



# Journal of Dhaka National Medical College & Hospital

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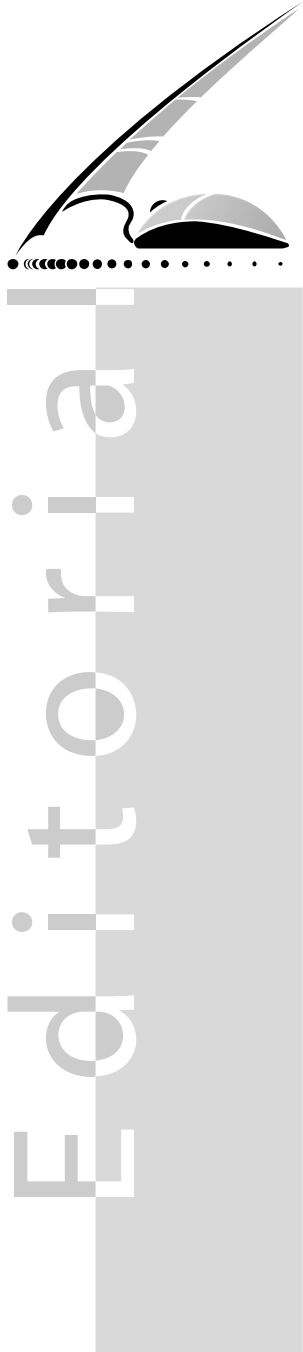
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## Calcium: Its role in human health and diseases

Calcium is an important nutrient in human body. The total amount of calcium in the adult human is about 1.1 kg (27.5 mol).<sup>1</sup> It is the major constituent of the bones and teeth where 99% of total body calcium is distributed. The rest 1% is found in free and bound forms inside and outside the cells throughout the body. The concentration of calcium in plasma is (2.1-2.6 mmol/L i.e 8.5mg to10.5 mg/dl). The concentration of ionized calcium is (1.1-1.3 mmol/L) and the physiological action of calcium is mediated by ionized calcium<sup>1</sup>. Calcium regulating hormones such as parathyroid hormones or parathormone, calcitonin and 1, 25 dihydroxy cholecalciferol (active form of vitamin D) play an important role in the maintenance of plasma calcium concentration.

Calcium as an important nutrient involved in many body functions such as signal transduction, neuromuscular excitability, exocytosis, muscle contraction, vascular contraction, hormonal secretion, formation of bone and teeth and acts as a second messenger. It is observed that calcium absorption occurs along the whole length of small intestine and colon particularly in the upper part of small intestine.<sup>2</sup> A total of 30-80% of ingested calcium is absorbed and  $Ca^{2+}$  absorption is facilitated by protein and active form of vitamin D whereas it is inhibited by phosphate, oxalate<sup>3</sup> and glucocorticoids.<sup>2</sup>

$Ca^{2+}$  absorption is adjusted to body needs. Absorption is increased in  $Ca^{2+}$  deficiency and decreased in  $Ca^{2+}$  excess. It is necessary to take required amount of calcium to maintain many important body functions. The daily requirement of calcium varies according to different age and different condition of the body. The daily requirement of calcium for the children is 800-1200 mg whereas for the adult is about 700-800 mg. The daily requirement of calcium for women during pregnancy and lactation is about 1200 mg.

To take adequate calcium it is also necessary to know the food which contains high concentration of calcium. The food which contains high concentration of calcium includes vegetables: [(Red Amaranthus i.e.Lal Shak, kachu shak, Amaranthus i.e. Data Shak, Callaloo i.e.Pui Sak and beans), Fruits [Apple, Amloki, Tamarind, Guava, Mango, Wood apple i.e. Bell], Fish [Walking cat fish i.e Magur fish, Stinging cat fish i.e sing fish, Rui fish, Dried fish (Shutki)], Meats, Milk, cereals and in oils [Mustard oil and sesame (Til oil)].

It has been reported that adequate calcium intake can reduce the risk of fracture, osteoporosis, diabetes and obesity.<sup>4,5,6,7</sup>

Post menopausal women, individuals with milk allergy or lactose intolerance, adolescents and elderly are identified as higher risk groups for dietary calcium deficiency.<sup>8,9,10</sup>

Calcium deficiency may progress with age due to less exposure to sun light, poor dietary habit and progressive loss of kidney tissue (prolonged kidney disease), decrease formation of active form of vitamin D and steatorrhoea.

It is necessary to maintain normal blood calcium level for many body functions as already mentioned. Any deviation from normal blood calcium level may result many diseases. Hypocalcaemia may result in diseases like osteoporosis, hypertension, arteriosclerosis, myocardial infarction, diabetes mellitus, neurodegenerative disease, myocardial infarction and tetany.<sup>12</sup> On the other hand hypercalcaemia may leads to peptic ulcer, lack of appetite, abdominal pain, constipation, sluggish reflex activity of CNS, depressed relaxation of heart during diastole and parathyroid poisoning.<sup>12</sup>

Therefore, it is expected that everybody should be aware of the importance of calcium which is involved in many body functions and give emphasis to take adequate calcium intake in the diet to prevent many diseases and live a healthy life.

### **Professor Jalal Uddin Chowdhury**

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**Instruction for Authors:**

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Each of the following section should begin on separate page-

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States the purpose of the article and summarizes the rational of the study.

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Should be very clear mentioning study design, place and period.

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## Original Article

# Socio-demographic profile of Autism Spectrum Disorder: A Study in an Urban Area of Bangladesh

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### Abstract

This descriptive cross-sectional study was conducted to explore the socio-demographic profile of Autism Spectrum Disorder (ASD). The study was conducted for a period of six months from January to June 2015 and 'Institute for Paediatric Neuro-disorder and Autism' under BSMMU was considered as a place of study. Sample size was 111 ASD children and their parents were considered as respondent for interview. Frequency distributions of the selected socio-demographic factors were undertaken. Association of Socio-demographic profile with the different levels of disability (cognitive type) was tested by Bailey Scale of Infant Development. The mean age of the autistic child was 30.6 months ( $SD \pm 6.855$ ). 72.1% of them were male and 27.9% were female. More than seventy percent of them were first born child and all of them lived with their parents. About 70% mothers were educated. Educational status of the fathers were graduate and above 79 (71.2%) and 18 (16.2%) were limited within primary level. More than half of mothers (60.4%) of the child were housewives. Majority of fathers (86.5%) of autistic child were service holders. Most of the respondents had more than 4 family members. The mean monthly family income of the respondents was BDT 50,162.16  $\pm$  37,747.857. 96 (86.5%) of the mothers delivered their first child at 25 years of age and below. In the present study more than seventy percent (70.7%) parents faced social problems and 29.3% parents suffered financial problems. In regard to intellectual disability, 85 (76.57%) children had significantly delayed performance level and 26 (23.42%) had mildly delayed performance level. There was no delayed performance in any children of this study group. The findings did not show any association of socio-demographic profile with the levels of intellectual disability. The result of this study gives emphasis for the need of further study in a larger scale with controls and larger sample size to obtain more information for planning and implementation.

**Key Words:** Socio-demographic profile, Autism Spectrum Disorder, Urban area.

### Introduction

Autism Spectrum Disorder (ASD) refers to the syndrome of childhood onset neuro-developmental disorders characterized by impairments in social interaction and communication, and the presence of repetitive and stereotyped behaviors<sup>1</sup>. In the 1970s, ASD were considered rare, with prevalence estimate of autism around 2 per 10,000.<sup>2,3</sup> However, the number of children reported as meeting modern ASD criteria has risen dramatically during the last decade.<sup>3</sup> In a UK study, the prevalence of ASD was estimated to be 157 per 10,000<sup>5</sup>. The most recent Centre of Disease Control (CDC) reported the prevalence of ASD in the US was 1 in 68. There are several factors of potential importance which may underlie this increase: (1) changes in diagnostic criteria and screening instruments. (2) changes in study design. (3) more advanced and accessible knowledge

about ASD. (4) improvements in public and professional awareness. (5) improved health services and (6) better acceptance of ASD by parents.

In the case of autism and Autism Spectrum Disorder (ASD), evidence for an association with socio-economic status (SES) has been mixed and more often in the opposite direction of that for other childhood disorders. In the earliest clinical descriptions of children with autism, it was noted that a preponderance of "highly intelligent parents. A number of clinical<sup>7,14</sup> and population-based<sup>14,15</sup> studies subsequently have reported positive associations between autism or ASD and SES indicators such as parental education, occupation, or income. In addition, ecological analyses of school enrolment data have found significant inverse associations between school district level proportions of children receiving special education under the autism

disability category and SES indicators such as the proportion of students reported to be economically disadvantaged due to lower household income.

In Bangladesh, some hospital based studies showed that the autism related reported cases are increasing which may be due to increased rate of incidence, lack of awareness or both. Socio-economic factors have a major epidemiological value which may be considered as an effective factor in developing, aggravating or preventing a diseased or unusual condition upon the human body. As the reported cases are increasing that is why the effect of socio-economic factors should be evaluated<sup>32</sup>. To date, no preventive strategies have demonstrated consistent benefits and no treatments have proven widely efficacious in treating the core symptoms of ASD. Consequently, ASD causes lifelong disabilities for affected individuals and significant burdens on their families, schools, and society. Present government of Bangladesh attaches top most priorities to include autistic population in the main stream of development.

The study aimed to provide information in regard to relationship of socioeconomic status with Autism Spectrum Disorder (ASD) to professionals such as social workers, psychologists, child therapists and teachers, as well as to other parents of children with autism. This information would enable these professionals to enhance partnership with the parents to improve quality of care for Autism Spectrum Disorder.

#### **Methodology**

This descriptive cross-sectional study was conducted to find out the socio-demographic profile of ASD and to correlate the ASD with socio-demographic profile in selected autism institution of Dhaka city. The study was conducted for a period of 6 months starting from 1<sup>st</sup> January to 30<sup>th</sup> June 2015. Within this period data were collected for 5 months. The parents/care givers of autistic children and autistic children themselves were study population. The area of the study was Institute for Paediatric Neurological Disorder and Autism in BSMMU which was considered for data collection because the parents were easily accessible there. All the parents having autistic children in upper and middle class in Dhaka city was considered as the unit of the study as their attendance to BSMMU was high. Sample size was 111. Convenient type of non probability sampling was done. Face to face interview was conducted with the parents through a pre-tested semi-

structured questionnaire and checklist. Informed consent was taken by explaining the purpose of the study. Assurance had been given that the confidentiality concerning their information would be maintained strictly. All the data were checked, verified and then entered into the computer. The analysis was carried out with the help of SPSS. All analyzed data were presented in the form of percentages. Chi-square tests were applied where applicable.

#### **Results**

In the study, we collected data from the parents of autistic children. In the study samples, the age range (in months) of these children was from 19 months to 42 months. Majority 55(49.5%) of the autistic child were within 25-36 months of age. The mean age of the autistic child was 30.6 months (SD  $\pm$  6.855). Out of 111 autistic children, most of them 80 (72.1%) were male and only 31(27.9%) respondents were female. More than seventy percent of the respondents were first born child. All 111(100%) of the autistic children are living with their parents. Majority 82 (73.8%) of the autism spectrum disorder were diagnosed at 0-12 months of age, 12 (10.8%) diagnosed at 12-24 months of age, 11 (10.0%) at 25-36 months of age and only 6 (5.45%) at >36 months of age (Table: 01). In case of parents, majority 61(55%) was within 21-30 years of age. The mean age of the parents was 27.8 years (SD  $\pm$  5.25).

Most 75 (67.6%) of the parents faced different kinds of problem. Only 36(32.4%) parents of autistic children did not face any problem at the time of data collection.

Out of 75(67.6%) parents, 53(70.7%) parents of autistic children faced social problem, 22(29.3%) parents suffered financial problem. (Figure: 4)

According to level of intellectual disability, out of 111 autistic children, 85(76.57%) ASD had significantly delayed performance level and 26 (23.42%) autistic child had mildly delayed performance level. There was no normal and accelerated performance level found in this study.

A significant relationship was present between the levels of intellectual disability with age at first diagnosis of ASD children (Table: 4). There is no association found between socio-demographic factors (monthly family income, education of father and mother, occupation of father and mother) with level of intellectual disability of ASD children.



