, FT3 level increases as serum TSH level decreases during 1st trimester and FT4, FT3 level gradually decreases as serum TSH level gradually increases during 2nd and 3rd trimester as a result of negative feedback mechanism^{19,22}.

Again, increase in plasma volume (approximately 50%) as well as changes in deiodinase activity in the placenta leads to a decrease in thyroid hormone concentration as pregnancy advances¹⁰.

Conclusion:

In this study it was observed that gradual alteration of serum TSH, FT4 & FT3 levels were observed during different trimesters in pregnant Bangladeshi women. Serum TSH level was gradually higher and both serum FT4 and FT3 levels were gradually lower from 1st to 3rd trimesters of gestation. To establish standard data further studies should be done on this aspect.

Conflict of Interest: None.

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Bacteriological Profile and Their Antimicrobial Susceptibility Pattern of Urinary Tract Infection Patients Attending at the Nephrology Department of Enam Medical College and Hospital, Savar, Dhaka.

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Abstract

Introduction: Urinary tract infection (UTI) is one of the common bacterial infections encountered by clinicians in clinical practice. Distribution and susceptibility of UTI-causing pathogens change according to time and place. Area-specific studies to gain knowledge about the type of pathogens and their resistance patterns may help the clinician to choose the proper antimicrobials for empirical treatment. **Objective:** This study was conducted to determine the distribution and antimicrobial susceptibility of uropathogens. **Materials and Methods:** This study was conducted in the Enam Medical College & Hospital, Savar, Dhaka between January 2021 to June 2021 to identify the organisms causing UTI and their antibiotic susceptibility. Clean catch midstream urine samples were collected from 476 clinically suspected UTI patients and tested bacteriologically using standard procedures. Antimicrobial susceptibility test was performed by Kirby-Bauer disk diffusion method. **Results:** The prevalence of UTI was higher in females than in males. Out of the 170 culture positive bacterial isolates *Escherichia coli* was the most common 51.76% organism, followed by *Staphylococcus aureus* 28.82%, *Staphylococcus saprophyticus* 11.17%, *Klebsiella* spp 8.23 % and *Enterococcus* spp 4.70%. Meropenem (100%) followed by Imipenem (92.86% to 100%) were found most susceptible drugs. While Trimethoprim-sulfamethoxazole and Cephadrine were the most resistant drug against the isolated uropathogens. **Conclusion:** As bacterial drug resistance is an evolving process, routine surveillance and monitoring studies should be conducted to provide physicians knowledge on the updated and most effective empirical treatment of UTIs.

Key words: Urinary tract infection, Bacteriological profile and Antimicrobial resistance.

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Introduction:

Urinary tract infection (UTI) is one of the most common bacterial infections seen in clinical practice, affecting more than 150 million people annually with a high rate of morbidity and financial cost¹. UTI may be either symptomatic or asymptomatic. Symptomatic infection is associated with a wide spectrum of morbidity, from mild irritative voiding symptoms to bacteremia, sepsis and occasionally death². Typical symptoms of UTI include the triad of urgency (the enhanced desire to void the bladder), frequency (increased frequency of urination) and dysuria (painful urination)³. Clinically, UTIs are categorized as uncomplicated or complicated. Uncomplicated UTIs typically affect individuals who are otherwise healthy and have no structural or neurological urinary tract abnormalities⁴. Several risk factors including female anatomy, age, sexual activity, vaginal infection, diabetes, obesity, certain types of birth control practice and genetic susceptibility are associated with uncomplicated UTI. Whereas complicated UTI may be defined as; UTIs associated with factors that compromise the urinary tract or host defense, including urinary tract abnormalities, urinary obstruction, urinary retention caused by neurological disease, immunosuppression, renal failure, renal transplantation, pregnancy and the presence of foreign bodies such as calculi, indwelling catheters or other drainage devices^{4,5}. Complicated UTIs in particular constitute a huge burden on health-care systems as a frequent reason for hospitalization⁶.

UTIs are usually caused by a single bacterial species but polymicrobial

infections may also take place. Among the uropathogens, *Escherichia coli* (*Esch. coli*) is responsible for 75–90% infections⁷. Other organisms such as *Klebsiella* spp., *Pseudomonas*, *Proteus* spp., *Enterococcus faecalis* and *Enterobacter* account for a smaller number of infections. *Staphylococcus saprophyticus* is also responsible for approximately 5–15% UTI cases in young sexually active females^{8,4}. Chronic Kidney Disease (CKD) is now a global problem. Infection is one of the major causes of greater morbidity and mortality in CKD patients⁹. Due to the structural and functional defect, incidence of UTI in CKD patients is higher compared to others. Increased risk of UTI in CKD patients includes; the impairment of host immunity, change in the composition of urine, oliguria, anuria and the resultant changes in urinary pH and osmolality. Furthermore, uremic condition may also inhibit the antimicrobial activity of granulocytes, macrophages and other defense reactions of the host. In the patients with CKD, urinary drug concentration may be too low to eradicate organisms completely¹⁰.

Antibiotics are the cornerstone in treating UTI. Easy availability and non-judicious use of antimicrobial agents may contribute to the development of resistance against commonly used antibiotics¹¹. As antimicrobial susceptibility test report is usually obtained after 48 hours, clinicians have to start an antimicrobial drug before getting the report. In these cases, the empirical choice of antibiotic is influenced by recent available data about the susceptibility pattern and the causative agent⁸. Unfortunately, UTI has been suffering a shift in the etiological agents and antimicrobial susceptibility in the last decade. Distribution of urinary pathogens and the susceptibility pattern to antimicrobial agents may vary in different places and in same place from time to time^{12,11}. Thus empirical choice of antibiotics in UTI is not uniform and it depends on local guidelines, if available¹¹. Therefore, it is necessary to have knowledge about the distribution of the pathogens and their susceptibility pattern to antibiotics in a particular setting to guide the initial empirical treatment¹².

There is a need to generate data in every institution that will guide the clinicians to select empirical choice of appropriate antimicrobial agent. Thus the present study was carried out to describe the bacteriological profile causing UTI and their antimicrobial susceptibility pattern. This study is important for clinicians in order to facilitate the effective treatment and management of patient with urinary tract infection.

Materials and Methods:

This cross sectional study was carried out in the department of Nephrology and Microbiology in Enam Medical College Hospital, Savar, Dhaka during the period of January 2021 to June 2021. Irrespective of age and sex of the patient, a total of 476 clean-catch midstream urine specimens were collected from the clinically suspected UTI patients with their written consent from the Nephrology department of

Enam Medical College Hospital, Savar, Dhaka. The study was approved by the ethical review committee of the Enam Medical College.

After collection of specimen a loopful (0.01 mL) of urine was inoculated by calibrated wire loop on Blood agar and MacConkey's agar media and incubated aerobically at 37°C for 24 hours for the growth of bacteria. All the plates were inspected for growth and the isolates were identified by observing colony morphology, Gram-stain characteristics and relevant biochemical tests. Colony count $\geq 10^5$ colony/mL of urine were considered as significant bacterial growth. All the isolates were tested for susceptibility against Azithromycin, Ciprofloxacin, Amoxicillin-clavulonic acid, Cefixime, Cefuroxime, Cephadrine, Nitrofurantoin, Trimethoprim-sulfamethoxazole, Ceftriaxone, Ceftazidime, Gentamicin, Imipenem and Meropenem antibiotics by Kirby Bauer disc diffusion technique on Mueller-Hinton agar media. Results were read according to the National Committee for Clinical Laboratory Standards guidelines^{13,14}.

Results:

The distribution of the infections according to the age and sex of the UTI patients are summarized in Table 1. Among 170 patients, majority were females 109 (64.11%) and the male to female ratio was 1: 1.79. Most of the patients 54 (31.77%) were in the age group 50–59 years, followed by 33 (19.41%) in the 60–69 age group.

Table-I: Age and sex distribution of the UTI patients.

Age group	Male	Female	Total
< 20	-	02	02
20-29	02	05	07
30-39	05	16	21
40-49	06	17	23
50-59	23	31	54
60-69	13	20	33
≥ 70	12	18	30
Total	61	109	170

In the present study, we found that vomiting 82.35% was the commonest symptom followed by increased frequency of micturition 76.48%, supra-pubic pain 73.52%, dysuria/burning sensation 64.70%, incontinence 55.89%, urgency of urine 51.76%, fever 38.23% and loin pain in 17.64% cases (Fig: 1).

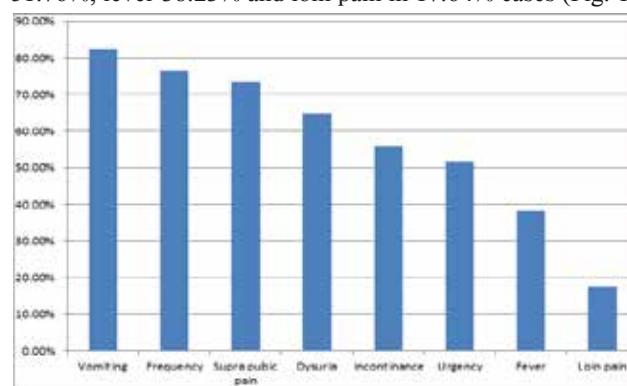


Figure-1: Clinical manifestations of the UTI patients.

Out of 170 culture positive samples *Escherichia coli* was found to be most commonest 88 (51.76%) organism, followed by *Staphylococcus aureus* 49 (28.82%), *Staphylococcus saprophyticus* 19 (11.17%), *Klebsiella* spp 14 (8.23%) and *Enterococcus* spp 8 (4.70%).

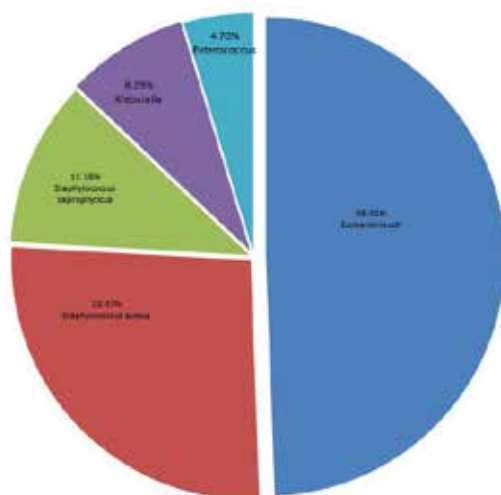


Figure-2: Bacteriological pattern isolated from the urine samples (n=170).

The susceptibility pattern of the commonly used antibiotics are summarized in table- III. In our study susceptibility pattern of *Esch. coli* showed lowest Trimethoprim-sulfamethoxazole 10.71%, and followed by Cefixime 21.42% sensitive. Meropenem was found to be 100% sensitive, followed by Imipenem 95.23%, Ceftazidime 89.29% and Ceftriaxone were 84.52% sensitive.

Staphylococcus aureus exhibited low level of sensitivity against Trimethoprim-sulfamethoxazole 10.71%, Cephadrine 20.23%, Cefuoxime 22.61% and Cefixime 31.11%. Average sensitivity were observed against Ciprofloxacin 48.89% and Azithromycin 64.44%. While high level of sensitivity showed against Imipenem 93.33%, Gentamicin 91.11%, Ceftazidime 89.29% and Ceftriaxone 84.44%. Meropenem was found to be 100% sensitive.

Sensitivity pattern of *Staphylococcus saprophyticus* showed lowest against Trimethoprim-sulfamethoxazole 15.17% followed by Cephadrine 31.58% and Ciprofloxacin 42.11%. While Nitrofurantoin and Amoxicillin-Clavulonic were found 78.94% sensitive. Imipenem 94.73%, Ceftazidime 89.48% and Ceftriaxone 84.21% sensitive. Meropenem showed 100% sensitive.

Klebsiella spp. showed sensitivity level against Trimethoprim-sulfamethoxazole 7.16% followed by Cephadrine 28.58% and Ciprofloxacin 35.71%. Imipenem, Ceftazidime, Ceftriaxone, Nitrofurantoin and Amoxicillin-Clavulonic were found 92.86%, 85.71%, 85.71%, 78.58% and 71.42% sensitive respectively. While Meropenem showed no resistance.