**Results**

**Table-1: Distribution of characteristics of autistic children (n=111).**

Characteristics of autistic child	Frequency	Percent	Mean ± SD
<b>1. Age in months</b>			Mean=30.6306, SD = ±6.85556
12-24 months	28	25.2	
25-36 months	55	49.5	
>36 months	28	25.2	
<b>2. Sex</b>			
Male	80	72.1	
Female	31	27.9	
<b>3. Birth position</b>			
first born	81	73.0	
subsequent born	30	27.0	
<b>4. Age at first diagnosis</b>			
0-12 months	82	73.87	
12-24 months	12	10.81	
25-36 months	11	10.00	
>36 months	6	5.45	

**Table: 2 Distribution of demographic characteristic of parents/care giver of autistic children (n=111)**

Characteristic of the parents or care giver of autistic child	Frequency	Percent Mean ± SD	
<b>1. Age of parents/care giver</b>		Mean=27.8468, SD = ±5.25218	
<20 yrs	9		8.1
21-30 yrs	61		55.0
>31 yrs	41		36.9
<b>2. Religion</b>			
Hindu	23	20.7	
Relation with autistic child			
Mother	83	74.8	

Characteristic of the parents or care giver of autistic child	Frequency	Percent Mean ± SD
Father	28	25.2
<b>3. Education of mother</b>		
Primary	18	16.2
Secondary	3	2.7
Higher secondary	13	11.7
Graduate and above	77	69.4
<b>4. Education of father</b>		
Primary	18	16.2
Secondary	11	9.9
Higher secondary	3	2.7
Graduate and above	79	71.2
<b>5. Occupation of mother</b>		
House wife	67	60.4
Service holder	44	39.6
<b>6. Occupation of father</b>		
Service holder	96	86.5
Others(Businessman, brokers, school teacher, poultry farm owner)	15	13.5

In this study there was no caregiver of the ASD except parents. In case of parents, majority 61(55%) was within 21-30 years of age. Among rest, 41(36.9%), 9(8.1%) respondents were >31 years and <20 years of age. The mean age of the respondents was 27.8 years (SD ± 5.25). Regarding Educational level of mother, majority 77(69.4%) of the respondents were graduate or more and 18 (16.2%) were primary level educated and 16(14.4%) respondents were educated up-to secondary and higher secondary level together. On the other hand, according to the educational status of the respondent's father, 79(71.2%) were educated up to graduate or more, 18(16.2%) were educated up to primary level, 11(9.9%) were educated up-to secondary level and only 3(2.7%) were educated up to higher secondary level. In regard to occupation, majority 67(60.4%) mothers of autistic child were housewives and 44(39.6%) were service holders, while 96(86.5%) father were service holders and rest 15(13.5%) were engaged in other occupation like businessman, brokers, school teacher, poultry farm owner. (Table:2)

In the study, 57(51.4%) respondents had > 4 family members and 54 (48.6%) respondents had <4 family members in their family. In regard to monthly family income (father and mother income together), majority 52(46.8%) had income <30,000 BDT, 30(27.0%) earned 50,001-1,00,000 BDT per month, 15(13.5%) earned 30,001-50,000 BDT per month and a few respondents 14(12.6%) earned more than BDT 1,00,000 per month. The mean income of the respondents was BDT 50162.16±37747.857. Almost seventy percent (69.4%) respondents' monthly family income was satisfactory. Only 21(18.9%) respondents had other disabled member in the family. More than ninety percent mothers were working mother either professional or non manual during pregnancy time. About 96 (86.5%), 13(11.7%) and 2(1.8%) mother delivered their child at 25 or below, at 31-35 and at 26-30 years of age respectively.

#### Types of family of the respondents of ASD children

Regarding type of family, more than 76 (68.5%) respondents belonged to nuclear family, 35(31.5%) respondents belonged to joint family

#### Frequency of problems faced by parents of ASD (n=75)

Out of 75(67.6%) parents, 53(70.7%) parents of autistic children faced social problems, 22(29.3%) and some parents suffered financial problem also.

#### Frequency Distribution of level of Intellectual disability of autistic children (n=111)

According to level of intellectual disability, out of 111 autistic children, 85(76.57%) ASD had significantly delayed performance level and 26 (23.42%) autistic child had mildly delayed performance level. There was no normal and accelerated performance level found in this study.

**Table 3: Relationship of level of Intellectual disability with age at first diagnosis of autistic children (n=111)**

Age at first diagnosis	Intellectual disability(Cognitive)		Total	$\chi^2$ ,P value
	Mildly delayed performance level	Significantly delayed performance level		
0-12 months	11(42.3)	71(83.52)	82 (73.87)	$\chi^2=17.608$ P = 0.001
12-24 months	6(23.07)	6(7.05)	12 (10.81)	
25-36 months	6(23.07)	5(5.88)	11 (10)	
>36 months	3(11.58)	3(3.52)	6 (5.45)	
<b>Total</b>	<b>26 (100)</b>	<b>85 (100)</b>	<b>111 (100)</b>	

There is a significant relationship present between levels of intellectual disability with Age at first diagnosis of ASD children. (Table: 3)

**Table-4: Relationship of level of Intellectual disability with age at first diagnosis of autistic children**

Age at first diagnosis	Intellectual disability(Cognitive)		Total	$\chi^2$ ,P value
	Mildly delayed performance level	Significantly delayed performance level		
<b>1. Monthly family income</b>				
BDT<15000	3 (11.53)	7 (8.23)	10 (9.09)	$\chi^2 = 0.265$ P = 0.428
BDT>15000	23 (88.46)	78 (91.76)	101 (90.99)	
<b>Total</b>	<b>26 (100)</b>	<b>85 (100)</b>	<b>111 (100)</b>	
<b>2. Education of mother</b>				
Primary	5 (19.23)	13 (15.29)	18 (16.21)	$\chi^2 = 0.933$ P = 0.433
Secondary	1 (3.84)	2 (2.35)	3 (2.70)	
Higher secondary	3 (11.53)	10 (11.76)	13 (11.71)	
Graduate and above	17 (65.38)	60 (70.58)	77 (69.36)	
<b>Total</b>	<b>26 (100)</b>	<b>85 (100)</b>	<b>111 (100)</b>	
<b>3. Education of father</b>				
Primary	5 (19.38)	13 (15.29)	18 (16.21)	$\chi^2 = 0.895$ P = 0.605
Secondary	3 (11.53)	8 (9.41)	11 (9.90)	
Higher secondary	1 (3.84)	2 (2.35)	3 (2.70)	
Graduate and above	17 (65.38)	62 (72.94)	79 (71.17)	
<b>Total</b>	<b>26 (100)</b>	<b>85 (100)</b>	<b>111 (100)</b>	

There is no association found between socio-demographic factors (monthly family income, education of father and mother, occupation of father and mother) with level of intellectual disability of ASD children. (Table: 04)

#### Discussion

The study aimed to find out the Socio-demographic profile of autism spectrum disorder. In the study, we collected data from the parents of autistic children. The mean age of the autistic child was 30.6 months (SD ± 6.855). Out of 111 autistic children, most 80 (72.1%) of them were male and only 31 (27.9%) respondents were female. The age and sex distributions of the respondents were corresponded with the study "Diagnosis of autism

spectrum disorders in the first 3 years of life" conducted by Rebecca J Landa<sup>13</sup>. More than seventy percent of the respondents were first born child which was similar with the study done in two autism schools in Dhaka City, Bangladesh<sup>17</sup> and a child neurological developmental clinic in Lagos and not similar with the study conducted by Ginny Russell et.al.<sup>15</sup> All 111(100%) the autistic child lived with their father and mother rather than only father and mother and 82 (73.8%) of autism spectrum disorder were diagnosed at age of 0-12 months. Ginny Russell et.al.<sup>15</sup> observed the same findings in their study. In case of parents of autistic child, majority 61 (55%) was within 21-30 years of age. The mean age of the respondents was 27.8 years (SD  $\pm$  5.25) which was almost similar with the study conducted in South West England. Out of 111 respondents, 82 (73.9%) were female and 29 (26.1%) were male. Azina Wati Nikmat et.al indicates the similar findings in their study.<sup>16</sup> Among the respondents Muslim's were predominate which is 88 (79.3%) and rest 23 (20.7%) were Hindu. Parvin MN et. al found the same result done in Protibondhi Foundation Dhaka.<sup>16</sup> Regarding Educational level of mother, majority 77(69.4%) of the respondents were educated up-to graduate and above and 18 (16.2%) were educated up-to primary level and educational level of father, 79 (71.2%) were educated up to graduate and above, 18 (16.2%) were educated up to primary level which was similar in the study conducted by Azina Wati Nikmat Et.al<sup>15</sup> and dissimilar in the study done in two selected school in Dhaka City.<sup>17</sup> According to the mother's occupation, majority 67 (60.4%) were housewives,44(39.6%) were service holder. Similar findings were noted in the study done in an Arab country. In this study 96 (86.5%) father of autistic child were service holder and rest 15(13.5%) were engaged in other occupation. The study done in Protibondhi foundation indicates the same findings and A et.al found the dissimilar findings in their study.<sup>18</sup> Regarding type of family, more than 76 (68.5%) respondents belonged to nuclear family, 351 (31.5%) respondents belonged to joint family and 57(51.4%) respondents had >4 family members and 54(48.6%) respondents had <4 family members in their family. The mean income of the respondents was taka 50162.16  $\pm$  37747.857. Almost same findings found in the study conducted by Parvin MN et.al. Almost seventy percent 77(69.4%) respondents monthly family income was satisfactory which was similar with the study conducted by Mostafa A et.al. According to maternal occupational class, more than ninety percent mothers were professional at their pregnancy time and 96 (86.5%), 13 (11.7%) mother delivered their child at 25 years or below, at 31-35 years of age. The study done in the UK indicates the same

findings. Out of 111 respondents, 89 (80.2%) lived in brick house and 21 (18.9%) lived in pucca house. Regarding source of drinking water, more than 96 (86.5%) used water from supply source. About 99 (89.2%) respondents used sanitary latrine. In the above table, 75 (67.6%) parents face the different kind of problem. Out of 75(67.6%) parents, it is seen that 53(70.7%) parents of autistic children face social problem, 22 (29.3%) parents suffer financial problem which was quite similar with the study of problems of Autistic Children and Their Families: A Study in the Urban Areas of Bangladesh conducted by Dhaka University, Bangladesh. Only 36 (32.4%) parents of autistic children did not face any problem up-to the time of data collection. According to level of intellectual disability, out of 111 autistic children, 85 (76.57%) respondents had significantly delayed performance level and 26(23.42%) autistic child had mildly delayed performance level. There is no normal and accelerated level performance level found in any autistic child. In today's blog "Autism and IQ" Seattle Children's Autism Center, Kelly Herzberg<sup>18</sup> found the same result in his interview. There is a significant relationship present between intellectual disability with Age at first diagnosis of ASD children and no association found between socio-demographic factors (monthly family income, education of father and mother, occupation of father and mother) with level of intellectual disability of ASD children.

#### **Recommendations**

Autism is a biological disorder. It exhibits the same core deficits in all cultures. However, the clinical presentation of ASD may be shaped by culturally determined factors and needs more elaborate/different intervention programs. The cultural context may significantly influence the parental expectation and family concerns about managing the problem. In this study, we have identified several socio economical indicators of ASD. Further research is required to explore what extent of these factors affects in children at development of autism and then appropriate intervention studies can be designed.

#### **Conclusion**

Further studies are to be done incorporating a comparison group, such as children with mild intellectual disability without autism. This may further clarify the parental expectation differences for both boys and girls in other groups with intellectual and developmental disabilities compared with autism as well. Also, because the co-occurring behaviour problems were gleaned from parent-reports, the potential effects of parental biases must be considered.

Additional assessment by structured clinical interviews and observational measures would have been desirable to provide a more comprehensive view of the participant's problems. We need to include cultural, behavioural and educational management strategies in any comprehensive intervention program for young children and adolescents with ASD.

It is recommended that more detailed studies would reveal more information, so that health authority and other concerned organizations would be able to take appropriate measures to reduce the incidence, prevalence and also proper planning to do early diagnosis, treatment of the ASD children and reduce the problems of their family members.

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## Original Article

# Current trend of Caesarean section and Vaginal birth in Dhaka National Medical College Hospital

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### Abstract

**Background:** A frequent dilemma for obstetricians is to determine the best mode of delivery in order to optimize pregnancy outcome for both the mother and the neonate.

**Objective:** This study was undertaken to compare demographic characteristics, parity status, antenatal care, obstetric complications and maternal outcome of all pregnancies in women who underwent caesarean section with those who had a normal vaginal delivery.

**Methods:** This prospective study was done in the Departments of Obstetrics and Gynaecology in Dhaka National Medical College Hospital from January, 2015 to June, 2015. Women who visited for antenatal check-up and admitted for delivery in this hospital were included in the study. The subjects were divided into two groups on the basis of mode of delivery.

**Results:** Majority of mothers who were having caesarean section and vaginal delivery falls in 20-25 yrs of age group (50.47% vs. 65.44%). Mothers belonging to low and lower middle socioeconomic background had higher rate in vaginal birth (80.87%). While, higher rate of caesarean sections was observed among mothers of middle and high socioeconomic status compared to vaginal delivery (75.94% vs. 19.11%). Caesarean section was higher among primigravida (64.28% vs. 36.03%) and in multigravida rate of vaginal delivery was higher (63.97% vs. 35.72). Vaginal delivery was higher among mothers who on regular antenatal check-up (80.15% vs. 72.14%). The major indications for caesarean section in this study were fetal distress (25.71%) and previous caesarean section (24.52%). Among the mothers uneventful puerperium was present in majority cases (90% in caesarean section vs. 98.53% in vaginal delivery).

**Conclusion:** Caesarean section is higher at Dhaka National Medical College Hospital as this hospital deals with high number of referred patients. Trend is common among primigravida, mothers of middle and high socioeconomic status having irregular antenatal check-up, fetal distress and previous caesarean section.

**Key Word:** Caesarean section, vaginal delivery.

### Introduction

Vaginal delivery has always been considered as natural and preferred way to give birth but is not always possible for all babies. In some cases, delivery through a caesarean section is necessary for healthy baby and healthy mother. In Bangladesh, the current proportion of 17% caesarean section rate is slightly higher than the globally acceptable level of fifteen (15%) percent.<sup>1</sup> Caesarean section is a major operation, with great potential benefit, but also with substantial risks for both mother and baby.<sup>2</sup> A caesarean section is indicated when delivery is required and cannot be performed vaginally because it will take too long or endanger the mother or the foetus life.<sup>3</sup> Schindl et al<sup>4</sup> favour elective caesarean

deliveries because of fear of childbirth. Heit et al<sup>5</sup> found urinary and fecal incontinence after vaginal delivery, Hannah et al<sup>6</sup> also favour elective caesarean section due to avoid complication of vaginal delivery of breech presentation at term and other studies also showed neonatal outcome as an unexplained fetal death and complications of labour.<sup>4,6,7</sup> Harper et al<sup>8</sup> emphasized on relative safety of vaginal delivery because caesarean deliveries implied a higher risk of maternal death, Bergholt et al<sup>9</sup> found longer recovery time and operative complications, Souza et al<sup>10</sup> showed higher risk of unexplained stillbirth in subsequent pregnancies and respiratory problems of newborn infants.<sup>11-14</sup> The current study was designed to compare demographic characteristics,

parity status, antenatal care, obstetric complications and maternal outcome in pregnancies with caesarean section and vaginal delivery.

### Materials and Methods

This prospective study was done in the Departments of Obstetrics and Gynaecology in Dhaka National Medical College Hospital from January 2015 to June 2015. Dhaka National Medical College Hospital is a tertiary care centre having a large number of referral cases and provides antenatal care and delivery services to pregnant women. Women who visited for antenatal check-up and admitted for delivery were included in this study. A questionnaire was designed to meet the requirement of the study. Informed verbal consent was obtained from women admitted during the study period. The subjects were further divided into caesarean section and vaginal delivery group on the basis of mode of delivery. Demographic characteristics, parity status, antenatal care and obstetric complications were noted in both groups. Data were analyzed by using SPSS version 17.

### Results

During the study period total 556 deliveries were conducted. They were divided into two groups on the basis of the mode of delivery. Caesarean section was done in 75.54% patient and 24.46% patient had vaginal delivery (Fig.-1). This study shows large number of mothers who were having caesarean section (50.47%) and vaginal delivery (65.44%) falls in 20-25 yrs of age group. Mothers belonging to low and lower middle socioeconomic background had higher number in vaginal birth (80.87%) when compared to caesarean birth (24.04%). While, higher rate of caesarean section (75.94%) was observed among mothers of middle and high socioeconomic status compared to vaginal delivery (19.11%) [Table-I]. Regarding antenatal check-up, 80.15% patients of vaginal delivery had regular antenatal check-up and 72.14% patients of caesarean had regular antenatal check-up (Fig.-2). Outcome of pregnancies with gestational age were similar in term and preterm babies in caesarean section (95.95% and 4.05%) when compared to vaginal birth (93.38% and 6.62%). Birth weight was also similar in low birth weight (<2.5Kg) and normal birth weight (>2.5Kg) in caesarean section (5% and 95%) when compared to vaginal birth (5.88% and 94.12%) [Table-II]. Caesarean section in primigravida was 64.28 % and vaginal delivery was only 36.03%. In multigravida, caesarean section was in 35.72% cases and vaginal delivery was in 63.97% cases [Fig.-3]. The major indications for caesarean section in this study were fetal distress (25.71%), previous caesarean section (24.52%), oligohydramnios (14.04%),

cephalopelvic disproportion (9.76%), and pregnancy induced hypertension (7.38%) [Table-III]. Post partum complication in caesarean section were headache 6.91%, wound infection 2.14% and post partum hemorrhage 0.95% (Table-IV).

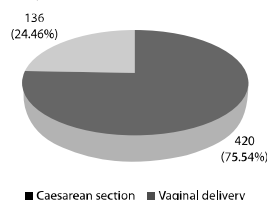


Fig.-1 Distribution of mode of delivery

Table-I: Socio-demographic status of study population (n=556)

Socio-demographic study	Caesarean section N (%)	Vaginal delivery N (%)
Age group (Year)		
<20	156(37.14)	29(21.32)
20-25	212(50.47)	89(65.44)
26-30	39(9.28)	14(10.29)
31-35	13(3.09)	4(2.94)
Residence		
Urban	383(91.19)	129(94.85)
Rural	37(8.80)	7(5.14)
Monthly family income (Taka)		
Lower (<10,000)	25(5.95)	65(47.79)
Lower middle (10,000-20,000)	76(18.09)	45(33.08)
Middle (20,001-30,000)	86(20.47)	23(16.91)
Higher (>30,000)	233(55.47)	3(2.20)

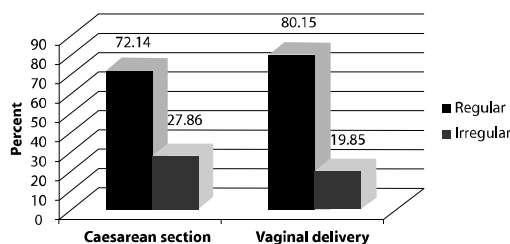
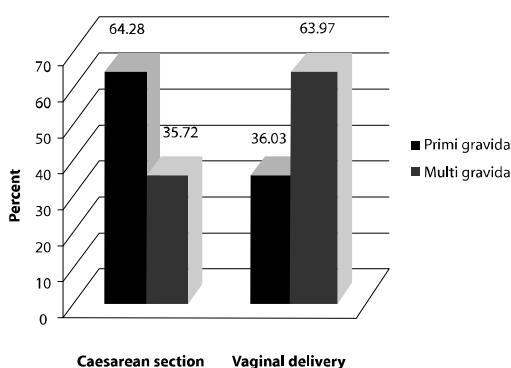


Fig.-2 Distribution of antenatal check-up and mode of delivery

**Table-II: Outcome of pregnancies with gestational age and birth weight at delivery (n=556)**

Outcome of pregnancies	Caesarean section N (%)	Vaginal delivery N (%)
Gestation (Weeks)		
Term	403(95.95)	127(93.38)
Preterm	17(4.05)	9(6.62)
Birth weight (Kg)		
<2.5	21(5)	8(5.88)
>2.5	399(95)	128(94.12)



**Fig-3 Outcome of pregnancies with parity (n=556)**

**Table-III: Indications of caesarean section (n=420)**

Indications	No.	%
Foetal distress	108	25.71
Previous caesarean section	103	24.52
Oligohydramnios	59	14.04
Cephalopelvic disproportion	41	09.76
Pregnancy induced hypertension	31	7.38
Failed induction	33	7.25
Maternal Request	26	6.19
Scar tenderness	05	1.19
Antepartum hemorrhage	11	2.61
Others	03	0.71

**Table-IV: Distribution of maternal outcome (556)**

Maternal complications	Caesarean section N (%)	Vaginal delivery N (%)
Uneventful puerperium	378(90)	134(98.53)
Postpartum hemorrhage	4(0.95)	00
Wound infection	9(2.14)	00
Headache	29(6.91)	00
Postpartum eclampsia	00	02(1.47)

### Discussion

In this study, seventy five percent (75.54%) of women were delivered by caesarean section while 24.46% by vaginal route. The high caesarean rate in this hospital may be partially attributed to the fact that this being a referral hospital gets a larger proportion of complicated pregnancies. Data from the recent Bangladesh Maternal Mortality Survey show that among births occurring in facilities, more than one-half are by caesarean section, and the caesarean section rate reaches 71% for birth occurring in private facilities.<sup>15</sup> This study showed that large number of mothers who were having caesarean section and vaginal delivery falls in 20-25 yrs of age group (50.47% vs. 65.44%) which reflecting the early age of marriage and child bearing in our country. Thapa et al<sup>16</sup> found in his study that 42.6% of the women were of 20-24 years of age. In our study, mothers belonging to low and lower middle socioeconomic background had higher number in vaginal birth (80.87%) when compared to caesarean birth (24.04%). While, higher rate of caesarean section was observed among mothers of middle and high socioeconomic status compared to vaginal delivery (75.94% vs. 19.11%). Kim et al<sup>17</sup> found similar results. Berley et al<sup>18</sup> found that the caesarean sections are more likely in women's of high socioeconomic class. This explains women of middle and higher socioeconomic status was able to afford a relatively expensive method of delivery. Kaur et al<sup>19</sup> found that majority of mothers belonging to low socioeconomic status had high number in vaginal delivery. This has been reported by another cross-sectional study done by Kudisha et al<sup>20</sup> that only a minority of women from low socioeconomic background would go for caesarean section. Regarding comparison for antenatal check-up, 80.15 % of mothers having regular antenatal check-up had vaginal deliveries when compared to the number of caesarean deliveries. Majority of mothers in this study had regular antenatal check-up, so proper management during pregnancy had

done. There by there was more number of vaginal delivery. Kaur et al<sup>19</sup> found that women who had gone for full antenatal check-up had more number of caesarean section (44.02%). Adekanle et al<sup>21</sup> found that unbooked mothers and their babies are at higher risk for caesarean deliveries than booked mothers. These variations depend upon type of hospital and type of patients dealt with the particular hospital.

In our study, outcome of pregnancies with gestational age were similar in term and preterm babies in two groups. Birth weight was also similar in low birth weight (<2.5Kg) and normal birth weight (>2.5Kg) in two groups. Kaur et al<sup>19</sup> found that the rate of preterm babies was higher in caesarean section. His study was not comparable with our study because as there is no neonatal intensive care unit in our hospital, we usually refer the pregnant mother with preterm labour to the nearest center where the facilities was available.

Caesarean section was higher among primigravida when compared with vaginal delivery (64.28% vs 36.03%) in our study. Similar findings was also found in Kumari et al<sup>22</sup> where 53% primigravida undergone caesarean section. Caesarean section was their preferred method of delivery to avoid the issues associated with vaginal delivery, such as the fear of pain during childbirth, subsequent pelvic floor collapse, and incontinence.

In our study, multigravida rate of vaginal delivery was higher compared to caesarean section (63.97% vs. 35.72). Khanem et al<sup>24</sup> found in their study that multigravida was undergoing more caesarean section than primigravida probably due to previous caesarean section.

The major indications for caesarean section in this study were fetal distress (25.71%) and previous caesarean section (24.52%), other common indications included oligohydraminos (14.04%), cephalopelvic disproportion (9.76%), pregnancy induced hypertension (7.38%), failed labour (7.25%) and maternal request (6.19%). Kaur et al<sup>19</sup> study was comparable with this study where caesarean section due to fetal distress was 30.77%. Thapa et al<sup>16</sup> found common indication for caesarean section was cephalopelvic-disproportion (62.2%). Khanem et al<sup>24</sup> found major indication for caesarean section was breech presentation (31.6%).

#### **Conclusion**

Caesarean section is higher at Dhaka National Medical College Hospital as this hospital deals with high number of referred and complicated pregnancy. Trend is common among primigravida, mothers of middle and high socioeconomic status, having irregular antenatal check-

up, fetal distress and previous caesarean section. We need to create more regular antenatal check-up facilities. All pregnant patients should be delivered in hospital with adequate labour monitoring facilities. It is also important to pay attention to the first labour as its outcome greatly determines the future mode of delivery.

#### **Limitation**

Since the data were collected only from one hospital, it had chance of over representation which could not reflect general population and may not represent the similar situation in the whole population of the country. A broad base longitudinal cohort study could be more meaningful and helpful to validate the present study result.

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## Original Article

# Distribution of diseases among Children under 15 years of age Admitted in Dhaka National Medical College Hospital (DNMCH)

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### Abstract

**Background:** Children of under 15 comprises one third of our population and more than half of total deaths occurs in this group which is the major health problem of our country. An understanding of epidemiological trend in hospital admissions including disease pattern, is critical for health care planning, including effective case management strategies, appropriate resource allocation and improving existing services facilities.

**Objectives:** To evaluate the disease pattern among children for reducing the morbidity and mortality rate and also to identify the demographic profile of the patients attending in the department of paediatric, Dhaka National Medical College Hospital (DNMCH).

**Materials and Methods:** This was a prospective study. Sample collected of all patients admitted in the department of pediatrics, DNMCH, from 1<sup>st</sup> Jan 2015 to 30<sup>th</sup> June 2015 were analyzed.