Enterococcus spp. showed lowest 00% sensitivity against Trimethoprim-sulfamethoxazole and highest 100% sensitive

against Meropenem and Imipenem. Moderately sensitive were found against Azithromycin 75.00%, Amoxicillin-Clavulonic acid 75.0% and Nitrofurantoin 62.5%. While Ceftazidime and Ceftriaxone were 87.5% and 87.5% sensitive respectively.

Table-III: Antimicrobial susceptibility pattern of the bacterial isolates.

Antibiotics	Esch. coli	Staph. aureus	Staph. saprophyticus	Klebsiella spp	Enterococcus spp
Trimethoprim-sulfamethoxazole	10.71%	10.71%	15.17%	7.16%	00%
Cephadrine	20.23%	20.23%	31.58%	28.58%	12.5%
Ciprofloxacin	32.14%	48.89%	42.11%	35.71%	37.5%
Azithromycin	70.23%	64.44%	52.64%	64.29%	75.00%
Cefixime	21.42%	31.11%	42.10%	42.86%	50%
Cefuoxime	22.61%	22.61%	42.10%	64.29%	37.5%
Amoxicillin-Clavulonic acid	69.04%	69.04%	78.94%	71.42%	75.00%
Nitrofurantoin	82.14%	82.14%	78.94%	78.58%	62.5%
Ceftazidime	89.29%	89.29%	89.48%	85.71%	87.5%
Ceftriaxone	84.52%	84.44%	84.21%	85.71%	87.5%
Gentamicin	76.20%	91.11%	84.21%	71.42%	50%
Imipenem	95.23%	93.33%	94.73%	92.86%	100 %
Meropenem	100%	100%	100%	100%	100%

Discussion:

UTI is one of the most common a common clinical problem seen in clinical practice both in outpatient and inpatient department. Epidemiologically UTIs account for more than 150 million cases annually with a high rate of morbidity and financial cost.

In the present study, we found 109 (64.11%) were females and the male to female ratio was 1: 1.79. Most of the patients 54 (31.77 %) were in the age group of 50-59 years. Similar finding had been observed in a study done by Ahmed F et al. in Bangladesh which reported 67% were females and the male to female ratio was 0.49:1. The most common age group was 46–60 years (34%)¹⁵. In another study by Rahman MR et al. also showed that out of 103 patients females were (69) more than male (34) with a male to female ratio of 1:2. Mean age was 57.5±9.5 (range 19-80) years¹¹. Female predominance were observed in the present and other studies. The reason behind this high prevalence of UTI in females is due to proximity of the urethral meatus to the anus, shorter and wider urethra, sexual intercourse, incontinence and less acidic pH of vaginal surface and poor hygienic conditions. The incidence of UTI increases with age¹⁵.

In the present study, we found that vomiting 82.35% was the commonest symptom followed by increased frequency of micturition 76.48%, supra-pubic pain 73.52%, Dysuria/Burning sensation 64.70%, incontinence 55.89%, urgency of urine 51.76%, fever 38.23% and loin pain in 17.64% cases In a study done by Raman MR et al. found Fever 93.2% was the most common symptom followed by increased urinary frequency 46.6%, Dysuria 79.6%, loin

pain 30.1%, supra-pubic pain 45.6%, incontinence 7.8% and vomiting in 40.8% patients¹¹. In other study Ahmed F et al. showed most of the patients had fever 55%, followed by loin pain 37%, burning and increased frequency of micturition 32%, vomiting 28%, urgency of urine 23%, delirium 15% and incontinence in 18% patients¹⁵.

In our study we found *Escherichia coli* to be most common 88(51.76%) organism, followed by *Staphylococcus aureus* 49(28.82%), *Staphylococcus saprophyticus* 19(11.17%), *Klebsiella* spp 14(8.23 %) and *Enterococcus* spp 8(4.70%) cases. In a study Saber S et al revealed that *E. coli* (64%) was the most common organism and *Staphylococcus* spp. 19%, *Proteus* 12 % and *Klebsiella* 5% were the other organisms³. Setu SK et al. showed that among the gram negative organisms *E. coli* 63.93% was the most common followed by *Klebsiella* spp 17.09%, *Pseudomonas* 5.59%, *Enterobacter* (5.28%) were the other isolates. While *Enterococci* 75.07% was the predominant followed by *Staphylococcus aureus* 12.88% among the gram positive organisms¹⁶. In another study by Nazme NI et al. found *E. coli* was the commonest isolate 62.1% followed by *Enterococcus* 19.2%, *Klebsiella* 10.2%, *Pseudomonas* 3.4%, *Acinetobacter* 3.4% and *Proteus* 1.7%¹⁷. It is observed that although *Esch. coli* was the most frequent pathogen in all study results but there are variations in other organisms among different studies. The dissimilarities of the rate of isolation and isolated bacterial species between the present study and other studies may be due to the geographical variation, difference among sexes, various personal, educational and overall socioeconomic status, availability of medical facilities, method of collection of urine samples etc¹².

Regarding the susceptibility pattern of antibiotics, it was observed that the Meropenem 100% followed by Imipenem (*E. coli*- 95.23%, *Staph. aureus*-93.33%, *Staph. saprophyticus*-94.73% and *Klebsiella* spp-92.86%) were the most effective antibiotic in our present study.

In our present study susceptibility pattern of *Esch. coli* showed lowest Trimethoprim-sulfamethoxazole 10.71% and followed by Cefixime 21.42% sensitive. Meropenem was found to be 100% sensitive, followed by Imipenem 95.23%, Ceftazidime 89.29% and Ceftriaxone were 84.52% sensitive. In a study done by Shill MC et al showed that *Esch. coli* exhibited high resistance with amoxicillin and ciprofloxacin with 94% and 79% resistance respectively. All the Cephalosporins showed moderate activity against the *Esch. coli* infection; Cephadrine, Cefixime, Ceftriaxone and Cefepime exhibited 68.7%, 62.7%, 61.2% and 46.3% resistance respectively. Gentamicin demonstrated only 26.9% resistance while Meropenem showed no resistance at all. Amikacin also proved to be very active against *Esch. coli* with only 3% resistance and so did nitrofurantoin with just 11.9% resistance¹⁸. In another study Hossain Get al. showed that *Esch. coli* was most sensitive to Nitrofurantoin (92.5%), Meropenem 92.5%, Amikacin (84.6%) and Gentamycin 71.8% and resistant to most commonly used drugs like Cefixime 78%, Cefuroxime 77.5%, Ciprofloxacin 62.5%, Ceftriaxone 62.5%¹⁹.

In our study *Staph. aureus* exhibited low level of sensitivity against Trimethoprim-sulfamethoxazole 10.71%, Cephadrine 20.23%, Cefuroxime 22.61% and Cefixime 31.11%. Average sensitivity were observed against Ciprofloxacin 48.89% and Azithromycin 64.44%. While high level of sensitivity showed against Imipenem 93.33%, Gentamicin 91.11%, Ceftazidime 89.29% and Ceftriaxone 84.44%. Meropenem was found to be 100% sensitive. The study done by Haider JSet al. found that the Gram positive isolates including *Staph. aureus* showed highly sensitive 100 % to Nitrofurantoin, Deptomycin and Linezolid followed by Teicoplanin 90.5% and showed low response to Cefoxitin 9.5%, Cefotaxime, Imipenem and Oxacillin showed 14.3%, Erythromycin and Ampicillin showed 28.6% and Amoxicillin-clavulanae 33.3% and Penicillin G 38.0%²⁰. We found Sensitivity pattern of *Staphylococcus saprophyticus* lowest against Trimethoprim-sulfamethoxazole 15.17% followed by Cephadrine 31.58% and Ciprofloxacin 42.11%. While Nitrofurantoin and Amoxicillin-Clavulonic acid were found 78.94% sensitive. Imipenem 94.73%, Ceftazidime 89.48% and Ceftriaxone 84.21% sensitive. Meropenem showed 100% sensitive. In a study done by Haque R et al. found Trimethoprim-sulfamethoxazole 73.68%, Cefaclor 73.68%, Amoxicillin 71.05%, Cephalexin 65.79%, Ciprofloxacin 63.16%, Ceftriaxone 44.74%, Cefuroxime 39.47%, Gentamicin 47.37% and Nitrofurantoin 18.42%, resistance against *Staph. saprophyticus*⁷. In our study *Klebsiella* spp. showed low of sensitivity level against Trimethoprim-sulfamethoxazole 7.16% followed by Cephadrine 28.58% and Ciprofloxacin 35.71%. Imipenem, Ceftazidime, Ceftriaxone, Nitrofurantoin and Amoxicillin-Clavulonic acid were found 92.86%, 85.71%, 85.71%, 78.58% and 71.42% sensitive respectively. While Meropenem showed no resistance. Study done by Mollick et al. showed the sensitivity pattern of *Klebsiella* spp. They found Cephadrine 22.23 %, Ceftriaxone 44.44 %, Cefixime 44.44%, Ceftazidime 55.56%, Cotrimoxazole 44.44%, Ciprofloxacin 66.67%, Nitrofurantoin 72.22%, Gentamicin 77.77% and Amikacin 88.89%, Meropenem 94.44% and Imipenem 100% sensitive¹². In a study done Ahmed F et al. showed that as a whole all organisms are mostly sensitive to Meropenem 93.1%, Nitrofurantoin 86.2%, Amikacin 77.2% and Gentamycin 64.9% and mostly resistant to Cefixime 83.3%, Cefuroxime 81.4% and Ceftriaxone 66.9%¹⁵. From the analysis of the results of the antimicrobial susceptibility pattern of the present and other studies it revealed that the susceptibility pattern of some antibiotics are seems to be similar or closure to our study and some are quite dissimilar. It may due that the resistance pattern of uropathogens is changing drastically, because of uncontrolled-widespread use of antibiotics¹ and it may also vary in different places and even in same place from time to time or even institution to institution^{11,8}.

Conclusion:

Pattern of uropathogens vary in different settings and the increasing antimicrobial resistance is a great concern in developed and developing countries. Wherever possible,

urine culture and sensitivity of micro-organisms should be done before prescribing antibiotics and the empirical therapy must be considered on the recent antibiogram of a particular geographical area.

Conflict of Interest: None.

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Prevalence of Oral Candidiasis among Children Caused by Different Candida Species

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Abstract

Introduction: Oral candidiasis, which is caused by *Candida* species by the involvement of hard and soft palates, tongue, buccal mucosa, and floor of the mouth, is becoming a very common threat to oral health. Although in the majority of the cases, this infection is caused by *Candida albicans* which is a normal commensal organism in humans, however, it might be also caused by other *Candida* species, such as *C. glabrata*, *C. tropicalis*, and *C. krusei*. **Objectives:** This study aimed to evaluate the prevalence of oral candidiasis among children and to compare the type of causative candida species among them. **Materials and Methods:** This prospective observational study was conducted in the Shishu Hospital, Shamoly, Dhaka, spanned January 2016 through December 2016. A total of 286 oral swab samples were collected, and three methods including direct wet mount smear, staining, and culture were used for laboratory investigation of *Candida* infections. **Results:** Among 286 respondents, 161 (56.29%) were culturally and microscopically confirmed to have oral candidiasis. Among all of the detected species, *C. Albicans* was by far the highest species with 139(86.34%) followed by *C. tropicalis* with 14 (8.68%). Whereas 05(3.12%) cases were infected by *C. krusei*. On the other hand, the least detected species were *C. glabrata* and *C. guilliermondii* with 01(0.62%) and 02(1.24%) respectively. **Conclusion:** These days accurate and prompt identification of the infectious candida strains is crucial because isolates of *Candida* species differ extremely, both in their ability to produce infection and also in their susceptibility to antifungal agents.

Key words: Oral candidiasis, *Candida* species, laboratory investigation.