**Result:** Total 432 patients (aged 1 day to 12 years) were admitted during this study period; among them Neonate 19.21%, Infant (1month-12 month) 24.30%, preschool age group (1-5 years) 33.56% and children (6 years-12 years age) 22.9%. Among the admitted cases, Acute Respiratory Infection (ARI) 53%, Diarrhoea (33.33%), Bronchial Asthma (4.76%), Enteric fever (2.86%) in infant (1-12 month age group). Enteric fever and Diarrhoea, were found as top two causes of admission in Preschool age (1-5 yrs age group) and Children (6-12 yrs age group). Most frequent five diseases in case of neonates (1-28 days age group) from admission are shown in this study. Among the admitted neonates, Perinatal Asphyxia (30.12%), Neonatal Jaundice (24.09%), Neonatal Sepsis (20.48%), preterm Low Birth Wt. (18.07%), Intra uterine growth retardation (IUGR) 3.6%. Maximum of our patients are found male (51.62%) and 48.38% are female. The maximum patients about 74.54% have come from old part of Dhaka city. Among the admitted patients live in concrete house about 48.61% and 41.67% housing are semi-concrete. The patients family member are (4-5 person) about 52.55%, 45.83% family member are (2-3 person).

**Conclusion:** Finding of this study helps us to understand Paediatric admission trend and disease pattern of this institution, which are essential for health sector planning, including effective case-management strategies.

**Key words:** Admission, Dhaka National Medical College Hospital (DNMCH).

### Introduction

Bangladesh is a developing country with a population of more than 140 million. Nearly 45% of its population are under age 15 years, of whom 17% is of 0-4 years and 28% 5-14 years of age<sup>1</sup>. Mortality in under five children in low to middle income countries is still very high. Every year more than 10 million children in these countries die before they reach their fifth birthday. Seven in 10 of these deaths are due to acute respiratory infections (mostly pneumonia), diarrhoea, measles, malaria or malnutrition and often a combination of these condition. In Bangladesh, common illness in children

under 5 years of age include fever (40.1%), Acute Respiratory infections (20.8%), diarrhoea (7.5%) and malnutrition (45%) and often in combination. Majority of child death occur in our country due to Diarrhoea, pneumonia, malnutrition, Tetanus etc. Infant Mortality Rate to be high at 52/1000 live births and under five mortality Rate at 65/1000 live births per year. Neonatal mortality 37/1000 live birth contributes to over 2/3 of infant deaths, which are a direct consequence of factors such as low birth weight (LBW), preterm delivery, birth asphyxia etc.<sup>2</sup>

Children are the future of Nation. They are most vulnerable

group composed of highest percentage of total very much neglected. In our country there are studies on disease pattern of children which are mainly hospital based or done on selected area of urban and rural area of Bangladesh which reflect the light on the total situation of disease of the children. Morbidity and mortality among children are merely estimated in developing countries, because of the difficulties in obtaining data accurately. Useful information on this regard can easily be obtained from periodic review of morbidity and mortality in medical institutions as it reflects what is occurring in a community.<sup>3</sup> Such understanding of epidemiological trend in hospital admissions is critical for health care planning and appropriate resource allocation.<sup>4</sup> Childhood mortality is a reliable indicator of health care facilities of a country and its development.<sup>5</sup> Moreover, evaluation of characteristics of children who dies in hospitals gives an insight into main medical illness in children and measures to overcome those.<sup>6</sup> Therefore, review of such information help to draw attention to the pattern of childhood illness in the community. Considering that children of under 15 years of age comprises one third of our population and more than half of total death occurs in this group, which is the major health problem of our country. Therefore, the purpose of the study was to find out the pattern of diseases among children for reducing the morbidity and mortality rate of the disease and also to find out the socio-economical status and to identify the demographic profile of the patients attending in paediatric department of Dhaka National Medical College Hospital. Dhaka National Medical College Hospital located in Old Dhaka, more dense population area and also serving the population of both old and new Dhaka City. Analysis in this hospital should therefore give better evaluation of patients caring service of these regions.

#### Materials and Methods

**Study type:** This was a prospective study.

**Setting:** Department of Paediatrics, Dhaka National Medical College Hospital, Dhaka (DNMCH)

**Period:** 1<sup>st</sup> Jan 2015 to 30<sup>th</sup> June 2015.

**Population:** All the admitted Children aged 1 day to 12 years (upper age limit for admission in pediatric ward), in the department of Paediatrics, DNMCH over a period of 6 months.

**Sample size:** 432.

**Data Collection:** Data collection was done by using questionnaires through face to face interview to collect the information about the current problem of admitted cases (Aged 1 day to 12 years). Data was collected at the bedside from the patient's attendant of the study of

children. The record contained the name, age, sex, weight, residence, housing condition, family member, food habit, socio-economic condition, provisional diagnosis, etc., diagnosis was based on the final assessment by the managing unit. It was based on the presenting clinical features with or without the results of laboratory tests. The collected data were analyzed and tabulated using distribution tables as percentages and suitable diagrams.

#### Results

Over a span of six months, there were total 432 patients admission. All the patients were segregated into four age groups. This age wise distributions of patients in admissions and sex were depicted in Table - 1. Among the admitted cases, the maximum patients are from pre school age group ( 1-5 yrs) have represented 33.56%, Infant (1 month - 12 months) are 24.30%, children from 6 yrs - 12yrs. of age have represented 22.9% and 19.21% are Neonate (1 day - 28 days). Table - 1 also shows that maximum of our patients are found male 51.62% and 48.38% ate female.

**Table: 1**

**Title: Age & Sex Distribution of Patients.**

Age	Frequency (Total-432)	Percentage (100%)
Neonate (1day-28days)	83	19.21%
Infant (1month-12months)	105	24.30%
Pre School Age (1-5yrs)	145	33.56%
6yrs-12yrs	99	22.91%
Sex	Frequency (Total-432)	Percentage (100%)
Male	223	51.62%
Female	209	48.38%

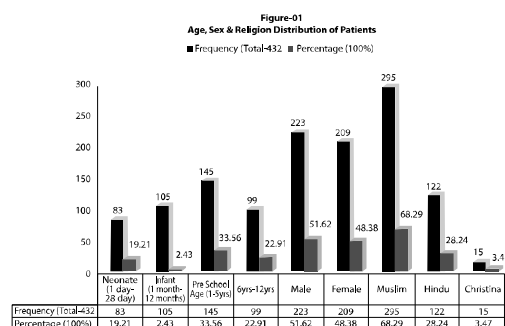
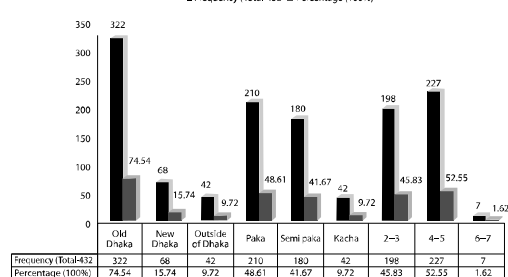


Table 2: Shows the maximum patients about 74.54% have comes from old part of Dhaka City. 15.74% and also 9.72% patients have come from new Dhaka City and outside of Dhaka. This Table -2 also shows that majority of the patients live in concrete house about 48.61%, 41.67% housing are semi concrete and 9.72% are tinshed house. Table -2 also shows that maximum of the patients family member are (4-5) person about 52.55%, 45.83% family member are (2-3) person and 1.62% family member are (6-7) person.

**Table: 2**  
**Title: Residence, Housing & Family Member Distribution of Patients.**

Residence	Frequency (Total-432)	Percentage (100%)
Old Dhaka	322	74.54%
New Dhaka	68	15.74%
Outside of Dhaka	42	9.72%
Housing Condition	Frequency (Total-432)	Percentage (100%)
Concrete	210	48.61%
Semi concrete	180	41.67%
Tinshed	42	9.72%
Family Member	Frequency (Total-432)	Percentage (100%)
2--3	198	45.83%
4--5	227	52.55%
6--7	7	1.62%

**Figure-02**  
**Residence, Housing & Family Member Distribution of Patients**

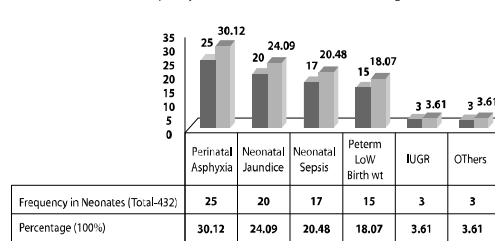


**Table: 3-A**  
**Title: Pattern of disease Distribution among the Neonates.**

Name of Disease	Frequency	Percentage (%)
Neonates (1-28days)	Frequency in Neonates (Total-432)	Percentage (100%)
Perinatal Asphyxia	25	30.12%
Neonatal Jaundice	20	24.09%
Neonatal Sepsis	17	20.48%
Preterm Low Birth Wt	15	18.07%
IUGR	3	3.61%
Others	3	3.61%

**Table: 3-A-Shows** the pattern of disease distribution among he patients. Most frequent five diseases in case of Neonates (1-28 days) from admission are shows in Table: 3-A. Among the admitted cases, Perinatal asphyxia (30.12%), Neonatal jaundice (24.09%), Neonatal sepsis (20.48%) preterm low birth wt. (18.07%), Intruterine growth retardation (IUGR) (3.61%) and also 3.61% are categorized as others.

**Figure-04-A**  
**Pattern of disease Distribution among the Patients**

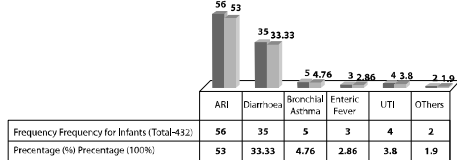


**Table: 3-B** also shows the pattern of disease distribution among the Infants (1-12 months). Among the admitted cases, Acute Respiratory Infection (ARI) [53%], Diarrhoea (33.33%), Bronchial Asthma (4.76%), UTI (Urinary Tract Infection (3.80%), Enteric fever (2.86%) & others (1.90%).

**Table: 3-B**  
**Title: pattern of disease distribution among the Infants (1-2 months).**

Infants (1-12 month)	Frequency for Infants (Total-432)	Percentage (100%)
ARI	56	53.00%
Diarrhoea	35	33.33%
Bronchial Asthma	5	4.76%
Enteric Fever	3	2.86%
UTI	4	3.80%
Others	2	1.90%

**Figure-04-B**  
**Pattern of disease Distribution among the Patients**  
 ■ Frequency Frequency for Infants (Total-432) ■ Percentage (%) Percentage (100%)

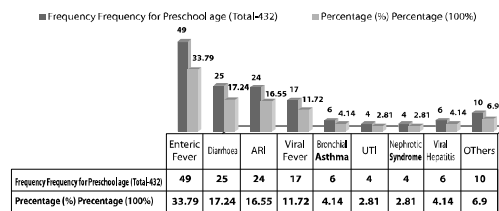


**Table: 3-C** Shows the pattern of disease distribution among the pre School age (1-5 yrs). Most frequent 8 (eight) diseases from admission are shown in figure: 3-C. Besides these, 6.90% diseases that are categorized as 'Others' Among the admitted cases, Enteric fever 33.79%, Diarrhea 17.24%, Acute Respiratory tract infection (ARI) 16.55%, Viral fever (11.72%) Bronchial Asthma (4.14%), Urinary tract Infection (UTI) 2.81%, Nephrotic Syndrome (2.81%), Viral Hepatitis (4.14%).

**Table: 3-C**  
**Title: Pattern of disease Distribution among the Preschool age (1-5 Yrs.)**

Preschool age (1-5yrs)	Frequency for Preschool age (Total-432)	Percentage (100%)
Enteric Fever	49	33.79%
Diarrhoea	25	17.24%
ARI	24	16.55%
Viral Fever	17	11.72%
Bronchial Asthma	6	4.14%
UTI	4	2.81%
Nephrotic Syndrome	4	2.81%
Viral hepatitis	6	4.14%
Others	10	6.90%

**Figure-04-C**  
**Pattern of disease Distribution among the Patients**  
 ■ Frequency Frequency for Preschool age (Total-432) ■ Percentage (%) Percentage (100%)

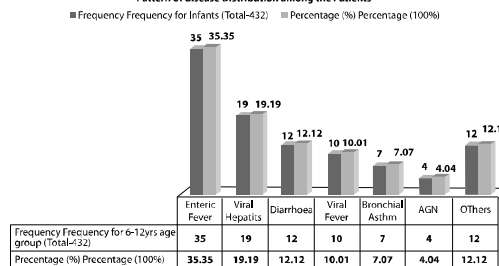


**Table: 3-D** Shows the pattern of disease distribution among the (6-12yrs) age group. Most frequent 6(six) diseases from admission are shown in figure: 3-D. Among the admitted cases, Enteric fever (35.35%), Viral Hepatitis (19.19%), Diarrhoea (12.12%), Viral fever (10.10%), Bronchial Asthma (7.07%), Acute glomerulonephritis (AGN) 4.04% and besides these, 12.12% diseases are categorized as 'Others'.