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Introduction:

Over the last few decades, the role of fungi as a causative agent of nosocomial infections in children has been skyrocketed¹. These fungi are a major cause of child morbidity, given the increased length of hospital stay also^{2,3}. Oral candidiasis, which is caused by *Candida* species by the involvement of hard and soft palates, tongue, buccal mucosa, and floor of the mouth, is becoming a very common threat to oral health. Although in the majority of the cases, this infection is caused by *Candida albicans* which is a normal commensal organism in human^{1,4-6} however, it might be also caused by other *Candida* species, such as *C. glabrata*, *C. tropicalis*, and *C. krusei*^{1,7}. Despite the recent revolution in laboratory techniques, primary diagnosis of invasive candidiasis remains challenging, which causing the delayed detection of candidiasis⁸. Specific and accurate identification of *Candida* strains is crucially important, considering the diseases producing ability of the strains and induce susceptibility to the antifungal drugs. Therefore, the present study aimed to evaluate the prevalence of oral candidiasis among children and to compare the type of causative candida species among them.

Material and Methods:

This prospective observational study was conducted in the Shishu Hospital, Shamoly, Dhaka with the ethical clearance of the review board, spanned January 2016 through December 2016. In this study, a total of 286 oral swab samples were collected, and three methods including direct wet mount smear, staining, and culture were used for laboratory investigation of *Candida* infections. Fresh smear with 20% potassium hydroxide (KOH) and direct microscopic examination with Gram staining of each sample was performed. By the gram stain technique, candidal hyphae and yeasts appeared in dark blue.

Budding yeast was seen by direct microscopy in wet mount preparation.

Subsequently, the samples were inoculated aerobically at 37°C for 24–48 hours into Sabouraud dextrose agar (SDA) media with the supplement of chloramphenicol and gentamycin in a screw-capped test tube where *Candida* produced cream, smooth, pasty convex moist colonies with a distinctive yeast smell. Then the positive cultures were transferred to CHROMagar *Candida* media for further analysis and differentiation between species⁹ based on colony appearance and color following primary culture.

The germ-tube test was performed for identifying *C. Albicans* and to differentiate *Candida Albicans* from non-*albicans* groups. The test involves the induction of hyphal outgrowths (germ-tubes) when subcultured in fresh human pooled serum at 37°C for 2–4 hours. The wet mount preparation also presented a germ tube which was a hyphal projection without having constriction at the point of origin from the yeast cell. A commercial Analytic Index (API) yeast indication kit (named API *Candida*) was used to perform the biochemical test (bioMerieux, Franch) for the isolation of *Candida* sp which was consist of twelve biochemical tests.

Results:

Socio-demographic findings of the study population. A total of 286 patients were included in this study according to the inclusion criteria of the study. Out of those majority, 169 (59.09%) were females whereas, 117(40.91%) was male patient. By far the highest study population was within the age ranging from 1 year to 05 years with 137(47.90%). The cases gradually reduced with the increase of the age where 87(30.42%) patients were between 6-10 years and 62(21.68%) patients were from 11 to 15 years age group.

Regarding the parent's income level, low socio-economic condition patient was by far the highest number with 217(75.87%) followed by middle socio-economic and higher socio-economic groups with 66(23.08%) and 03(1.05%) respectively. At the same time, the highest number of the patient's parents were illiterate 166(58.04%), in contrast, 120(41.96%) had completed their education and had knowledge about oral hygiene (Table I).

Table-I: Socio-demographic data of the study population (n= 286).

Variables	Total Number	Percentage (%)
Sex	Male	117
	Female	169
Age	1-5 years	137
	6-10 years	87
	11-15 years	62
Income of the parents	Low	217
	Middle	66
	High	03
The educational level of the parents	Illiterate	166
	Literate	120

Among 286 respondents, 161 (56.29%) were culturally and microscopically confirmed to have oral candidiasis. Among all of the detected species, *C. Albicans* was by far the

highest species with 139(86.34%) followed by *C. tropicalis* with 14 (8.68%). Whereas 05(3.12%) cases were infected by *C. krusei*. On the other hand, the least detected species were *C. glabrata* and *C. guilliermondii* with 01(0.62%) and 02(1.24%) respectively (Table II).

Table-II: Rate of Isolation of *Candida* species among the study group (n=161).

Name of species	Total Number	Percentage (%)
<i>C. albicans</i>	139	86.34
<i>C. guilliermondii</i>	02	1.24
<i>C. glabrata</i>	01	0.62
<i>C. krusei</i>	05	3.12
<i>C. tropicalis</i>	14	8.68

Discussion:

Fungal organisms are a dire source of nosocomial infections as well as cause significant ailments among children. Modern medicine is faced with great challenges, considering the increased length of hospital stay and high healthcare costs in children and patients with nosocomial infections^{3,10-14}. A relevant study by Walsh et al. in France found a strong correlation between mortality of acute candidiasis and children. He noted that about 10-15% of oral *Candida*-infected children are suspected of septicemia¹⁵. The present study was highlighted to evaluate the prevalence of oral candidiasis and to compare the type of causative *Candida* species in children.

In our study female *Candida* infected patient was remarkably high with 169 (59.09%) than male. It was probably for the reluctant attitude to the girls in the low socio-economic condition's population as in our study the low-income people were significantly high with 217(75.87%). We noted that age ranged from one year to five years was the grave victim of oral *Candida* infection which plummeted with the increase of age. As this early age group population is fully dependent on their parents for maintaining their oral hygiene so it was purely for the lack of proper oral care knowledge and lack of education of their guardians.

In our study, the most commonly detected *Candida* species were *C. Albicans* (86.34%), *C. tropicalis* (8.68%), *C. guilliermondii* (1.24%), *C. glabrata* (0.62%), and *C. krusei* (3.12%). *C. Albicans* has been found to be the long recognized as well as the most common cause of disseminated candidiasis, followed by *C. glabrata* *Albicans* species in both child and adult patients^{16,17,18}. Another factor of *Candida* infection is the imposition of economic burden on the patient due to the increased costs of care including the investigation fees, the use of antifungal agents and, even more for some time the prolonged length of hospital stay due to the development of fungal pneumonia¹⁹⁻²².

Conclusion:

Candida species were the most common fungal pathogens in the child department. Nowadays a greater emphasis has been given for the reliable, less time-consuming, and cost-effective identification methods for detecting *Candida* species. It is also important to identify the infecting strains of the

Candida because isolates of Candida species differ extremely, both in their ability to produce infection and also in their susceptibility to antifungal agents. Therefore, efforts should be made to prevent this fungal infection.

Conflict of Interest: None.

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Laboratory Parameters of Dengue Infection in a Medical College Hospital

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Abstract

Introduction & objective: Dengue is an acute illness caused by *Aedes mosquito*, commonly caused by *Aedes aegypti*. It is an endemic disease in South East Asian countries especially in Bangladesh. In 2019 a outbreak occurred in Bangladesh. The objective of the study was to see the laboratory parameter and outcome of dengue fever in a tertiary medical college hospital. Early diagnosis and laboratory investigations is essential to prevent the mortality associated with this disease. **Materials & Methods:** This prospective study was conducted on dengue ward at Khulna medical college hospital from 1 July 2019 to 31 December 2019. The diagnosis of dengue infection was confirmed by serology. Sera were processed by dengue ELISA. Investigations like haemoglobin estimation, haematocrit, platelet count, total count; differential leukocyte count, peripheral smear, coagulation profile were performed. **Results:** Total number of cases was 98. Of them 62 (63.2%) was male and 36 (36.73%) was female. Fever was most common (100%) manifestation and duration of fever ranges from 5 to 8 days with a mean duration of 6.31 (± 0.95) days. Blood for NSI was positive in 90 (91.83%) cases; most cases 71 (72.44%) become positive between 2nd to 4th day. 90 (91.83%) cases developed thrombocytopenia and it starts at 5th day in 45 (45.91%) cases. Anti IgM was positive in 4 (4.08%) cases; 2 at 4th day and 2 at 5th day of illness. IgG was positive in case at 8th day of illness. **Conclusion:** These findings help physicians in early diagnosis of dengue by suspecting these features as of dengue and can prevent morbidity and mortality associated with dengue.

Key words: Dengue, Thrombocytopenia, Hematocri.

Number of Tables: 06; **Number of References:** 20; **Number of Correspondence:** 04.

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Introduction:

Transmission of dengue to humans occurs by the bite of the female *Aedes aegypti* mosquito infected by one of four serotypes of the virus. The period of transmission from humans to mosquitoes begins one day before the start of fever up to the sixth day of illness corresponding to the viremia phase. After a female bites an individual in the viremia phase, viral replication (extrinsic incubation) begins in the vector in from eight to twelve days. In humans, the incubation period ranges from 3 to 15 days (intrinsic incubation) with an average of 5 days.

According to estimates of the World Health Organization (WHO), about 50 million cases of dengue fever occur annually worldwide and 2.5 billion people live in risk areas¹.

In 2005, the World Health Assembly, through WHA Resolution 58.3, in a review of the International Health Regulation (IHR), included dengue fever as an emergent public health disease, with implications for health safety due to the spread of the epidemic beyond national boundaries².

Leukopenia is the most prominent hematological change, sometimes with counts of less than $2 \times 10^9/\mu\text{L}$. However, there are reports of mild leukocytosis at the onset of the disease, with neutrophilia.

Lymphocytosis is a common finding, with the presence of atypical lymphocytes. The hematocrit

concentration should be monitored according to the days of illness, remembering that, with the

progression to DHF, there will be a 20% increase in hematocrit from the patient's baseline, associated with thrombocytopenia ($< 100 \times 10^9/\text{L}$)³.

Of biochemical variables, the most frequent changes occur in liver function tests such as in serum aspartate aminotransferase (AST), serum alanine aminotransferase (ALT), Gamma-glutamyl transpeptidase and alkaline phosphatase levels, and serum albumin concentrations⁴.

In this context, the present study aimed to assess the biochemical and hematological dynamics of patients with dengue fever in order to increase the sensitivity of the screening by healthcare professionals in the most serious cases and to try to identify laboratory markers that may indicate this evolution.

The objective of this study was to assess the laboratory parameter of the dengue infection in a tertiary hospital.

Materials and Methods:

It was a prospective observational study. The whole number of patients included in our study was 98 ($n = 98$). The study period was from 1 July 2019 to 31 December 2019.

Confirmed cases of dengue fever admitted in Dengue isolation ward of Khulna medical college hospital were taken into account by purposive sampling method. All patients were with positive dengue tests, either NS1 antigen or IgM, IgG. Patients who were positive for malaria, meningitis, and enteric fever were excluded from the study.

The patient was examined in detail for various clinical signs like pallor, icterus, cyanosis, lymphadenopathy, edema feet, edema face, and signs of dehydration like weak and thready pulse, sunken eyes etc, conjunctival congestion, and presence of rashes over the body. Detailed examination was also done for search of signs of bleeding manifestations like Purpura, Petechiae, ecchymoses, low blood pressure i.e. hypotension, cold and clammy peripherals, etc.

Cases were followed up daily for the clinical and laboratory parameters. Blood parameters were monitored every day till remarkable improvement seen clinically and haematologically. TC of WBC, Total Platelet Count, Hb, haematocrit, for each patient were recorded. Daily vitals were monitored. Chest X-ray, ultrasonography, and liver function tests were done on selected cases.

The patients were treated with oral paracetamol, intravenous fluids, blood and platelet transfusion, and inotropes when necessary. The frequency of various signs and symptoms and the laboratory tests were calculated.

The results were tabulated and correlated. The outcomes were recorded.

Results:

Total number of cases was 98. Of them 62 (63.2%) was male and 36 (36.73%) was female. The male-female ratio was 1.7: 1. Most of the patients 27 (27.55%) was in the age group of 21-30 years. followed by 13-20 years (25.53%).

Most of the patient 62 (63.2) attacked at the month from June to October. Average Hospital stay was 7.4 (± 1.26) days. Duration of fever ranges from 5 to 8 days with a mean duration of 6.31 (± 0.95) days.

Blood for NS1 was positive in 90 (91.83%) cases; most cases 71 (72.44%) become positive between 2nd to 4th day. Among them 31 (31.63%) become positive at 3rd day of fever followed by 20 (20.40%) cases in 2nd day; 20 (20.40%) cases in 4th day; 13 (3.26%) cases 5th day, 5 (5.10%) cases in 1st day; 1 (1.02%) case 6th day.