**Table: 3-D**  
**Title: Pattern of diseases distribution among (6-12 yrs) age group.**

6-12yrs age group	Frequency for 6-12yrs age group (Total-432)	Percentage (100%)
Enteric Fever	35	35.35%
Viral Hepatitis	19	19.19%
Diarrhoea	12	12.12%
Viral Fever	10	10.10%
Bronchial Asthma	7	7.07%
AGN	4	4.04%
Others	12	12.12%

**Figure-04-D**  
**Pattern of disease Distribution among the Patients**  
 ■ Frequency Frequency for Infants (Total-432) ■ Percentage (%) Percentage (100%)



**Discussion**

Over a period of 6 months, total 432 patients were admitted in this hospital In this study, all the patients were segregated into four age groups, the maximum

patients were from pre School age group (1-5yrs) represented 33.56%, Infant (1month-12 months) were 24.30%, Children (6 yrs-12 yrs of age) were 22.9% and also Neonate (1 day- 28 days of age) represented 19.21%. Although, Dhaka National Medical College & Hospital (DNMCH) located in old part of Dhaka, more dense population area but the tendency of lower number of admissions in comparison to other hospital for limitation of hospital beds in paediatric department of this hospital. In this study 77.07% of the total admissions were from the under five age group, as in other study.<sup>7</sup> On admission maximum of our patients were male in this study, similar male preponderance is found other studies done in Nigeria.<sup>3,4</sup> This finding may reflect a gender bias in health seeking behavior regarding their children.<sup>3</sup> Alternatively, there may be epidemiological reasons for male susceptibility to infections or other condition requiring admission.<sup>8</sup>

In Bangladesh, common illness in Children under 5 years of age include Acute Respiratory infection (20.8%), Diarrhea (7.5%), Malnutrition (45%) and often in combination.<sup>2</sup> This study also showed, common diseases like Diarrhoea, Acute Respiratory tract infection (ARI), Enteric fever and Bronchial Asthma, in under 5 age group. Among the admitted cases include infant (1-12 months) and preschool age (1-5yrs). Acute Respiratory Infection (ARI) [53%], Diarrhea (33.33%), Bronchial Asthma (4.76%) Enteric fever (2.86%) in Infant (1-12 months age) and in case of preschool age (1-5yrs) Acute Respiratory Infection (ARI) 16.55%, Diarrhoea (17.24%), Enteric fever (33.79%) and Bronchial Asthma. In this study also showed most frequent six diseases among the children ( 6-12 yrs age group) were Enteric fever (35.35%), Diarrhoea (12.12%) Bronchial Asthma (7.07%), viral hepatitis (19.19%) Viral fever (10.10%). Acute glomerulonephritis (AGN) 4.04%. Majority of admissions from Respiratory illness, Diarrhoea and Enteric fever are also the common findings in other hospitals of the country. A seasonal variation in some of the diseases with Acute Respiratory Infection (ARI), Bronchial Asthma, Diarrhoea and Enteric fever in this study is consistent with global epidemiological trend.

Acute Respiratory tract infection (ARI) is the major cause of morbidity and mortality in paediatric age group. In Bangladesh, Acute Respiratory tract infection (ARI) alone is responsive for 33.4% of total under five death, 38.8% of total paediatric OPD visit<sup>9</sup>. In this study 86.1% of the total hospital admission in paediatric age group especially under five children was Acute Respiratory tract infection (ARI). The diarrhoeal diseases are a leading cause of childhood morbidity and mortality in the developing countries, and a major cause of

undernutrition. In Bangladesh alone Diarrhoea and dysentery kill some 270,000 children; and estimates from various studies suggest that about 2-4 episodes of diarrhoea per child per year occurs in the under five age group. Thus diarrhoeal illnesses put a heavy burden on the meagre health facilities and resources of a poor country like Bangladesh.<sup>10</sup> In this study, 62.69% of total admission was Diarrhoea.

Neonatal mortality 37/1000 live births (BDIHS, 2006) contributes to over  $\frac{2}{3}$ rd of the infant deaths, which are a direct consequence of factors such as low birth weight (LBW), preterm delivery, Birth asphyxia etc.<sup>2</sup> Perinatal asphyxia constitutes the major bulk of Neonatal morbidity and mortality in the hospital. Begum et al. Study showed that perinatal Asphyxia was the leading cause of admission (52.09%, 311cases out of total 597 cases).<sup>11,12</sup> In this study, perinatal Asphyxia (30.12%) was admitted in Neonatal ward of this hospital preterm low birth wt (<2.5kg LBW) is common and a major risk factor for poor infant survival and growth in south Asia. Approximately 22% of infant born in northern rural Bangladesh are preterm. Nearly half are born small in multiple dimensions of size for sex-specific gestational age.<sup>12,13</sup> In this study, preterm low birth weight (PLBW) 25% was admitted in neonatal ward of this hospital. Prematurity and Intrauterine growth retardation leading to excessive mortality risk represent major public health concerns for newborns in Bangladesh. Neonatal Jaundice is a common finding in the majority of newborn premature and full term infants. An elevation of serum bilirubine >2mg/dl is found in most newborns in the first several days of life. 65% of newborns are clinically Jaundice (serum bilirubine concentration >5mg/dl). It may cause potential complications if not managed properly. One study showed that total 264 newborn babies were admitted in SCABU, BIRDEM during the 6 months period. Among them Jaundice developed in 190 babies and 133 babies were included that study who had significant Jaundice.<sup>13,14</sup> But in this study shows that significant Neonatal jaundice developed 24.09% of total neonatal admission, multiple aetiology were responsible for most cases.

In this study shows that the tendency of more number of admission with communicable diseases for many risk factors. They include not only the climatic conditions but also the housing, socio-economic and parental education status and also overcrowded dwellings, polluted water sources, inadequate sanitation, poor nutrition, low birth weight, environmental factors which could influence admission patterns<sup>14,15</sup> Therefore, this study includes residence, housing and family member distribution of patients.

### **Conclusion**

Findings of this study helps us to understand paediatric admission trend and disease pattern of this institution, which are essential for health sector planning, including effective case management strategies.

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## Original Article

# Aetiological evaluation of Anaemia in one hundred patient admitted in a Tertiary Hospital

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### Abstract

**Anaemia is a condition where there is a lower than normal number of red blood cells (RBCs)** in the blood, usually measured by decrease in the amount of hemoglobin (Hb). Anemia is a very common problem encountered in our clinical practice. So, knowledge about the aetiological pattern of anaemia of patients admitted in tertiary hospitals will help the clinician in planning investigations for early diagnosis and effective management of the patients. A cross sectional study was carried out over a period of 12 months in total 100 patients with severe anaemia having Hb level below 6 gm/dl admitted in tertiary care hospital. Result of this study was - Anaemia due to marrow replacement by haematological malignancies like leukaemia, lymphoma, multiple myeloma, myelofibrosis etc. were found to have highest incidence in this study (42%), Anaemia of chronic disorder 23%, Aplastic anaemia 12%, Haemolytic anaemia 9%, Iron deficiency anaemia 7%, Megaloblastic anaemia 4%, Anaemia due to acute blood loss 3%. It is concluded that in this study Haematological malignancy appeared to most common cause of anaemia. Anaemia associated with chronic disorders were found to be the second most common causes of anaemia. Aplastic anaemia was the third most common in Tertiary Hospital.

### Introduction

Anaemia is from the ancient Greek word, meaning "without blood".<sup>2</sup> Anaemia refers to a state in which the level of haemoglobin in the blood is below the normal range appropriate for age and sex.<sup>3</sup> The normal value of Hb in male is 13.5-17.5 (g/dl), in female is 11.5-16 (g/dl), haematocrit (PCV) in male is 0.4-0.54 (L/L), in female is 0.37-0.47(L/L).<sup>4</sup> A decrease in any of this values (Hb/Ht) is called anemia. They can be altered by the plasma volumes. Difference between women and men values are due to androgen hormones.<sup>5</sup> Anaemia can be caused by many things but three main bodily mechanisms that produce it are- i) Excessive destruction of RBCs ii) Blood loss, iii) Inadequate production of RBCs.<sup>6</sup>

Anaemia is not a diagnosis; it is a manifestation of an underlying disorder. So, even mild or asymptomatic anemia should be investigated so that the primary problem can be diagnosed and treated. Prevalence of anaemia among Bangladeshi population is still very high.<sup>7</sup> Iron deficiency anaemia is most common in women of child bearing age and they suffer from moderate to severe anaemia, but here only severe anaemia are encountered (Hb <6 gm/dl).

### Materials and methods

The study was conducted with a cross sectional design

and was carried out on Patients with anaemia admitted at the department of Medicine and Haematology in Bangabandhu Sheikh Mujib Medical University, Dhaka, over a period of 12 month from January to December 2008. The study was done by qualitative purposive sampling. Sample size total 100 patients.

Samples were selected from -

- 1) Patients who gave informed written consent.
- 2) Patients age more than 12 years, irrespective of their sex and education.
- 3) Patients with severe anaemia having Hb level below 6 gm/dl.
- 4) Clinical feature suggestive of anaemia.

History taking and physical examination and the other data were recorded in the structured form. Following investigations - Hb level, total and differential count of WBC, peripheral blood film, X-ray chest P/A view, stool routine examination, urine routine examination, serum creatinine, upper GIT endoscopy, Hb electrophoresis, Bone marrow study etc. were done to find out the aetiology and to exclude other diseases. All statistical analysis procedure were performed using the SPSS (Statistical Package for Social Science) 11.5 version. Data were analyzed using basic descriptive statistic.



## Results

**Table-1: Distribution of patients by cases of anaemia (n=100)**

Diagnosis	No. of patients	Percentage (100%)
Anaemia due to Haematological malignancy	42	42%
Anaemia of chronic disorder	23	23%
Aplastic anaemia	12	12%
Haemolytic anaemia	9	9%
Iron deficiency anaemia	7	7%
Megaloblastic anaemia	4	4%
Anaemia due to acute blood loss	3	3%

**Table-2: Distribution of patients by causes of bone marrow malignancy (n=42)**

Diagnosis	No. of patients	Percentage (100%)
Leukemia	32	76.2% AML
	12	37.5% ALL
	14	43.75% CML
	4	12.50% CLL
	2	6.25%
Multiple myeloma	5	11.9%
Lymphoma	2	4.76%
Myelodysplastic syndrome	2	4.76%
Myelofibrosis	1	2.38%

**Table-3: Distribution of patients with anaemia of chronic disease (n=23)**

Diagnosis	No. of patients	Percentage (100%)
Chronic renal failure	7	30.43%
SLE	6	26.09%
Abdominal malignancy	6	26.09%
Tuberculosis	3	13.04%
Chronic malaria	1	4.35%

## Discussion

Study was done to find out the aetiological pattern of anaemia in these patients. WHO estimates the number

anaemic people worldwide to be two billion and that approximately 50% of all anaemia can be attributed to iron deficiency.<sup>8</sup> In this study iron deficiency anaemia was found only in 7 (7%) cases because this study we consider severe anaemic patient (Hb<6%) and it was done in tertiary hospital. Anaemia due to marrow replacement were found to have highest incidence in this study (42%). Twenty three (23%) cases of anaemia of chronic disorder were detected, comprising second most common cause of anaemia in this study. Aplastic anaemia stands on third place (12%). Other causes of anaemia found in this study were haemolytic anaemia 9 (9%) cases, megaloblastic anaemia 4 (4%) cases and anaemia due to acute blood loss 3 (3%) cases.

In the present series, anaemia was found to be occurring in all the age groups from 2nd to 7th decade. Highest incidence was found in 2nd decade (24%) that is 20 to 29 years age group. This figure is well consistent with that of significantly good number of patients also belong to the 1st decade (20%), 4th decade (18%), 5th decade (16%), and 3rd decade (13%), 6th decade (9%). No patient below the age of 12 years was taken in this study.

In this series, among 100 patient 43 was male, 52 was female, Male and Female ratio is 1: 1.08.

Among 42 cases of haematological malignancies 32 cases were leukemia (76.2%), 5 cases were multiple myeloma (11.9%), 2 cases were lymphoma (4.76%), 2 cases were myelodysplastic syndrome (4.76%), 1 cases was myelofibrosis (2.38%).

Among 32 cases of leukaemia, the incidence of ALL was highest 14 (43.75%), followed by AML 12 (37.5%), the incidence of CML was 4 (12.5%) and CLL was 2 (6.25%).

In this study 23 patients were found with anaemia of chronic disorder. Among them 7 (30.43%) were suffering from chronic kidney disease, 6 (26.09%) of them had SLE, 6 (26.09%) had abdominal malignancy, 3 (13.04%) had tuberculosis, 1 (4.35%) had chronic malaria.

Among 12 cases of aplastic anaemia in this study no secondary cause was found. All causes (100%) were idiopathic, that is no identifiable causes were detected.

Among 9 cases of haemolytic anaemia in this study 8 (88.89%) were diagnosed as  $\beta$  thalassaemia major, 1 (11.11%) was Hb-E disease.