Table-I: NS 1 in Dengue patients.

Day	No	Percentage
1	5	5.10
2	20	20.40
3	31	31.63
4	20	20.40
5	5	5.10
6	1	1.02

Anti IgM was positive in 4 (4.08%) cases; 2 at 4th day and 2 at 5th day of illness. Ig G was positive in 1 case at 8th day of illness.

Table-II: IgM in dengue patients.

Day	No	Percentage
4	2	2.04
5	2	2.04

Total count of WBC was normal in 73 (74.48%) cases but among them in 50 (51.02%) cases it in lower limit. (4000-5000 /cc). Leucopenia was found in 21 (21.48%) cases and leukocytosis in 4 (4.08%) cases.

Table -III: Total count of WBC.

Total count of WBC	No	Percentage
< 4000	21	21.48%
> 4000 – 5000	49	50 %
> 5000- 11000	24	24.48%
>11000	4	4.08%

90 (91.83%) cases developed thrombocytopenia. Platelet count starts declining at 5th day in 45 (45.91%) cases; 20 (20.40%) cases at 4th day; 15 (15.30%) cases at 6th day; 10 (10.20%) cases at 3rd day. Lowest platelet count was at 6th day in 41 (41.83%) cases, 7th day in 31 (31.63%) cases; 5th day in 18 (18.36%) cases.

Table-IV: Day of lowest platelet count.

Day	No	Percentage
5	18	18.36
6	41	41.83
7	31	31.63
8	03	3.06

Table-V: Hct value in dengue cases.

Male		
Value	No	Percentage
<42	47	47.95
42-54	15	13.30
>54	0	0
Female		
Value	No	Percentage
<38	30	38.77
38-46	3	3.06
>46	3	3.06

SGPT was increased in 53 (54.08%) cases. In 40 (40.81) % cases values between 41-80 and 13 (13.26%) cases above 80. S creatinine was increased in 20 (20.40%) cases.

Table-VI: SGPT in Dengue cases.

SGPT	No	Percentage
0 – 40	45	45.91
41– 80	40	40.81
81 - 100	13	13.26

Transfusion was given in 15 (15.30%) cases. Among them Blood transfusion was given in 12 (12.24%) cases & Platelet transfusion was given in 3 (3.06%) cases. Complete recovery was in 96 (97.95%) cases and Death 2 (2.04%) cases.

Discussion:

Dengue is a flaviviral infection of humans spread by *Aedes Aegyptii* mosquito which breeds more commonly in stored clean waters¹. This RNA virus has four types namely Type 1–4. Involvement of younger age group is an indicator of higher incidence of infection⁵.

Dengue fever is an infectious disease which is difficult to distinguish from other viruses prevalent in our region as there are no specific markers that can diagnose the disease early. Because it is a disease that can evolve with serious consequences and even be fatal, this study aimed at analyzing epidemiological data and laboratory dynamics in order to try to identify biomarkers that are predictive of severity.

In our study male was more common than female. The male to female ratio was 1.7: 1. In a study by Aswari Raut⁶ male was 75% and female 25%. According to Quader Ahmed et al.⁷ dengue fever occurs more in male patients than their female counterparts.

Most of the patients (53%) was between age 13-30 years. This finding is similar to a study by Syed Reazul Hasan⁸ where 58.89% cases were within 13-30 years of age. Average Hospital stay was 7.4 (± 1.26) days. In a study by Ghazala⁹ mean duration was 6 days.

Fever was most common presentation 100%. Mohan Kashinkunti et al.¹⁰ suggests that fever was the most common presenting symptom (100%) in and around India. In our study duration of fever ranges from 5 to 8 days with a mean duration of 6.31 (± 0.95) days.

Blood for NS1 was positive in 90 (91.83%) cases & Anti IgM was positive in 4 cases; most cases 71 (72.44%) of NS1 become positive between 2nd to 4th day. Among them majority cases 31 (31.63%) of NS1 become positive at 3rd day of fever; 2 at 4th day and 2 at 5th day of illness. In the study done by Metha et al.¹¹ 52% cases were positive for NS1Ag while 41% and 26% were positive for IgG and IgM respectively.

Total count of WBC was normal in 73 (74.48%) cases but among them in 50 (51.02%) cases is at the lower end of normal limit. (4000-5000 /cc). Leucopenia was found in 20 (20.40%) cases and leukocytosis in 4 (4.08%) cases. Leucopenia was present in 9.3% cases in a study by ABM Shahid-ul Alam¹².

Thrombocytopenia was very common (91.83%) in our study also in other studies⁶. Platelet count started declining in most cases (45.91%) at 5th day. Lowest platelet count was at 6th day in 30 cases, 7th in 21 cases; 5th in 18 cases.

In a study by K.T.D. Thai¹³ platelets began to drop below 100,000/mm³ from day 4 of the disease and both tended to recover on day 9.

Mean Hct value is 40.13 (±5.02). In our study no significant changes were found in Hct. This finding is contradictory to most of the studies^{14,15}. SGPT was increased in 53 (54.08%) cases. In 40 (40.81) % cases values between 41-80 and 13 (13.26%) cases above 80. in a study by Nayak et al¹⁶ liver involvement was noted among 97.33%. S creatinine was increased in 20% cases.

Blood transfusion was needed in 12 cases and Platelet transfusion needed in 3 cases. These findings similar to a study by Tewari KN et al^{17,18,19}. Complete recovery in 96 (97.95%) cases and Death in 2 cases. In several studies the mortality was found to be approximately 10%^{8,20}.

Conclusion:

We identified important clinical presentations and useful CBC parameters to enable the differentiation of dengue patients from other patients with other causes of acute febrile illness. Dengue infection has a wide spectrum of clinical manifestations. A high index of suspicion for early diagnosis, monitoring and prompt fluid management and supportive treatment can decrease case fatality rate significantly. In our study we have enlisted all the necessary investigations. This study will elaborate knowledge about the disease and will improve the outcome. An accurate diagnosis using these data will enable further investigation to be tailored and early treatment for the patient.

Conflicts of Interest: None.

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Common Microorganisms Present in Diabetic Foot Infection and It's Spectrum of Antibiotic Sensitivity

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Abstract

Introduction: Diabetic patients have foot problems secondary to neuropathy, micro-vascular changes and impaired resistance to infection. They are at increased risk of infection and ulceration. Diabetic ulcers are frequently involved in both aerobic and anaerobe microorganisms. It is important to culture the specimen on several different media. The Gram stain can provide valuable information regarding the range of organisms under consideration. The aim of this study is to identify the sensitive antibiotics to the specific aerobic bacteria, to prevent the random misuse of broad spectrum antibiotics and make awareness about diabetic foot care. **Materials and Methods:** This study was a retrospective analysis and was carried out in general surgery and diabetic wards at North Bengal Medical College Hospital (NBMCH), Sirajganj, Bangladesh from August, 2019 to July, 2020. To identify common aerobic microorganism and spectrum of antibiotic sensitivity from 54 cases of diabetic foot ulcers, wound swabs taken and cultured using standard aerobic microbiological techniques. Antibiotic sensitivity testing to different antimicrobial agents were carried out using the disc diffusion method. **Result:** Among 54 aerobic bacterial isolates, Gram negative bacteria 41(75.9%) and Gram positive bacteria 13(24.1%). *Escherichia Coli* 28(51.9%), *Proteus spp* 09(16.7%), *Pseudomonas* 03(5.6%), *Klebsiella spp* 01(1.9%) were isolated Gram negative bacteria. *Staphylococcus aureus* 13(24.1%) was only Gram positive bacteria. Gram negative bacterial isolates were sensitive to Imipenem, while Vancomycin showed good activity against Gram positive bacteria. **Conclusion:** The antibiogram results of this study suggest that bacteria remain sensitive to a limited number of used agents, while found resistant to a number of widely used agents. Imipenem was most effective against Gram negative bacilli and also effective against Gram positive cocci.

Key words: Diabetes, Imipenem, Foot ulcer.

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Introduction:

Diabetes is a metabolic disorder of endocrine system. The incidence of diabetes is rising. Globally it is estimated that 415 million people had diabetes in 2015, which was about 10% of the total adult population. This figure is expected to reach 642 million by 2040¹ in 2017 an estimated 54.4 million(7.6%) people of working age in India had diabetes². Each year over 700000 new cases are diagnosed; 12000 to 14000 of which are children, teenagers and young adults, while this life threatening disease can be controlled. Diabetes is often accompanied by serious complications, and still today there is no cure³.

The life time risk of a patient with diabetes developing a foot ulcer may be as high as 25%⁴. Overall diabetes mellitus accounted for 83% of all major amputations related to foot ulcers⁵. Poorly controlled diabetes is prone to skin infections because elevated blood sugar reduces the effectiveness of bacteria fighting cells. Carbuncles, boils, and other skin infections may be hazardous if not properly treated. Even a small cut may progress to a deep, open sore, called an ulcer⁶. In most cases ulceration is a consequence of the loss of protective sensation that is, the loss of awareness of trauma that can cause the breakdown of the skin.

Diabetes is a major burden on health care facilities in all countries. Globally, in 2015, Diabetes caused 5 million death in those aged 20-79 years. Health care expenditure attributed to diabetes was estimated to be at least 673 billion US dollars or 12% of total health-care expenditure¹.

Bangladesh has a total population of more than 160 million and is among the countries with the highest number of people with diabetes worldwide. The international diabetes federation (IDF) estimated 8.4 million people with diabetes in Bangladesh and almost an equal number with undetected diabetes⁷.

Diabetic patients have foot problems secondary to neuropathy, micro-vascular changes and impaired resistance to infection. They are at increased risk of infection and ulceration. Ulceration can lead to major morbidity and amputation. Ulcers need to be treated urgently. It is a surgical emergency and needs optimal management with urgent admission, radiological and clinical assessment, followed by debridement, antibiotics if required⁸. A great variety of organisms are involved in diabetic infections. Diabetic ulcers are frequently involved in both aerobic and anaerobic microorganisms. It is important to culture the specimen on several different media under different atmospheric conditions. The Gram stain can provide valuable information regarding the range of organisms under consideration⁹.

Patient with diabetes are reported to have up to 50% higher perioperative mortality than patient without diabetes. Hyper-glycaemia impair wound healing and innate immunity, leading to increased risk of infection¹.

Diabetes with ulcers commonly experience infection with Gram positive organisms such as staphylococcus aureus, Enterococcus and Gram negative organisms like Pseudomonas aeruginosa, Escherichia coli, Klebsiella spp. Proteus spp etc, and anaerobes¹⁰. Among the gram positive aerobes Staphylococci are more prevalent. Gram negative organisms were most frequently isolated(80%) bacteria¹¹. Many of these microorganisms are developing resistance to commonly used antibiotics largely due to their indiscriminate use¹². The present study was undertaken to determine the microbiology of the diabetic foot ulcers and the antimicrobial sensitivity pattern of the isolates. Swabs were collected from ulcers that were macroscopically examined and classified based on Wagner's method of evaluation^{13,14}.

Materials and Methods:

The study was a retrospective analysis, was carried out among a total number of 54 diabetic patients admitted with foot ulceration fulfilling the inclusion criteria. The study was carried out in general surgery ward and diabetic ward of North Bengal Medical College Hospital, Sirajganj, Bangladesh during the period of August 2019 to July 2020. Inclusion criteria were clinically diagnosed as diabetic foot ulcer in both sex. Exclusion criteria were foot ulcer due to other cause, diabetic foot ulcer with no growth in culture. Swabs were collected from ulcers that were macroscopically examined and classified based on Wagner's method of evaluation. Swabbing was done on sloughy or inflamed tissue as bacteria tend to present in greater number in these areas. From each patient two swabs were collected. The sterile cottons were moistened with sterile saline before

collecting the specimens. One of the swabs was used for the isolation of bacteria. The other swab was used for wet mount microscopy.

For the isolation of bacteria the media used were blood agar, and Mac Conkey's agar, which were incubated at 37°C for 48 hours. The organisms isolated were subjected to antibiotic susceptibility testing on Muller-Hinton agar using Kirby-Bauer disc diffusion method. The study and procedure was explained to the patients and written consent was obtained from the patients. Hospital authority were informed about the study and permission was obtained. Detailed information were obtained in each cases according to protocol. Collected data was classified, edited, coded and entered into the computer for statistical analysis by using MS EXCEL.

Results:

Total 54 diabetic foot patients studied, 26 were males and 28 were females, the male: female ratio being 1:1.07. Their ages ranged from 8 years to 95 years with an average of 48 years. The maximum number of patients having diabetic foot infections belonged to the age group of 40-60 years.

Of the 54 patients, 30 patients had some other complications, such as peripheral vascular disease, neuropathy, nephropathy, retinopathy, cataract, ischemic heart disease or hypertension along with diabetes mellitus. Peripheral neuropathy has a central role and is present over 80% of diabetic patients with foot lesions. From the 54 patients studied, aerobic bacteria in the pure form were isolated in all the cases in which 13 were Staphylococcus aureus(24.1%), 28 were Escherichia Coli(51.9%), 01 Klebsiella spp(1.9%), 03 Pseudomonas aeruginosa(5.6%), 09 were Proteus spp(16.7%)(Table I).

Table-I: Isolation of aerobic bacteria.

Culture isolate	Number of isolates	Percentage %
Staphylococcus aureus (S. aureus)	13	24.1
Escherichia coli (E. coli)	28	51.9
Klebsiella spp	01	1.9
Pseudomonas aeruginosa	03	5.6
Proteus spp	09	16.7

Over 71.4% strains of Escherichia Coli were sensitive to Imipenem but only 3.6% of strains were sensitive to Ceftriaxone and none of strains is sensitive to Cefuroxime but 28.5% of strains were sensitive to Ciprofloxacin, 39.2% were sensitive to Amikacin (Table II).

Table-II: Antibiotic sensitivity pattern of Escherichia Coli.

Antibiotics	Escherichia Coli (n=28) Number of Sensitive Strains (%)
Amikacin	11 (39.2)
Cloxacillin	0
Netilmycin	17 (60.7)
Chloramphenicol	12 (42.8)
Ciprofloxacin	08 (28.5)
Cotrimoxazole	01 (3.6)

Antibiotics	Escherichia Coli (n=28) Number of Sensitive Strains (%)
Gentamycin	05 (17.8)
Ceftriaxone	01 (3.6)
Teracycline	03 (10.7)
Amoxicillin	01 (3.6)
Cephalexin	01 (3.6)
Cefuroxime	0
Erythromycin	03 (10.7)
Fusidic acid	04 (14.2)
Imipenem	20 (71.4)
Nitrofurantoin	10 (35.7)

Escherichia coli was highly sensitive to the antibiotics tested, Pseudomonas was highly resistant to them. Amikacin and Imipenem were highly sensitive to Pseudomonas but Gentamycin and Cefuroxime were resistant to them (Table III).

Table-III: Antibiotic sensitivity pattern of aerobic Gram negative bacteria.

Antibiotics	E. Coli n=28	Klebsiella spp. n=01	Proteus n=09	Pseudomonas n=03
Ciprofloxacin	08 (28.5)	0	02 (22.2)	-
Netilmycin	17 (60.7)	0	06 (66.7)	02 (66.7)
Cefuroxime	0	0	0	0
Ceftriaxone	01 (3.6)	01 (100)	01 (11.1)	01 (33.3)
Amikacin	11 (39.2)	0	05 (55.6)	03 (100)
Imipenem	20 (71.4)	0	06 (66.7)	03 (100)
Chloramphenicol	12 (42.8)	01 (100)	03 (33.3)	02 (66.7)
Gentamycin	05 (17.8)	0	03 (33.3)	0
Erythromycin	03 (10.7)	0	0	0
Antibiotics	E. Coli n=28	Klebsiella spp. n=01	Proteus n=09	Pseudomonas n=03
Co-trimoxazole	01 (3.6)	0	01 (11.1)	0
Tetracycline	03 (10.7)	0	01 (11.1)	0
Amoxicillin	01 (3.6)	0	0	0
Cephalexin	01 (3.6)	0	01 (11.1)	0
Fusidic acid	04 (14.2)	0	0	0
Nitrofurantoin	10 (35.7)	0	01 (11.1)	0

Over 69% strains of Staphylococcus aureus were sensitive to Vancomycin, Chloramphenicol and Amikacin. But none of strains were sensitive to Ceftriaxone and Cefuroxime. Only 38.5% of strains were sensitive to ciprofloxacin and 61.5% of strains were sensitive to Imipenem and only 15.4% sensitive to Cloxacillin (Table IV).

Table IV: Antibiotic sensitivity pattern of the aerobic Gram positive isolates

Antibiotics	Staphylococcus aureus (n=13) number of sensitive strains (percentage)
Amikacin	09 (69.2)
Amoxicillin	02 (15.4)
Netilmycin	08 (61.5)
Chloramphenicol	09 (69.2)
Ciprofloxacin	05 (38.5)
Cotrimoxazole	02 (15.4)
Gentamycin	05 (38.5)
Cefuroxime	0
Teracycline	05 (38.5)
Ceftriaxone	0
Erythromycin	02 (15.4)
Vancomycin	09 (69.2)
Cloxacillin	02 (15.4)
Fusidic acid	08 (61.5)
Imipenem	08 (61.5)
Nitrofurantoin	05 (38.5)

Discussion:

The presence of Staphylococcus aureus (S. aureus), Escherichia coli (E. coli) and other aerobic Gram negative bacilli in septic complications of infected diabetic feet have been reported in various studies. The infections are usually polymicrobial in nature, caused by aerobic Gram-positive S. aureus, and by Gram-negative bacilli like E. coli, Klebsiella species and Proteus¹⁵. Of the isolates; 75.9% were found to be Gram negative while 24.1% were Gram positive bacteria. This corresponds with the findings of Bansal et al, in which 76% of the microbes were Gram negative and 24% were Gram positive¹⁶. Pseudomonas aeruginosa was the most common isolate, accounting for 21.67%, followed by Staphylococcus aureus, E. coli and Klebsiella comprising 18.88%, 18.18% and 16.78% respectively¹⁶. In the present study, E. coli (51.9%) was predominantly isolated. As regards the other aerobic Gram negative bacilli, Pseudomonas aeruginosa (5.6%), Proteus (16.7%) and Klebsiella spp (1.9%) and Gram positive Staphylococcus aureus (24.1%) were the only Gram positive cocci isolated. Aminoglycosides are bactericidal drugs especially useful against many Gram negative rods. Amikacin and Gentamycin are most useful drugs against Gram negative rods such as E. coli, Pseudomonas⁹. Hefni AAH, et al¹⁷, found 100% sensitivity of Pseudomonas and E. coli to both Amikacin and Gentamycin. In this study, Sensitivity of E. coli to Amikacin was 39.2%, where Pseudomonas was 100% sensitive to Amikacin. Sensitivity of E. coli to Gentamycin was 17.8% but Pseudomonas was resistant to this drug.

Cephalosporins are B-lactam drugs. The first generation Cephalosporins are active primarily against Gram positive cocci. Second, third and fourth generations having expanded coverage against certain Gram negative rods⁹. Journal of Diabetes and Metabolic disorder 2020 shows, most of the organisms are resistant to all forms of Cephalosporins¹⁸. In this study, E. coli was not sensitive to Cefuroxime but only 3.6% were sensitive to Ceftriaxone. Pseudomonas was also resistant to Cefuroxime but only 33.3% sensitive to Ceftriaxone. Staphylococcus aureus was resistant to both Cefuroxime and Ceftriaxone.

Carbapenems are Beta lactam drugs that are structurally different from Penicillins and Cephalosporins. Imipenem, the currently used carbapenem, has the widest spectrum of activity of the beta lactam drugs and has excellent bactericidal activity against many Gram positive, Gram negative and anaerobic bacteria⁹. According to Gadepalli R et al Imipenem was found 100% sensitive to all types of organisms.¹⁹ In this study, E. coli was 71.4%, Pseudomonas was 100% sensitive to Imipenem but Staphylococcus aureus was 61.5% sensitive to Imipenem.

Vancomycin is a bactericidal agent, effective against certain Gram positive bacteria. Its most important use is in the treatment of infections by Staphylococcus aureus strains, that are resistant to the Penicillinase-resistant penicillins⁸. In a study Nageen A showed, Vancomycin is sensitive to Staphylococcus in 49.47% cases²⁰. In this

study, *Staphylococcus aureus* was 69.2% sensitive to Vancomycin.

Among the 28 isolates of *E. coli*, Imipenem, Netilmycin and Amikacin showed a higher sensitivity than to commonly used Cephalosporin and Quinolone group of antibiotics. 09 isolates of *Proteus* were resistant to major group of antibiotics but a high sensitivity pattern was shown towards Netilmycin and Imipenem. In *Pseudomonas* the total isolates were resistant to the most commonly used antibiotics like ciprofloxacin, Cefuroxime, Gentamycin but all were sensitive to Amikacin and the beta lactum antibiotic Imipenem. Only one *Klebsiella* spp was found and sensitive to Ceftriaxone.

Among the 13 isolates of *Staphylococcus aureus*, Vancomycin, Chloramphenicol, Amikacin, Netilmycin and Imipenem showed a higher sensitivity than to commonly used Cloxacillin, Cephalosporin and quinolone group of antibiotics.

Conclusion:

54 aerobic bacteria were isolated from diabetic foot ulcer. *Escherichia coli* and *Staphylococcus aureus* were the most common bacteria isolated. Most of the Gram negative and Gram positive isolates were sensitive to Imipenem, which was resistant to inactivation by most bacterial beta lactamases. So, it has the widest spectrum of antibacterial activity. Imipenem should therefore be used as a monotherapy against polymicrobial infections. It produces a better response comparable to that of second and third generation cephalosporins. Though, most of the bacterial isolates were sensitive to Imipenem, it is matter of great regret that, the widely used antibiotics such as Cephalosporin and Quinolone groups were resistant to most of the bacterial isolates. It shows the terrible picture of antibiotic resistance in our community which is a great danger for future. So, irrational use of antibiotics must be prohibited and make awareness among the mass people. All diabetic patients should be prescribed and educated about foot care to prevent diabetic foot infection.

Conflict of Interest: None.

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Antibiotic Sensitivity in Complicated and Uncomplicated UTI in Potuakhali Medical College Hospital

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Abstract

Introduction: Urinary tract infection (UTI) is a common reason for attending hospital emergency departments (ED). A complicated urinary tract infection (UTI) is associated with structural or functional abnormalities of the genitourinary tract or presence of any underlying disease. **Objective:** To assess the antibiotic sensitivity in complicated and uncomplicated UTI. **Materials and Methods:** The study was carried out in the Department of Medicine and Department of Microbiology. The urine samples were collected from the OPDs (outpatients departments). These sample collection sites were chosen as they mostly covered the urban area of the city. The duration of the study was one and a half year from July 2018 to January 2020. The urine samples of 200 patients, comprised of 60 males and 140 females, who attended the outpatient departments (OPDs) of three hospitals and had clinical evidence of urinary tract infection, determined by treating physicians, were included in this study. **Results:** Most common isolated pathogen was *Escherichia coli* 170(85.0%) followed by *staphylococcus aureus* 40(20.0%) and *Klebsiella* (10%). Multiple organisms were found few cases. Regarding drug sensitivity it was observed that maximum sensitivity was to Amikacin 94.0% followed by Nitrofurantoin 92.0%, Levofloxacin 90.0%, Meropenam 88.0%, Amoxicillin+Clavulanate 70.0% and Cefixim 70.0%. **Conclusion:** Female patients were predominant most common isolated pathogen were *Escherichia coli*, *staphylococcus aureus* and *Klebsiella*. Amikacin, Nitrofurantoin, Levofloxacin, Meropenam and Amoxicillin+Clavulanate were more sensitive antibiotic.