Among 7 cases of iron deficiency anaemia 4 (57.1%) were due to inadequate iron intake, 3 (42.9%) were due to chronic blood loss from GIT.

Among 4 cases of megaloblastic anaemia 1 (25%) was due to gastric surgery, 3 (75%) causes of megaloblastic anaemia could not be identified because of lack of adequate investigation.

Among 3 cases of anaemia due acute blood loss 1 (33.33%) was due to NSAID induce gastric erosion, 2 (66.67%) were due to ruptured oesophageal varices.

#### **Conclusion**

In this study 100 hospitalized adult patients were studied to find out causes of anaemia. In this series leukemia appeared to most common cause of anaemia. Among the patient with leukemia majority had acute leukemias. Anaemia associated with chronic disorders were found to be the second most common causes of anaemia, of which chronic kidney disease was found to be the major offender. Aplastic anaemia was the third most common cause of anaemia. A good number of cases of iron deficiency anaemia, megaloblastic anaemia, congenital haemolytic anaemia, anaemia due to acute haemorrhage were also detected.

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## Original Article

# Incisional Hernia Cases and Repair in last five years at Dhaka National Medical College Hospital (DNMCH)

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### Abstract

**Background:** An incisional hernia is a hernia that occurs through a previously made incision in the abdominal wall. A good number of patients present with Incisional Hernia following various surgery at various stages. Though safe, surgical approach is widely adopted, still incisional hernia continues.

**Objective:** Evaluation of patients presenting with incisional hernia and also to observe the hazards of hernioplasty.

**Materials and Methods:** It is a retrospective study carried out in Surgery dept. at unit-I, DNMCH from June 2011 to May 2016 among the admitted patients, who underwent surgical repair in this hospital.

**Results:** This study includes 34 (n=34) women between 26 to 65 yrs (mean age-37.32) yrs of age. Most of them are from middle & lower middle class family. Among the 34 women, 31 (91.18%) previously had various lower abdominal surgery, 1 person had post-traumatic repair surgery, 2 (5.88%) had hernia from umbilical port following laparoscopic surgery. 28 (82.35%) women were obese. 4 (11.77%) patients were diabetic, 2 patients have chronic bronchial asthma, 6 (17.7%) patients gave history of wound infection following primary surgery. After proper evaluation, hernioplasty with Prolene Mesh was done. Among the 28 obese persons, 20 (58.8%) patients developed variable degree of seroma. 19 patients recovered subsequently but persist in one patient where seroma persisted for up to 6-wks. She was advised for readmission & removal of mesh under anaesthesia. Average hospital stay is 6 days but follow-up continued up to 8 wks.

**Discussion:** Obesity is the commonest reason for incisional hernia. Diabetes mellitus & Bronchial Asthma must be controlled before elective surgery. Regarding post-operative seroma, it is a recognized complication of synthetic mesh induced hernioplasty.<sup>3</sup>

**Conclusion:** Social awareness must be created against obesity.

**Key word:** Incisional hernia, Obesity, Prolene mesh.

### Introduction

A hernia is a protrusion of a viscus or part of a viscus through an abnormal opening in the wall of its containing cavity. An incisional hernia is a hernia that occurs through a previously made incision in the abdominal wall. 1-2% patients present with incisional hernia following various abdominal surgery at various stages. It usually starts as a symptomless partial disruption of the deeper layer during the immediate or early post-operative period, the event passing unnoticed if skin wound repair intact after the skin sutures have been removed. Incisional hernia can develop and enlarge months or years after surgery, but they are most likely to happen 3-6 months after surgery.<sup>1</sup> These patients need surgical intervention to prevent complications. The treatment of choice is Herniotomy & Hernioplasty under anaesthesia after proper evaluation.

Etiology and pathogenesis:

Risk factors:

1) Patient factors:

Obesity.

Protein energy malnutrition.

Immuno-suppression (DM & HIV Patients, Malignancy patients receiving Chemo & or Radiotherapy & steroid therapy.)

Chronic cough.

Heavy weight lifting.

Malignancy.

2) Wound factors:

Poor quality tissue.

Deep wound infection.

3) Surgical factors:

Inappropriate suture materials, Incorrect placement of suture.

The Clinical classification is as flows:

- Occult - not detectable clinically; may cause severe pain
- Reducible - a swelling which appears and disappears
- Irreducible - a swelling which cannot be replaced in the abdomen, high risk of complications
- Strangulated - painful swelling with vascular compromise, requires urgent surgery
- Infarcted - when contents of the hernia have become gangrenous, high mortality

#### Herniotomy & Hernioplasty

Whatever the reason and stage of hernia, herniotomy following identification of the sac, separation and reduction of the contents is to be done. Hernioplasty using mesh is to be done to reduce the recurrence<sup>3</sup>.

#### Types of Mesh

Inorganic (synthetic) Prolene mesh, combined polyglycolic acid & Prolene mesh and relatively temporary TIGR matrix mesh<sup>5</sup>. Biological (Biomesh-organic biomaterial eg, bovine/porcine dermis or small bowel)<sup>6</sup>. Among the different variety of mesh, prolene mesh is relatively inexpensive, easily available and better tolerated.

**Objective:** Evaluation of patients presenting with incisional hernia & also to observe the hazards of hernioplasty.

**Material and Method:** It is a retrospective study carried out in Surgery dept. at unit-I, DNMCH from June 2011 to May 2016 among the admitted patients, who underwent surgical repair in this hospital. Most of the patients are from middle & lower middle class family.

#### Results

In this study, 34 women (n=34) is included of various age ranging from 26 to 65( mean age-37.32) yrs. They had variable primary surgery.

#### Table-I: Primary surgery.

Type of surgery	No. of patient	%
Lower abdominal surgery including LUCS & Hysterectomy.	31 (LUCS 25 & TAH 6)	91.18
Post-trauma repair surgery.	1	2.94
Umbilical port hernia following laparoscopic surgery.	2	5.88

#### Table-II: Etiological factors.

	No. of patient	%
Obesity/ morbid obesity	28	82.35
Diabetes mellitus	4	11.76
Chronic asthma	2	5.88
Wound infection	6	17.65

#### Table-III: Type of Hernia.

	No. of patient	%
Irreducible	32	94.12
Reducible	2	5.88

After proper evaluation, hernioplasty was done using prolene mesh in all 34 patient.

#### Table-IV: Results of Hernioplasty.

Complications	No. of patient	%
Seroma	20	58.82
Mesh rejection	1	2.94

None of the patient of this series developed surgical site infection, hematoma or other complications of surgery. Average hospital stay is 6 days but follow-up continued for upto 8 wks.

#### Discussion

Observing the history and clinical examination of incisional hernia, it may be concluded that most of the hernia follows all three factors (patient, wound & surgical factors). A surgical scar, even with perfect healing, has only 70% of the initial muscle strength. This loss of strength can result in hernia in 10% surgical incisions. Laparoscopic port hernia is 1%.<sup>3</sup> Poor tissue quality in obese patients eventually results in incisional hernia. Lack of awareness and delayed presentation increases the incidence of irreducible hernia.<sup>3</sup> Regarding post operative seroma, Prolene was used in all patients considering its property, cost & availability.

#### Conclusion

Patient selection combined with proper surgical technique & wound care may improve this clinical condition.

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## Original Article

# Pulmonary Rehabilitation on Small Airways Function in COPD Patients

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## Abstract

**Background:** The importance of pulmonary rehabilitation (PR) is known to be therapeutically useful for COPD patients.

**Objective:** To evaluate the effects of PR program of pursed lip breathing (PLB) and diaphragmatic breathing (DB) on FEF<sub>25-75%</sub> and FEF<sub>50%</sub> in male patients with moderate stable COPD.

**Methods:** This prospective study was conducted in the Department of Physiology, BSMMU, Dhaka from July 2010 to June 2011 on 116 male stable moderate COPD patients aged 50 to 65 years. They were enrolled from the outpatient department (OPD) of the Department of Medicine of BSMMU and NIDCH Dhaka. All the patients were grouped as control (56 patients without PR) and experimental (60 patients with PR). The experimental patients were advised to perform the PR program for 30 minutes duration per session at home twice daily, for consecutive 60 days along with the standard drug treatment of COPD. The control patients were advised to continue their standard drug treatment alone for consecutive 60 days. For the assessment of small airways function status, FEF<sub>25-75%</sub> and FEF<sub>50%</sub> were recorded of all the subjects on day 0 and day 60 for both the groups by a portable digital MicroDL Spirometer and the statistical analysis was done by independent sample 't' test and paired Student's 't' test.

**Results:** Significant improvement were observed in FEF<sub>25-75%</sub> and FEF<sub>50%</sub> in patients who performed PR program.

**Conclusion:** The study concludes the improvement of small airways function with this sort of combination of PR program in stable COPD patients.

**Key words:** Pulmonary rehabilitation, COPD, Spirometry, FEF<sub>25-75%</sub>, FEF<sub>50%</sub>

## Introduction

Chronic Obstructive Pulmonary Disease (COPD) is one of the major causes of chronic morbidity and mortality throughout the world.<sup>1</sup> It is the fourth leading cause of death in adults of United States and also projected to be the third by 2020.<sup>2</sup> According to Global Initiative for Chronic Obstructive Lung Disease COPD is a preventable and treatable disease. However, once developed this disease along with its comorbidities can not be cured, though its progression and morbidity can be reduced.<sup>1</sup>

The pulmonary component of COPD is characterized by airflow limitation caused by a mixture of small airways disease (obstructive bronchiolitis) and parenchymal destruction (emphysema). In addition, chronic inflammation causes structural changes and narrowing of

the small airways with subsequent decrement in ventilation.<sup>1</sup>

Spirometry has been suggested as the method of assessing lung function by measuring the volume of air that a person can expel from the lungs after a maximal inspiration.<sup>3</sup> Again, GOLD (2008) stated that spirometry is the best way of making a definitive diagnosis of COPD.<sup>1</sup> Although spirometry does not fully capture the impact of COPD on a patient's health, it remains the gold standard for diagnosing the disease and monitoring its progression.<sup>1</sup> It has also been proposed as the best standardized, most reproducible and most objective measurement within the available maneuver for any airflow limitation.<sup>1</sup> It has been suggested by different investigators abroad that, the ventilatory function of the lung such as FEF<sub>25-75%</sub> and FEF<sub>50%</sub> can be assessed by spirometry.<sup>4</sup>

PR is an evidence-based, multidisciplinary and comprehensive intervention for patients with chronic respiratory diseases who are symptomatic and often have decreased daily life activities.<sup>5</sup> According to GOLD standard, PR aims to reduce the symptoms, to improve quality of life, and to increase the physical and emotional participation of COPD patients in everyday activities.<sup>1</sup> The minimum length of an effective rehabilitation program has been suggested as 6 (six) weeks.<sup>1</sup>

Medicines might have a limited role in improving these ventilatory variables in COPD patients. Breathing exercises (pursed lip breathing and diaphragmatic breathing) as component of PR have been found to improve ventilatory variables. Home based PR has been advocated to patients for its various advantages.<sup>6</sup>

In different prospective studies abroad improvement in FEF<sub>25-75%</sub> and FEF<sub>50%</sub> were found by different investigators in patients with stable COPD both before and after administration of different components of PR program such as breathing strategies.<sup>7</sup>

However, with the best of our knowledge no study has yet been done in Bangladesh to observe the effects of combination of more than one component of PR program on small airways function in stable COPD patients. Therefore, on the basis of this background, the present study has been designed to evaluate the effects of PR program such as PLB and DB on small airways function in male patients with moderate stable COPD.

#### Methods

This prospective study with exercise intervention was carried out in the Department of Physiology, Bangabandhu Sheikh Mujib Medical University (BSMMU), Shahbag, Dhaka from July 2010 to June 2011. The study protocol was approved by Ethical Review Committee (ERC) of BSMMU. A total number of 116 male stable (without any exacerbation for last 4 weeks<sup>8</sup>) moderate COPD (Postbronchodilator FEV<sub>1</sub>/FVC < 0.70 and FEV<sub>1</sub> < 80% but ≥ 50% of predicted<sup>1</sup>) patients aged 50 to 65 years were selected from the Medicine OPD (Respiratory medicine unit) of BSMMU and the Department of Medicine of National Institute of Diseases of the Chest and Hospital (NIDCH) Mohakhali, Dhaka by systematic random sampling. 56 patients without PR served as control and 60 patients with PR served as experimental. They were assessed on day 0 and on day 60. Subjects with the history of bronchial asthma,

bronchiectasis, respiratory failure, pneumothorax, pleural effusion, pulmonary tuberculosis, pulmonary fibrosis, pneumonectomy or pulmonary lobectomy etc<sup>9</sup> any cardiovascular diseases<sup>9</sup>, diabetes mellitus (Fasting plasma glucose >7 mmol/dl<sup>10</sup>), irritable bowel syndrome<sup>11</sup>, SLE<sup>12</sup>, systemic hypertension (SBP ≥ 140 and DBP ≥ 90 mm of Hg<sup>13</sup>), any malignancy or renal disease (Serum creatinine >1.36 mg/dl<sup>14</sup>), were excluded from the study. PR program included PLB and DB for 30 minutes duration per session and were performed at home twice daily, for consecutive 60 days along with the standard drug treatment of COPD. In the technique of PLB, patients inhaled through the nose with mouth closed, and then exhaled through mouth with lips pursed tightly.<sup>6</sup> The exhalation was twice as long as the inhalation. In the technique of DB, the patients were asked to exhale slowly through pursed lips while drawing the abdomen inward, and inhale slowly through the nose so that the abdomen would expand outward.<sup>6</sup>

After selection, all the patients were thoroughly informed about the aims, objectives and procedure of the study and were encouraged for their voluntary participation. Then an informed written consent was taken from each subject. A detail personal, medical, family, socioeconomic, occupational and drug history were recorded in a preformed data schedule and thorough physical examinations were done and documented. For the assessment of small airways function status, FEF<sub>25-75%</sub> and FEF<sub>50%</sub> of all subjects were recorded by a portable digital MicroDL Spirometer. FEF<sub>25-75%</sub> and FEF<sub>50%</sub> were measured in both the groups, on the first day of the study and also at 60<sup>th</sup> days. Data were expressed as mean ± SD of percentage of the predicted value (% PV) and were statistically analyzed by SPSS (Version 16.0) using independent sample 't' test and paired student's 't' test, as applicable. In the interpretation of results, p<0.05 was accepted, as level of significance.

#### Results

All of the participants were similar in respect of age, height, duration of COPD, duration of smoking, socioeconomic status and occupation. (Table I)

After 60 days follow up, mean FEF<sub>25-75%</sub> and FEF<sub>50%</sub> were decreased in the group without PR and increased in the group with PR but the increment was statistically significant and the decrement of mean FEF<sub>25-75%</sub> in the group without PR was statistically significant. (Table II)

**Table I: Socio demographic characteristics of different groups (n=116)**

Parameters	COPD patient without PR (n=56)	COPD patient with PR (n=60)
Age (years)	58.91±4.05 (50-65)	58.58±4.12 (50-65)
Height (meters)	1.655±0.03 (1.58-1.72)	1.651±0.03 (1.57-1.71)
Duration of COPD (years)	3.04±1.12 (0.5-5)	3.41±1.22 (1-5)
Duration of smoking (pack years)	15.41±4.16 (11-25)	16.80±4.38 (11-25)
Socioeconomic status (score)	1.63±0.78 (1-4)	1.88±0.83 (1-4)
Occupation (score)	2.04±1.06 (1-4)	2.37±1.06 (1-4)

Data were expressed as mean±SD. Figures in parentheses indicate ranges. Statistical analysis was done with independent sample 't' test and Chi-square test (<sup>2</sup>).

**Table II: FEF<sub>25-75%</sub> and FEF<sub>50%</sub> in different groups with different duration (n=116)**

Parameters	COPD patient without PR (n=56)		COPD patient with PR (n=60)	
FEF <sub>25-75%</sub>	23.84±5.19 (16-37)	22.93±5.11# (17-36)	22.87±6.46 (16-37)	24.83±6.71### (17-40)
FEF <sub>50%</sub>	25.20±6.02 (17-41)	24.80±6.33 (17-40)	23.67±6.24 (15-38)	25.22±7.06## (16-40)

Data were expressed as mean±SD of % of PV. Statistical analysis was done by unpaired and paired student's 't' test. #: Day 0 vs Day 60 (#: p<0.05; ##: p<0.01; ###: p<0.001).

#### Discussion:

The present study shows significant improvement of FEF<sub>25-75%</sub> and FEF<sub>50%</sub> in pulmonary rehabilitated COPD patients after 60 days of follow up. Similar observation were reported by several investigators.<sup>7</sup> On the other hand, FEF<sub>25-75%</sub> and FEF<sub>50%</sub> were decreased in both the groups without PR but the decrement of FEF<sub>25-75%</sub> was statistically significant. However, no similar observation was available for comparison.

From our study, the exact mechanisms of the benefit of PR program on ventilatory functions in stable COPD patients could not be elucidated. It has been suggested

that long standing alveolar hypoventilation and dyspnea in the COPD patients may cause increased work of breathing, hypoxia induced decreased ATP production and increased energy expenditure followed by negative nitrogen balance may cause decreased protein synthesis, which might be an important contributory factor for the genesis of respiratory muscle wasting.<sup>15-17</sup> On the other hand, expiratory airflow limitation due to decrease elastic fibres in the alveolar walls and airways have also been suggested as an important contributory factor for lung hyperinflation in this group of patients. As a consequence, there may be increase in inspiratory airflow resistance followed by derangement of ventilatory variables.<sup>18,19</sup> In addition, the decrement in elastic fibres in the chest wall may also produces chest wall deformity and mechanical derangement in ventilation in COPD patients to cause additional obstacle for ventilation.<sup>9</sup> All of these above mentioned factors might be the cause of decrement in overall skeletal muscle mass in the stable COPD patients of our study which may produce their respiratory dysfunction and alteration in the ventilatory variables.

The first component of PR program that is, regular PLB has been suggested to decrease the amount of the trapped air in the lungs followed by decreased work of breathing<sup>20</sup> as well as relief of dyspnea<sup>20,21</sup> and increase in SpO<sub>2</sub>.<sup>22</sup> Moreover, regular DB (another important component of PR program) along with PLB have also been proposed to be a cause of strengthening of the diaphragm and abdominal muscles followed by decrement in energy utilization for breathing.<sup>23</sup> As a consequence, coordinated movement of the diaphragm during respiration may produce improvement of the ventilatory variables (FEF<sub>25-75%</sub> and FEF<sub>50%</sub>) in this study.

#### Conclusion

From this study, it may be concluded that small airways function were improved after regular PR program in male patients with moderate stable COPD.

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## Original Article

# Antimicrobial Susceptibility Pattern and Extended Spectrum $\beta$ Lactamase Production among Uropathogenic *Escherichia coli* in a Teaching Hospital in Bangladesh.

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### Abstract

**Background & Aims:** A major portion of urinary tract infections are caused by *Escherichia coli*. It has been found that these organisms are being increasingly resistant to broad spectrum  $\beta$ -lactam antibiotics mediated by extended Spectrum  $\beta$ -lactamase (ESBL) enzymes. The present study was undertaken to determine the antimicrobial susceptibility pattern and the incidence of ESBL production among *Escherichia coli* strains isolated from urine.

**Materials & Methods:** Urine specimens from patients were subjected to culture as per Clinical Laboratory Standard Institute (CLSI) guidelines. All specimens were inoculated on to Blood agar and MacConkey agar plates and growth showing significant bacteriuria ( $>10^5$  colony/ml of urine) were further identified by the standard biochemical procedures. Detection of ESBL production by isolated *E. coli* strains was done by Double Disc Synergy Test which is a phenotypic confirmatory test for ESBL production. Antibiotic susceptibility testing of isolates was also done as per CLSI guidelines. The study was conducted from 1st January, 2014 to 30th June, 2015.

**Result:** A total of 377 *E. coli* strains were isolated of which 165 (44%) isolates were ESBL producers. Susceptibility pattern of isolates to Ceftriaxone, Cefotaxime, Cefixime and Ciprofloxacin was not satisfactory. More than 80% sensitivity was found only to Imipenem (96%), Nitrofurantoin (91%) and Amikacin (89%).

**Conclusion:** The presence of ESBL carries tremendous clinical significance. As the ESBLs are frequently plasmid encoded & same plasmid can carry genes encoding resistance to other antibiotic group, thus extremely limiting the antibiotic treatment option.

### Introduction

Drug resistant bacteria are emerging world wide as a threat to treatment of common infections in community and hospital setting. Urinary tract infection is common in both community and hospitalized patients and in most of the cases is caused by *E. coli*. Also *E. coli* are well known to produce multidrug resistance. Extended spectrum  $\beta$ -lactamase (ESBL) production is perhaps the most important cause of resistance to many antibiotics especially to Penicillin & Cephalosporins<sup>1</sup>. ESBL is the enzyme that cause increased hydrolysis of the  $\beta$ -lactam drugs like Penicillins and Cephalosporins, including oxyimino- $\beta$ -lactam compounds (Cefuroxime, third- and fourth-generation Cephalosporins and Aztreonam). These enzymes have been identified in large number in various *E. coli* strains. The first ESBL-producing strains were identified in 1983 in Germany, and since then a large number of outbreaks of infection due to ESBL producing organisms have been described worldwide.<sup>2, 3, 4, 5, 6</sup> Most

ESBLs belong to the Ambler class A of  $\beta$ -lactamases and are inhibited by  $\beta$ -lactamase inhibitors (Clavulanate, Sulbactam and Tazobactam).<sup>7</sup> These  $\beta$ -lactamases are encoded by genes that can be exchanged between bacteria.<sup>8</sup> As the  $\beta$ -lactam drugs are the most common treatment for bacterial infections, so persistent exposure of bacterial strains to a number of  $\beta$ -lactams has induced continuous production & mutation in  $\beta$ -lactamases. As a result there is an expansion of activity of  $\beta$ -lactamases even against the newer  $\beta$ -lactam drugs. ESBL strains have been associated with resistance to other non  $\beta$ -lactam drugs like Aminoglycosides and Chloramphenicol.<sup>8</sup> This leads to increased patient mortality and morbidity when antibiotics inactive against ESBL producing organisms are used. Also ESBL producing organisms are threat to infection control and there is a potential for transfer of such organism to other patients. So control of outbreak of infection by ESBL producing organisms is very important. For this

detection of ESBL producing organisms from clinical samples like urine is essential.<sup>8</sup> The present study was therefore conducted with a view to find out the occurrence of ESBL producing *E. coli* in urine and at the same time to see the antimicrobial susceptibility profile of isolated *E. coli* to formulate effective antibiotic strategy and to plan a proper hospital infection control policy to prevent the spread of these strains.

#### Materials:

This prospective observational study was carried out in the Department of Microbiology, Dhaka National Medical College, Dhaka. Urine samples from all patients (indoor & outdoor) with suspected urinary tract infection were evaluated from 1<sup>st</sup> January 2014 to 30<sup>th</sup> June 2015. Early morning mid stream urine specimens were collected aseptically in pre-sterile dried containers from all patients. Urine were cultured on Mac Conkey agar and Blood agar media. The plates were incubated overnight at 37°C. *E. coli* isolates with significant bacteruria (>10<sup>5</sup> colony/ml of urine) were identified based on standard laboratory procedures; namely colony morphology, gram staining, motility, biochemical tests.<sup>9</sup>

**Antimicrobial susceptibility testing:** Antimicrobial susceptibility testing of the isolates was carried out using various antimicrobial disks

(shown in table I) by Kirby-Bauer disk diffusion method.<sup>10</sup> Inoculum of 0.5 McFarland standards turbidity was prepared in a nutrient broth from isolated colony of *E. coli* selected from 18-24 hour agar plates. Within 15 minutes, a sterile cotton swab was dipped into the inoculum suspension. The swab was rotated several times and pressed firmly against the inside wall of the tube above the fluid level and inoculated on the dried surface of Mueller - Hinton agar plate by streaking the swab over it. For even distribution of the inoculum, the swab was streaked two more times at 60° angle over the surface. After 3-5 minutes antibiotic disks were applied and pressed down to ensure complete contact with agar surface. The disks were distributed evenly to ensure a minimum distance of 24 mm from centre to centre. The plates were then inverted and incubated aerobically at 37°C within 15 minutes. The diameter of zone of inhibition for

**Table I: Antimicrobial disc used & their zone diameter interpretative for *E. coli***

Antimicrobial disc	Disc potency	S	I	R
Imipenem	10µg	≥23	20-22	≤19
Amikacin	30µg	≥17	15-16	≤14
Gentamicin	10µg	≥15	13-14	≤12

Antimicrobial disc	Disc potency	S mm	I mm	R mm
Nitrofurantoin	50µg	≥17	15-16	≤14
Nalidixic Acid	30µg	≥19	14-18	≤13
Ciprofloxacin	1µg	≥21	16-20	≤15
Cephadrine	30µg	-	-	-
Ceftazidime	30µg	≥21	18-20	≤17
Ceftriaxone	30µg	≥23	20-22	≤19
Cefuroxime	30µg	>20	17-19	<16
Cefixime	5µg	≥21	18-20	≤17
Trimethoprim-Sulphamethoxazole	25µg	≥16	11-15	≤10
Doxycycline	30µg	≥16	13-15	≤12

**Note:** S= Sensitive, I= Intermediate, R= Resistant individual antimicrobial agent was measured in millimeter with the help of a ruler and described as sensitive, intermediate & resistant according to CLSI 2012 guideline.<sup>11</sup>

**Detection of ESBL:** All *E. coli* isolates were tested for ESBL production by Double Disk Synergy test (DDST), which is a phenotypic confirmatory test of ESBL production. For this, a lawn culture of isolated bacteria was made on Mueller- Hinton Agar and disks containing 30 µg Ceftriaxone and 30 µg Ceftazidime were placed with a disk of Amoxicillin-Clavulanic acid (20 µg /10 µg) in between. The distance between the disks was 20mm centre-to-centre. The plate was incubated overnight. A clear extension of the edge of any Cephalosporin inhibition zone toward the disk containing Clavulanic acid was interpreted as synergy, indicating the presence of ESBL.<sup>11</sup>

#### Result:

Among all the isolates producing significant bacteruria from urine, 377 were *E. coli* (Table:II). Among them 165 (44%) isolates were ESBL producer. 58% of *E. coli* isolated from indoor specimens & 37% from outdoor specimens were ESBL producers (Table:III). Sensitivity of isolated *E. coli* to Imipenem (96%), Nitrofurantoin (91%) and Amikacin (89%) was very good. But sensitivity to 3<sup>rd</sup> generation cephalosporin was between 37% to 51% which is quite low. Even only 49% isolates were sensitive to Ciprofloxacin. Better sensitivity was observed to Gentamicin (77%) (Table: IV).