Keywords: UTI, Sensitivity pattern, Organism.

Number of Tables: 04; **Number of References:** 28; **Number of Correspondence:** 04.

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Introduction:

Urinary tract infection (UTI) is a common reason for attending hospital emergency departments (ED)¹. In the United States, UTIs represented more than 3 million visits to ED⁺, making it one of the most common reasons for prescribing empirical antibiotics²⁻³. A complicated urinary tract infection (UTI) is associated with structural or functional abnormalities of the genitourinary tract or presence of any underlying

disease. Complicated UTI may be associated with severe morbidity, such as septic shock, renal failure or even death⁴. Urinary tract infection is one of the commonest infections seen in clinical practice. Lack of compliance and unjustified antibiotic prescriptions has resulted in bacterial resistance and is proving as a major challenge in the management of these infections⁵. The treatment of UTI can be classified into uncomplicated and complicated on the basis of their choice of treatment. UTI is more common in females than in males as female urethra structurally found less effective for preventing the bacterial entry⁶. It may be due to the proximity of the genital tract and urethra⁷ and adherence of urothelial mucosa to the mucopolysaccharide lining⁸. The other main factors which make females more prone to UTI are pregnancy and sexual activity⁹. The spectrum of bacteria causing complicated UTI is much broader than of those causing uncomplicated UTI. Increasing multidrug resistance in bacterial uropathogens is an important and emerging public health problem. This study was conducted to determine the distribution and antimicrobial susceptibility of uropathogens in the Bangladeshi community as well as to determine the effect of antibiotic sensitivity in complicated and uncomplicated UTI.

Materials and Methods:

The study was carried out in the Department of Medicine and Department of Microbiology. The urine samples were collected from the OPDs (outpatients departments). These sample collection sites were chosen as they mostly covered the urban area of the city. The duration of the study was one

and a half year from July 2018 to January 2020. The urine samples of 200 patients, comprised of 60 males and 140 females, who attended the outpatient departments (OPDs) of three hospitals and had clinical evidence of urinary tract infection, determined by treating physicians, were included in this study. The age of patients included in the study ranged from 15 to ≥ 60 years. Patients with history of hospital admission a week before their presentation in OPDs were excluded from the study to rule out hospital-acquired infections. The patients on antibiotic therapy were also excluded from the study. Clean catch midstream urine was collected from each patient into a 20mL calibrated sterile screw-capped universal container which was distributed to the patients. The specimens were labeled, transported to the laboratory, and analyzed within 6 hours. In each container boric acid (0.2mg) was added to prevent the growth of bacteria in urine samples. All patients were well instructed on how to collect sample aseptically prior to sample collection to avoid contaminations from urethra. Verbal informed consent was obtained from all patients prior to specimen collection. The study was conducted after due ethical approval which was subjected to the hospital administrations. A calibrated loop method was used for the isolation of bacterial pathogens from urinary samples. A sterile 4.0mm platinum wired calibrated loop was used which delivered 0.001mL of urine. A loopful urine sample was plated on Cystine-Lactose-Electrolyte Deficient (CLED) agar, MacConkey agar, and blood agar medium (Hi Media Laboratories, Mumbai, India). The inoculated plates were incubated at 37°C for 24 h and for 48 h in negative cases. The number of isolated bacterial colonies was multiplied by 1000 for the estimation of bacterial load/mL of the urine sample. A specimen was considered positive for UTI if an organism was cultured at a concentration of $\geq 10^5$ cfu/mL or when an organism was cultured at a concentration of 104 cfu/mL and >5 pus cells per high-power field were observed on microscopic examination of the urine. Identification of bacterial isolates was done on the basis of their cultural and biochemical characteristics. Gramnegative bacteria were identified by the standard biochemical tests and Gram positive microorganisms were identified with the corresponding laboratory tests: catalase, coagulase, and mannitol test for *Staphylococcus aureus*. Identified and pure isolates were maintained in nutrient agar slants and incubated at 37°C for 24 hrs. The isolates were subcultured periodically. Antibiotic Susceptibility Testing. Isolates were tested for antimicrobial susceptibility testing by the standard Kirby Multiple Antibiotic Resistance (MAR) Indexing. MAR index for an antibiotic = [number of antibiotics resistant to the isolates/(number of antibiotics $\times$ Number of isolates)]. The number of MAR index for an antibiotic indicates its sensitivity and resistance. Antibiotic resistance increases with the increasing MAR values.

Results:

Out of 200 patients, majority 120 (60.0%) patients belonged to age group 15-60 years with mean age was 52.7 ± 13.5 years. Female patients were predominant

140(70.0%) whereas male 60(30.0%). Male-female ratio was 1:2.3 (Table-I). Complicated UTI was found 40(20.0%) and uncomplicated was 160(80.0%) (Table-II). Most common isolated pathogen was *Escherichia coli* 170(85.0%) followed by *Staphylococcus aureus* 40(20.0%) and *Klebsiella* (10%), *Proteus* (9%), *Streptococcus* (8%), *Pseudomonas* (7.5.0%). Multiple organisms was found few cases (Table-III). Regarding drug sensitivity it was observed that maximum sensitivity was to Amikacin 94.0% followed by Nitrofurantoin 92.0%, Levofloxacin 90.0%, Meropenam 88.0%, Amoxicillin+Clavulanate 70.0%, Cefixim 70.0%, Azithromycin 55.0%, Cefroxiam 50.0%, Cefuroxime 50.0%. Other results are depicted in the Table-IV.

Table-I: Demographic characteristics of the study patients (n=200).

Variables	Frequency	Percentage
Age (years)		
<15	10	5.0
15-60	120	60.0
>60	70	35.0
Mean$\pm$SD	52.7 $\pm$ 13.5	
Sex		
Male	60	30.0
Female	140	70.0

Table-II: Pattern of UTI (n=200).

UTI	Frequency	Percentage
Complicated UTI	40	20.0
Uncomplicated UTI	160	80.0

Table-III: Distribution of the study patients by organism (n=200).

Organism	Frequency	Percentage
<i>E. coli</i>	170	85.00
<i>Staphylococcus aureus</i>	40	20.00
<i>Klebsiella pneumonia</i>	20	10.00
<i>Proteus</i>	18	9.00
<i>Streptococcus pneumonia</i>	16	8.00
<i>Pseudomonas</i>	15	7.50

Table-IV: Distribution of the study patients by drug sensitivity (n=200).

Drug sensitivity	Frequency	Percentage
Amikacin	188	94.0
Nitrofurantoin	184	92.0
Levofloxacin	180	90.0
Meropenam	176	88.0
Cefroxiam	100	50.0
Amoxicillin	90	45.0
Amoxicillin+Clavulanate	140	70.0
Cefuroxime	100	50.0
Cefixim	140	70.0
Azithromycin	110	55.0
Flucloxacilline	50	25.0

Discussion:

In this study observed that the majority 120(60.0%) patients belonged to age group 15-60 years with mean age was 52.7 ± 13.5 years. Kidwai et al.⁵ reported that the mean

age was 48.5 ± 12 years. 83(45.6%) patients were between 45-60 years. In study of Prakash et al.¹⁰ reported the highest susceptible age group of patients to UTI was ≥ 48 years (63.51%) followed by 26-36 years (58.11%), 15-25 years (54.55%), and 37-47 years (39.19%). In another study differs from the other studies done in Kuwait¹¹ and Nigeria¹² in which the highest incidence of UTI was recorded among the age group 20 to 50 years (63.4 and 74.7%, resp.) and lowest among the age group >50 years (13.3 and 10.3%, resp.). However, their results agree with the study done in Japan with a 20-year period in which a trend of increasing complicated UTI was reported in elderly patients¹³.

In current study observed female patients were predominant 140(70.0%) whereas male 60(30.0%). Male-female ratio was 1:2.3. Similar study was found Kidwai et al.⁵ reported Male to Female ratio is 1: 2 (n=58/126). In another study showed a high prevalence of UTI in females (73.57%) than in males (35.14%) which correlates with other findings which revealed that the frequency of UTI is greater in females as compared to males¹⁴⁻¹⁵. The reason behind this high prevalence of UTI in females is due to close proximity of the urethral meatus to the anus, shorter urethra, sexual intercourse, incontinence, and bad toilet¹⁶⁻¹⁷. In present study revealed most common isolated pathogen was *Escherichia coli* 170(85.0%) followed by *Staphylococcus aureus* 40(20.0%) and *Klebsiella*, *Proteus*, *Streptococcus*, *Pseudomonas* 20(10.0%). Kidwai et al.⁵ study also agreement with our observation they showed most common isolated pathogen was *Escherichia coli* 108(59%) followed by *Staphylococcus aureus* 30(16.4%) and *Klebsiella* 20(11%). Etiology of UTI shows a diverse group of uropathogens of which the commonest pathogen involved is *E. coli*, a gram -ve facultative anaerobe responsible for 80% of UTI cases in women aged 18-39 years, followed by *Staphylococcus saprophyticus* and the less common *Klebsiella*, *Enterobacter*, *Serratia*, *Proteus*, *Pseudomonas* and *Enterococcus*¹⁸. Prakash and Saxena¹⁰ study observed total of 155 bacterial uropathogens comprised of 140 (90.32%) Gram negative and 15 (9.68%) Gram positive were isolated from positive urine samples. *Escherichia coli* was found the dominant bacteria among all isolated uropathogens with the prevalence rate of 42.58%. The second most prevalent isolate was *Klebsiella pneumoniae* (18.71%) followed by *Pseudomonas aeruginosa* (12.90%), *Staphylococcus aureus* (9.68%), *Proteus* spp. (9.03%), and *Enterobacter* spp. (7.10%). There was no statistically significant variation ($P > 0.05$) was found among the isolates. These findings were not correlate with other reports in which *P. aeruginosa* was reported as the second most common bacterial isolate in UTI studies in India¹⁹ and Lafia, Nigeria²⁰; however, these results correlates with others in which *Klebsiella* spp. was reported as the second most frequently isolated organism in UTI²¹⁻²². Regarding drug sensitivity it was observed that maximum sensitivity was to Amikacin 94.0% followed by Nitrofurantoin 92.0%, Levofloxacin 90.0%, Meropenam 88.0%, Amoxicillin+

Clavulanate 70.0%, Cefixim 70.0%, Azithromycin 55.0%, Cefroxiam 50.0%, Cefuroxime 50.0%. In Kidwai et al.⁵ study, *E. coli* showed the highest sensitivity to imipenem 93% followed by amikacin 78%, tazobactam 69%, fosfomycin 60% and nitrofurantoin 59%, interestingly the floxacine group showed only 26-28% sensitivity, also including was cefixime 25% and augmentine 22%, which explains the failure of response to treatment on empirical basis. Fosfomycin 59% was the other oral antibiotic which has shown some sensitivity. *Klebsiella* had also shown similar pattern of sensitivity only the percentages are lower when considering imipenem 85%, amikacin 70% and tazobactam 70%. Response to floxacine group was better than *E. coli* although not satisfactory, being the most sensitive to Levofloxacin 54% then ciprofloxacin 40%, ofloxacin 40% and only 20% to moxifloxacin. In the cephalosporin group *Klebsiella* had shown maximum sensitivity to cefuroxime 50%. About 53% were sensitive to fosfomycin and only 25% to nitrofurantoin unlike *E. coli*. *Staphylococcus Aureus* sensitivity to antibiotics was better than *E. coli* and *Klebsiella*. Maximum sensitivity was to imipenem 97%, Tazobactam 87%, Nitrofurantoin 86% and Augmentine 77% followed by cefotaxime 74%, Amikacin 71% and cefuroxime 71%. 65% were sensitive to fosfomycin. Most of the subjects were not literate with unsatisfactory hygiene and although the method of collection was explained specifically the possibility of contamination cannot be ruled out. Another study conducted in India proved that the hospital acquired *E. coli* in UTI was more aggressive and difficult to control needing at least one IV antibiotic preferably cephalosporin along with an oral antibiotic when compared with community acquired *E. coli*, again endorsing the prevalence of resistance in UTI needing inpatient treatment¹². Shifali and Gupta in their study done on females proved maximal susceptibility pattern of pathogens predominantly to Amikacin and Nitrofurantoin favouring our results²³. These antibiotic susceptibility results correlate with other studies²⁴⁻²⁵. Another study conducted in India showed that meropenem was highly sensitive against Gram negative bacilli whereas cephalosporin showed highest resistance against gram negative rods²⁶. In other study, meropenem and imipenem were found to be 98% and 100% sensitive, respectively, against highly resistant gram negative bacilli²⁷. A study done in King Fahd Hospital, Saudi Arabia showed that meropenem was 95.8% sensitive followed by amikacin (93.7%) and imipenem (91.71%) against extended spectrum β lactamase producing *E. coli*²⁸.

Conclusion:

Female patients were predominant most common isolated pathogen were *Escherichia coli*, *Staphylococcus aureus* and *Klebsiella*. Amikacin, Nitrofurantoin, Levofloxacin, Meropenam and Amoxicillin+ Clavulanate were more sensitive antibiotic. Several antibiotics and combination therapies have proven to be effective in treating complicated UTI.

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Sonological Evaluation of Ectopic Pregnancy-an Analysis of 50 Cases

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Abstract

Introduction: Ectopic pregnancy is the implantation of a fertilized egg in a location outside of the uterine cavity, including the fallopian tubes, cervix, ovary, cornual region of the uterus, and the abdominal cavity. **Objective:** To evaluate the sonological findings of ectopic pregnancy. **Materials and Methods:** A descriptive study was carried out at ultrasound unit in Lab-Aid diagnostic, Comfort Medical Services and Green View Diagnostic Complex in Sylhet city between January 2012 to January 2014. We included all cases with confirmed diagnosis of ectopic pregnancy, all antenatal mothers who are present in antenatal unit in a selected Hospital and excluded mothers with other associated medical condition. **Results:** Common clinical pattern were shock, marked pallor ness, abdominal pain, amenorrhea and irregular vaginal bleeding 52%, 66%, 62%, 54% and 38% respectively. Risk factor of ectopic pregnant in this study, 40% had history of infertility, 06% had Non tuberculous PID, 70% had no risk factor, 04% had tuberculous PID, 14% had previous abdominal pelvic surgery, 18% had previous ectopic and 10% had endometriosis. **Conclusion:** Common clinical pattern were shock, marked pallor ness, abdominal pain, amenorrhea and irregular vaginal bleeding. History of infertility, Non tuberculous PID, no risk factor, tuberculous PID, previous abdominal pelvic surgery, previous ectopic and endometriosis were risk factor of ectopic pregnant in this study.

Key words: Ectopic pregnancy, Sonological evaluation.

Number of Tables: 05; **Number of References:** 20; **Number of Correspondence:** 04.

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Introduction:

Ectopic pregnancy is the implantation of a fertilized egg in a location outside of the uterine cavity, including the fallopian tubes, cervix, ovary, cornual region of the uterus, and the abdominal cavity. Ectopic pregnancy can lead to massive haemorrhage, infertility, or death¹. At first an ectopic pregnancy develops like a normal pregnancy and the same symptoms such as nausea and tender breasts will be present. However, some women do not have these symptoms and do not suspect that they might be pregnant. The vaginal bleeding can vary from being slight or brown vaginal discharge to being like a normal period². An ectopic pregnancy starts out in the unruptured state, which is when the mass is still small enough to fit in the fallopian tube. However, if left untreated

for too long, the mass will continue to grow until it eventually gets so large that it will rupture the tube. All these treatments are forms of abortion and woman's chances of survival if she does not abort are very less comparatively³. Ectopic pregnancy is a high-risk condition that occurs in 1.9 percent of reported pregnancies. The condition is the leading cause of pregnancy-related death in the first trimester. Pregnancies in the fallopian tube account for 97 percent of ectopic pregnancies: 55 percent in the ampulla; 25 percent in the isthmus; 17 percent in the fimbria; and 3 percent in the abdominal cavity, ovary, and cervix. Ruptured ectopic pregnancy accounts for 10 to 15 percent of all maternal deaths⁴. A study on woman with an ectopic pregnancy reported that increased knowledge and awareness among health-care providers as well as technologic advances have decreased the risk of death from ectopic pregnancies. More sensitive pregnancy tests and improved diagnostic procedures have contributed to earlier and more rapid diagnosis of ectopic pregnancy⁵. Chronic ectopic pregnancy is often an enigma and a correct diagnosis is frequently not made until exploratory laparotomy. Hemodynamic stability, chronicity of symptoms, and a high incidence of false-negative pregnancy tests and culdocentesis results are clinical characteristics distinguishing it from the more common acute ectopic pregnancy. Dense adhesions and occasional abscess formation are surgical features that characterize the chronic ectopic pregnancy⁶.

The value of ultrasound in ectopic pregnancy diagnosis has been demonstrated^{7,8}. Ectopic pregnancy incidence has risen, and although only approximately 1% of gestations are extrauterine, these account for 4% of direct maternal deaths⁹. The combination of specific ultrasound findings with serum β -human chorionic gonadotropin measurements

can detect as many as 96% of ectopic pregnancies with a specificity of 100%. These same studies show a positive predictive value of 100% and a negative predictive value of 92% in women with a clinical suspicion of an ectopic pregnancy¹⁰. Given established risk factors or clinical suspicion, early ultrasound is recommended.

Materials and Methods:

A descriptive study was carried out at ultrasound unit in Lab-Aid diagnostic, Comfort Medical Services and Green View Diagnostic Complex in Sylhet city between January 2012 to January 2014. We included all cases with confirmed diagnosis of ectopic pregnancy, all antenatal mothers who are present in antenatal unit in a selected Hospital and excluded mothers with other associated medical condition. The diagnosis was primarily made clinically later on supplemented by sonological findings, HCG estimation, surgical findings and histopathological report. A proforma was used to collect the details regarding age, parity, risk factors, clinical pattern and management of the cases. Data were fed to SPSS program version 17 to analyse the results in terms of frequencies and percentages.

Results:

Total ultrasound was done in pregnant patients 3139 patients, out of them 56(1.78%) patients was suspected ectopic pregnancy, and finally included in this study 50 cases (Table-I).

Table-I: Prevalence of ectopic pregnancy of the study population.

	Number	Percentage
Total ultrasound in pregnant patients	3139	100%
Ectopic pregnant suspected	56	1.78%
Finally included	50	1.59%

Mean age was 24.59(±4.86) minimum age was 18 and 33 years, maximum age group was 26-30 years of age which was 42% (Table-II).

Table -II: Age group distribution of the study population.

Age group	Number	Percentage
≤ 20 years	09	18
21-25 years	13	26
26-30 years	21	42
>30 years	07	14
Total	50	100
Mean ±SD	24.59 (±4.86)	Range 18-33 years

Majority 46% was nuli para, 38% were primi para and 16% was multi para (Table-III).

Table-III: Distribution of parity.

Parity	Number	Percentage
Nuli para	23	46
Primi para	19	38
Multi para	08	16
Total	50	100

Common clinical pattern were shock, marked pallor ness, abdominal pain, amenorrhea and irregular vaginal bleeding 52%, 66%, 62%, 54% and 38% respectively (Table-IV).

Table-IV: Clinical pattern of the study population.

Clinical pattern	Number of patients	Percentage
Shock	26	52
Marked pallor ness	33	66
Abdominal pain	31	62
Amenorrhea	27	54
Irregular vaginal bleeding	19	38
Adnexal Mass	07	14
Syncopal attacks	04	08
Jaundice	01	02

Risk factor of ectopic pregnant in this study, 40% had history of infertility, 06% had Non tuberculous PID, 70% had no risk factor, 04% had tuberculous PID, 14% had previous abdominal pelvic surgery, 18% had previous ectopic and 10% had endometriosis (Table-V).

Table-V: Risk factors of the study population.

Risk factors	Number of patients	Percentage
History of infertility	20	40
Non tuberculous PID	03	06
No risk factor	35	70
Tuberculous PID	02	04
Previous abdominal pelvic surgery	07	14
Previous ectopic	09	18
Endometriosis	05	10

Discussion:

The current study found the incidence of ectopic pregnancy as 1.59% deliveries. Common clinical pattern were shock, marked pallor ness, abdominal pain, amenorrhea and irregular vaginal bleeding were found as the main predisposing factors. Worldwide the incidence has been reported as between 1:84 to 1:2301¹¹. Our reported incidence is comparable with the reports from other developing countries^{12,13}. However it was found lower than that reported by industrialized countries¹¹.

The reason can be related to the availability of advanced diagnostic aids for early asymptomatic ectopic pregnancies as well as more organized set up of health care system for registration in developed countries¹⁴. Majority of the patients were of low parity, younger age and had the history of infertility, non tuberculous PID, no risk factor, tuberculous PID, previous abdominal pelvic surgery, previous ectopic and endometriosis were the risk factors. Women often become victims of chronic pelvic inflammatory disease. Westrom and Pirii found pelvic inflammatory disease as the strongest risk factor for the pathogenesis of ectopic pregnancy¹⁵. Rose¹⁶ reported a 9 fold increased risk for ectopic pregnancy in patients with pelvic inflammatory disease and emphasized the importance of usage of condoms. The alarming rise of pelvic inflammatory disease need a preventive strategy with promotion of health education, in particular the safe sexual practice in our community. Emphasis should be towards treatment of both partners for complete cure. The classical pattern of period of amenorrhea and abdominal pain was lacking in most of the patients, however a provisional diagnosis was made in the light of risk factors, clinical features and sonological findings. Nevertheless the diagnosis

was initially missed in three patients who were admitted at medical ward as suspected case of chronic liver disease due to the clinical presentation of anemia and jaundice. Later on these patients were identified as cases of ruptured ectopic with massive hemoperitoneum. Considering the variable presentation of ectopic pregnancy the diagnosis of ectopic requires a high index of suspicion regarding its possibility in reproductive age, particularly with pre-existing risk factors¹⁷.

Majhi AK et al study reported the peak age of incidence was 26-30 years; primi were the most sufferers. There were 65.0% patients who had identifiable risk factors. Tubectomy (14.4%), history of abortion (26.1%), infertility (12.2%), pelvic inflammatory diseases (12.8%) and history of previous surgery (11.1%) were the important risk factors. Amenorrhoea (76.1%), abdominal pain (86.1%) and vaginal bleeding (42.2%) were the frequent presenting complaints. There were 87.8% patients who had pallor, 9.4% were admitted with features of shock. Cervical motion tenderness (82.2%) was the most frequent sign. Urinary beta-hCG was positive in 96.1% cases. Ultrasonography revealed diagnosis in 2/3rds cases among 129 patients. Culdocentesis evoked the diagnosis in 73.3% cases out of 135 patients. In 95.0% cases it was of tubal variety, 70.2% ruptured, 19.9% tubal abortion and 9.9% unruptured. Surgery by open method in the form of salpingectomy (81.9%), salpingo-oophorectomy (9.3%) and salpingostomy (5.3%) were the mainstay of management. Expectant management and medical therapy can be offered only in 1.2% and 1.75% respectively. There was no case fatality. By reducing and identifying the risk factors and 'catching' the patients at the earliest it is possible to improve the prognosis so far as morbidity, mortality and fertility are concerned. Ectopic pregnancies are a common gynecologic emergency that typically are impacting otherwise healthy individuals and can have significant morbidity and mortality. Continued improvement in the ultrasonographic evaluation of these patients will aid in decreasing the mortality that continues to be associated with ruptured ectopic pregnancies¹⁸⁻²⁰.

Conclusion:

Common clinical pattern were shock, marked pallor, abdominal pain, amenorrhoea and irregular vaginal bleeding. History of infertility, non tuberculous PID, no risk factor, tuberculous PID, previous abdominal pelvic surgery, previous ectopic and endometriosis were risk factor of ectopic pregnant in this study.

Conflict of Interest: None.

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Contraceptive Methods Used by the Selective Rural Tea Garden Workers of Sylhet

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Abstract

Introduction: This study was focused on contraceptive methods used by the selective Tea garden workers of Sylhet. The aim was to explore the used of the contraceptive methods and factors influencing the use of the contraceptive methods along with socio-demographic profile of the tea garden workers. **Materials and Methods:** It was descriptive type of cross-sectional study carried out in some selective tea garden of Sylhet from July-December, 2020. 150 respondents were selected by purposive type of non-probability sampling method. Data were collected by a pretested mixed type questionnaire. **Results:** The study revealed that 90 (60%) of workers belonged to of 20-29 years age group. The mean age was 33.87 ± 8.97 . Most of the respondents 104 (69.3%) were female, 117 (78%) were followers of Hinduism, 109 (72.7%) were illiterate, 136 (90.7%) were from the nuclear family and 129 (86%) were belonged to lower class. Majority of the workers 136 (90.7%) were using contraceptive methods, among them 78 (57%) were using injectable contraceptive but no one use permanent methods. Most of them used contraceptive methods for prevent unwanted pregnancy and reduced family expenditure that was 46 and 40 (34% and 29%). The survey assessed the positive association between use of contraceptive methods and sex, religion ($p < 0.05$). **Conclusion:** Due to covid situation, the present study was conducted among only 150 respondents. Large scale survey is necessary to find out the exact pattern of contraceptive methods use throughout the tea garden workers.

Key words: Contraceptive methods, Tea garden workers, Rural area.

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Introduction:

The tea industry of Bangladesh is playing a major role in fulfilling the domestic consumption as well as an important source of export earnings for the last few decades contributing about 0.8% of total GDP of the country. So, tea garden workers are considered as an important part of our country's population¹. Beside this, a common picture of our country is rapid population growth². The population is expected to be stabilized, if more use of contraception to reduce the birth rate. Bangladesh strides hard to solve the problem. Our country has experienced a sevenfold increase in its contraceptive prevalence rate (CPR) in less than 45 years from 8% in 1975 to 63% in 2019³⁻⁶. Use of contraception refers to practices that help individuals or couples to attain certain objectives like; to avoid unwanted birth, to bring about wanted birth, to regulate the intervals between pregnancies, to control the time at which births occur in relation to the ages of the parents, to determine the number of children in the family^{7,8}. According to Bangladesh Demographic and Health Survey 2017-18, our current fertility rate (TFR per thousand live births) is 2.3, which is still not good enough because only about 62% of total women of reproductive age group are taking any form of contraceptive methods². The health services are currently not set up to be male friendly. Restructuring services to include men could greatly expand utilization by both men and women. Educating men about family planning can enhance their capacity to make informed choice that can have beneficial outcomes for their female partner as well⁸. Still there might exist differences in such use rate by sex, rural urban residence, regional difference, among different castes and religious groups⁹. So, the

program needs to be closely monitored, evaluated and re-planned to get further achievement.

Materials and Methods:

A descriptive type of cross-sectional study was carried out in some selected tea garden, located at kulaura, Sylhet, from July to December, 2020. The study sample was all the married workers of those tea gardens, but 150 participants were selected by non-probability, purposive type of sampling methods followed by inclusion criteria that was workers of tea garden who were available during data collection, willing to participate in the study and the exclusion criteria was unmarried, pregnant and divorce couples. The research instrument was pretested mixed type of questionnaire. Data were collected by face to face interview. Data processing and analysis was performed with the help of SPSS version 23.0. The results were expressed in descriptive statistics as frequency, percentage, mean and standard deviation in tables and figures.

Results:

The study revealed that 90 (60%) of workers belonged to of 20-29 years age group. The mean age was 33.87 ± 8.97 years. 104 (69.3%) respondents were female and 46 (30.7%) were male. 117 (78%) of workers were followers of Hinduism. Large part of the respondents 109 (72.7%) were illiterate. 136 (90.7%) of the respondents were from the nuclear family. Most of them 129 (86%) were belonged to lower class.

Table-I: Socio-demographic features related (n=150).

1. Age groups	Frequency	Percentage (%)
• 20-29 years	90	60
• 30-39 years	40	26.7
• 40-49 years	20	13.3
2. Sex		
• Female	104	69.3
• Male	46	30.7
3. Religion		
• Hindu	117	78
• Muslim	33	22
4. Educational level		
• Illiterate	109	72.7
• Class 1- 5	35	23.3
• Class 6- 10	6	4
5. Type of family		
• Nuclear	136	90.7
• Joint	12	8
• Extended	2	1.3
6. Socioeconomic status		
• Lower	129	86
• Lower middle	21	14

Majority of the workers 136 (90.7%) were using contraceptive methods.

Table-II: Use of the respondents about contraceptive methods (n=150).

Use contraceptive methods	Frequency	Percentage (%)
• Yes	136	90.7
• No	14	9.3
Total	150	100

Among 136 contraceptive users, maximum of them 78 (57%) were using injectable contraceptive, 22 (16%) and 19 (14%) were using oral contraceptive pills and IUCD. Some of the respondents used condom 12 (9%) and safe period

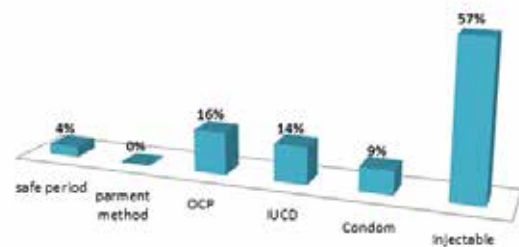


Figure-1: Types of contraceptive use.

In my study, among 136 contraceptive users, maximum of the workers used contraceptive methods for prevent unwanted pregnancy, reduced family expenditure and birth spacing that were 46, 40, and 35 (34%, 29% and 26%).

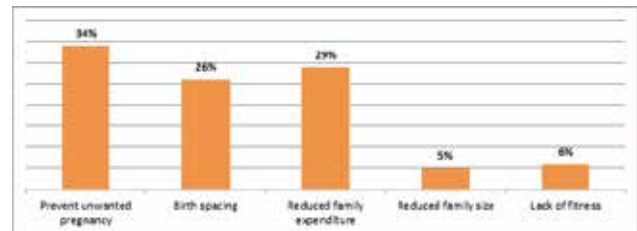


Figure-2: Causes of contraceptive use.

There is a strong association between use of contraceptive methods and sex.

Table-III: Association between use of contraceptive methods and sex (n=150).

Sex	Contraceptive methods				P value
	n (Yes)	%	n (No)	%	
Female	101	74.3	3	21.4	0.002*
Male	35	25.7	11	78.6	N/A
Total	136	100	14	100	

There is a positive association between use of contraceptive methods and religion.

Table-IV: Association between use of contraceptive methods and religion (n=150).

Religion	Contraceptive methods				P value
	n (Yes)	%	n (No)	%	
Islam	43	31.6	10	71.4	N/A
Hindu	93	68.4	4	28.6	0.003*
Total	136	100	14	100	

There is a no association between use of contraceptive methods and educational status.

Table-V: Association between use of contraceptive methods and educational status (n=150).

Educational status	Contraceptive methods				P value
	n (Yes)	%	n (No)	%	
• Illiterate	97	71.4	12	85.8	N/A
• Class 1-5	33	24.2	2	14.2	N/A
• Class 6-10	6	4.4	0	0	N/A
Total	136	100	14	100	

Discussion:

Population explosion is a great problem in Bangladesh. Although the government of Bangladesh has implemented a structural health and family planning service delivery system for the rural people. This descriptive cross sectional study was aimed at finding out the contraceptive use and factors influence the use of contraception among 150 tea garden workers of kulaura upazilla of Moulvibazar district in Bangladesh along with socio-demographic features.

An overview of the tea garden workers in this study reflected the common socio-demographic characteristics. Among the respondents 90 (60%) were the age group within 20-29 years, 40 (26.7%) were the age group within 30-39 years and 20 (13.33%) were the age group within 40-49 years. The mean age was 33.87 ± 08.97 years. This data is almost similar in other tea garden workers and different rural area of Bangladesh, who are use different type of contraception¹⁰⁻¹³. Among the 150 respondents, majority of the workers were female 104 (69.3%) and whereas 46 (30.7%) were male. 117 (78%) of workers were followers of Hinduism and 33(22%) were Islam. 136 (90.7%) of the respondents were from the nuclear family, 12 (8%) from joint family and 2 (1.3%) from extended family (Table-I). This study is nearly similar as other tea garden related study in Bangladesh and Assam¹⁰⁻¹².

On the quest of the educational status, it was calculated that 109 (72.7%) of the respondents were illiterate that means they cannot read, write, not even his / her name. 35 (23.3%) were class 1-5, 6 (4%) were class 6-10 (Table-I). Thus, it can be said that educational level of tea garden workers is not satisfactory. Lack of education adversely affects the use of contraception. Educational status of other tea garden workers is contradicts to our study^{11,12}.

Out of 150 respondents 129 (86%) of the workers were belonged to lower class and only 21 (14%) lower middle class (Table-I). It is nearly similar as other tea garden in Bangladesh and Assam¹⁰⁻¹².

Among the respondents, maximum 136 (90.7%) were using contraception methods which is higher then reported (62%) in 2017-18 by Bangladesh demography and health survey (Table-II). Another study found that, contraceptive use rates are greater in all divisions except Chittagong and Sylhet divisions, which is contradicts to my study^{14,15}. According to Bangladesh demographic & health survey data 2017-2018, oral contraceptive pills are the most preferable method in Bangladesh people which is 25.4%, but in my study we revealed that 57% preferred injectable method which is not similar to BDHS reports and other study done on rural area of Bangladesh and slum area of Dhaka^{2,13,16,18}. The second preferred methods in my survey were oral contraceptive pills 22 (16%) and IUCD 19 (14%). Few respondents were using condom 12(9%) and safe period method 5 (4%) but no one used permanent methods (Figure-1). Another study done on Bangladesh and Assam, here they found that oral contraceptive pills was the most preferred method followed by other methods including permanent methods, which

contradicts our study^{11,12}. Maximum study shows that, temporary methods of contraception is more preferable methods than permanent methods but the frequency of use of permanent methods are increasing day by day¹⁶.

In my study, among 136 contraceptive users, maximum of the workers use contraceptive methods for prevent unwanted pregnancy 46 (34%), reduced family expenditure 40 (29%) and birth spacing that was 35 (26%). Some of them 6 (4.4%) and 5 (3.6%) used contraceptive methods for reduced family size and lack of fitness (Figure-2). These finding were nearly similar with other study¹⁰⁻¹².

In this study, we found significant association between sex and use of contraceptive methods ($p < 0.05\%$). Among 136 respondents of the contraceptive user most of them was female 101 (74.3%) (Table-III). It is similar to BDHS data². The present study also shows that there was a positive association between use of contraceptive methods and religion ($p < 0.05$). Most of the Hindu workers used contraceptive methods. This was similar to other study done on Assam tea garden⁸ but contradicts to some study done on Bangladesh tea garden and slum area of Dhaka (Table-IV)^{11,17}.

In this survey no significant relationship between use of contraceptive methods and educational status ($p > 0.05\%$). Among 109 (72.7%) illiterate workers maximum were use contraceptive methods 97 (71.4%) because garden authority provides health education among the tea garden workers (Table-V). It is not similar to BDHS data and other study done on Bangladesh and Assam tea garden^{2,11,12}.

Conclusion:

Rapid population growth rate is one of the major social problems in developing world with deteriorate level of poverty and life expectancy^{19,20}. Vast use of contraception can controlling the fertility rate and also very helpful to solve may social problems. The study conducted under such circumstances when world is pandemic with Covid-19. For this reason, the survey conducted among only 150 respondents of some selected rural tea garden workers of Sylhet. Contraceptive use among these tea garden workers is more than national level. The rate has reached up to the mark 90.7%. But in our country the prevalence of contraceptive use is 62%². Within this study we get knowledge about their socio-demographic characteristics and associated factors related with contraception. But, large scale survey is necessary to find out the exact pattern of contraceptive methods use throughout the tea garden workers.

Conflict of Interest: None.

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