**Table II: Distribution of *E. coli* isolated from urine**

	No. of urine specimen N	Culture positive specimen n (% of N)	<i>E. coli</i> isolated n1(% of n)
Indoor	688	241(35)	120 (50)
outdoor	1870	549 (29)	257 (47)
<b>Total</b>	<b>2558</b>	<b>790 (31)</b>	<b>377 (48)</b>

**Table III: ESBL pattern of *E.coli* isolated from urine**

	ESBL producer n(%)	Non ESBL producer n(%)
Indoor	70 (58)	50 (42)
Outdoor	95 (37)	162 (63)
<b>Total</b>	<b>165 (44)</b>	<b>212 (56)</b>

**Table IV: Antimicrobial susceptibility of isolated *E.coli***

Antimicrobial agents	Sensitive n (%)	Resistant n (%)
Imipenem	361 (96)	16 (4)
Amikacin	335 (89)	42 (11)
Gentamicin	290 (77)	87 (23)
Nitrofurantoin	343 (91)	34 (9)
Nalidixic Acid	79 (21)	298 (79)
Ciprofloxacin	184 (49)	193 (51)
Cephadrine	33 (9)	344(91)
Ceftazidime	139 (37)	238 (63)
Ceftriaxone	192 (51)	185 (49)
Cefuroxime	49 (13)	328 (87)
Cefixime	143 (38)	234 (62)
Trimethoprim-		
Sulphamethoxazole	56 (15)	321(85)
Doxycycline	177 (47)	200 (53)

**Discussion**

The discovery and development of antibiotics was one of the greatest advances of modern medicine. But antibiotic resistant bacteria has emerged as a threat to this advancement. In this study an attempt was made to understand the antimicrobial sensitivity pattern and epidemiology of ESBL production of *E.coli* isolates in urine. The present study was based on laboratory findings and includes both indoor and outdoor patients. All the isolated *E.coli* were tested for ESBL production and antimicrobial sensitivity pattern. Highest sensitivity was found to Imipenem (96%). Nitrofurantoin (91%) and Amikacin (89%). Near about similar sensitivity was found in various studies.<sup>3,12,13</sup> Nitrofurantoin is a widely available antibiotic which can be administered orally and is very effective in uncomplicated LUTI. Resistance to Nitrofurantoin is rarely reported among *E.coli* though a study in India reports 34% resistant *E.coli* isolates.<sup>1</sup> In the present study a low sensitivity was observed with 3<sup>rd</sup> generation Cephalosporins

(Ceftazidime 37%, Ceftriaxone 51% & Cefixime 38%). A study in India showed 33% of their isolated *E.coli* were sensitive to Ceftazidime and Ceftriaxone.<sup>1</sup> Conventionally ESBL producers are also multidrug

resistant organisms. They are usually less sensitive to  $\beta$ -lactams as well as to other classes of antimicrobials including Trimethoprim-Sulfamethoxazole, Fluroquinolones and Aminoglycosides as all these resistant encoding genes share same plasmid.<sup>8</sup> In our study we found that 49% and only 15% of *E.coli* strains were sensitive to Ciprofloxacin and Trimethoprim-Sulfamethoxazole respectively. But moderate degree of sensitivity was found to Gentamicin (77%). High level of resistance to Ciprofloxacin and Trimethoprim-Sulfamethoxazole has been reported in other studies.<sup>3,14,15</sup> Bamford et al who studied antimicrobial susceptibility pattern of uropathogenic *E.coli* from the year 2007 to 2011 demonstrated a significant decline in sensitivity to fluroquinolones, while sensitivity to Amikacin and Gentamicin remained significantly high.<sup>16</sup>

In the present study out of 377 *E.coli* isolates, 165 (44%) were ESBL producers. It varies from country to country & from time to time. A previous study in Bangladesh shows 54% of uropathogenic *E. coli* were ESBL producer<sup>2</sup>. In studies from India<sup>1</sup> & Nepal<sup>16</sup> it was 54.67% & 13.51% respectively. ESBL production by *E.coli* is important due to the fact that they are normal flora of intestine and can transfer this ESBL gene to other bacteria by plasmid, so serve as reservoir of infection. In our study, prevalence of ESBL among indoor patients and outdoor patients was 58% and 37% respectively. A study from India also show more ESBL producing *E.coli* in indoor patients.<sup>1</sup> This result means that ESBL is also common in community which proves the assertion of Pitout et al that they are as much a problem in community as in hospital.<sup>17</sup> ESBL production by organisms restricts the use of  $\beta$ -lactam drugs which have got an extended spectrum of activity against Gram negative bacteria and have low toxicity. Various studies have reported about emergence of CTX-M type of  $\beta$ -lactamases among the uropathogens, the occurrence of which is linked to prior antibiotic therapy within one month preceding the current episode.<sup>18</sup> Also in conditions like pregnancy where the choice of antimicrobials is limited to  $\beta$ -lactams like Ampicillin & Cephalosporins, infections due to ESBL strains make the treatment difficult.<sup>13</sup> This study along with various other studies<sup>13,14,15</sup> indicate a widely prevalent MDR pattern of ESBL producing organisms to commonly used antibiotics & an urgent need to reconsider antibiotic prescribing pattern. Good infection control practice & proper antibiotic management are main factors to prevent the outbreak of infection by ESBL producing organisms. Educational programs to increase awareness among medical staffs should also be developed.

As antibiotic susceptibility pattern of organisms and prevalence of ESBL production among them differ geographically, so such institutional studies will help in formulation of antibiotic policy for a particular geographical area.<sup>19</sup>

**Conclusion:**

ESBLs have evolved greatly over the last several years. Their presence along with the plasmid mediated Quinolone and Aminoglycoside resistance will create significant therapeutic problems in future. So it will be very difficult to control infection by such multi-resistant organisms. Therefore, enhanced infection control coupled with appropriate antibiotic management for infections should be practiced to limit the spread of ESBL producing organisms.

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**Original Article**

## **Effects of Calcium Acetate Versus Calcium Carbonate As Oral Phosphate Binder in CKD Patients**

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### **Summary/Abstract**

Hyperphosphatemia and secondary hyperparathyroidism are common complication of CKD lead to significant morbidity.

Dietary restriction of phosphorus is limited by the need to provide adequate protein, estimated at roughly 1.0-1.2g protein per kg body weight in most ambulatory patients<sup>4</sup>. Therefore, most of the patient with CKD require an Exogenous Phosphate binder to prevent hyperphosphatemia.

68 patients of CKD (III - V) not on renal replacement therapy were prospectively evaluated in the department of Nephrology, SSMCH & MH, and Dhaka from Jan 2010 - Dec 2011 to see the effect of calcium acetate & Calcium Carbonate as phosphate binder.

Patients were subdivided into two equal groups, Group A (received calcium acetate, 667 mg BD) Group B (received calcium carbonate, 1250 mg BD). Both the group were matched for age, sex, BMI & renal function.

All patients were withdrawn from any phosphate binder and calcitriol 2 weeks ago & restricted to high protein (0.8 gm/day) & phosphate containing diet.

After a wash out period, group A had taken calcium acetate and group B had taken calcium carbonate. All the biochemical parameters (S. PO<sub>4</sub><sup>-</sup>, S. Ca<sup>++</sup>, S. Creatinine & iPTH) were estimated at 0 month, 1<sup>st</sup> month, 2<sup>nd</sup> month & 3<sup>rd</sup> month.

One month after intervention showed that serum calcium and serum phosphate were significantly reduced in acetate group than those in calcium carbonate group (P=0.03 & P= 0.01).

2<sup>nd</sup> month after intervention calcium acetate group showed significant reduction of calcium in comparison to calcium carbonate group (P<0.001) & serum phosphate of calcium acetate group decreased further & its difference with calcium carbonate group was significant (P=0.001).

At the end of 3<sup>rd</sup> month calcium acetate group shows a considerable reduction of serum calcium as such there was significant difference between the groups with respect to the variables (P<0.001). Serum phosphate of calcium acetate group also decreases faster causing a much wider difference with that of calcium carbonate group (P=0.005).

After end of the study iPTH decreased proportionately in both groups & serum creatinine was not significantly in either group.

### **Introduction**

CKD is defined as either Kidney damage or glomerular filtration rate (GFR) <60 ml/min/1.73 m<sup>2</sup> for >3 months. Kidney damage is defined as pathological abnormalities or markers of damage including abnormalities in blood or urine test or imaging studies.

Hyperphosphatemia and secondary hyperparathyroidism are common complication of CKD<sup>4</sup> which can lead to significant morbidity because of pain, bone loss,

increased risk of fracture, anaemia, HTN, atherosclerosis vascular disease, pruritus and sexual dysfunction.<sup>3</sup> Dietary phosphate restriction is limited by the need to provide adequate daily protein intake to maintain neural nitrogen balance 4). Therefore, most patients with advanced CKD or ESRD require an exogenous phosphate binder to prevent hyperphosphatemia.

Calcium salts (Usually calcium carbonate/calcium acetate) have become the treatment of choice for

hyperphosphatemia, although provision of calcium can lead to hypercalcaemia and increased risk of metastatic calcification, particularly among patients on Vit-D replacement.<sup>4</sup>

1989 Sheik et al first demonstrated the superior efficacy of calcium acetate over calcium carbonate as an intestinal phosphate binder<sup>7</sup>; they also showed theoretical as well as experimental evidence of reduced calcium absorption with the acetate salt, offering hope for greatly improved phosphate control.

### Subjects and Methods

This clinical trial was performed in the department of Nephrology, SSMCH, Dhaka and investigation were carried out in laboratory, department of SSMC over a period of Jan 2010 to Dec 2011.

Total 68 patients were equally distributed into two groups using a random allocation procedure, one marked with A (for Calcium acetate) & another with B (for Calcium Carbonate).

The daily dose of calcium acetate was 667 mg tab (containing 169 mg of elemental calcium) twice daily after taking meal, while the dose of calcium carbonate was 1250 mg tab (containing 500 mg of elemental calcium) twice daily orally after taking meal.

All patients were withdrawn from a phosphate binder and calcitriol for at least two weeks ago and restricted to high protein (0.8 gm/kg) and phosphate containing drug.

After a washout period of two weeks baseline biochemical markers (S.PO<sub>4</sub><sup>-</sup>, S.Ca<sup>++</sup>, S.Creatinine & iPTH) was measured and then group "A" had taken calcium acetate and group "B" had taken calcium carbonate for 3 months.

Biochemical markers (S.PO<sub>4</sub><sup>-</sup>, S.Ca<sup>++</sup>, S.Creatinine & iPTH) was measured in one month interval for 3 months.

### Statistical Method

Data were processed and analyzed using soft SPSS version 11.5. The test statistics used to analyses the data were Chi-square (X<sup>2</sup>) or fisher exact probability and student's t test.

### Results

Mean age of the patients in calcium acetate group was 54.09 ± 9.66 and in calcium carbonate group 53.37 ± 10.42, mean weight was in kg 62.30(± 3.55) in calcium acetate group and 58.20(± 5.96) in calcium carbonate group, mean height (m.) was 1.69(± 0.2) in calcium acetate group and 1.65(± 0.25) in calcium carbonate,

BMI in calcium acetate group were 21.78(± 1.95) and 21.32(± 2.22) were in calcium carbonate group.

In the study patients, the baseline level of biochemical variables like S. Calcium, S.Phosphate, S. iPTH & S. Creatinine were almost identical between groups (8.7 ± 1.07 Vs 8.9 ± 0.92 mg/dl, P=0.27, 3.8 ± 1.1 Vs 4.3 ± 1.1 mg/dl, P=0.10, 234.50 ± 42.5 Vs 205 ± 36.2 pg/ml, P = 0.65 & 3.6 ± 1.8 Vs 3.7 ± 2.0 mg/dl P = 0.90 respectively). (Table II)

One month after interventions changes in biochemical variables showed that calcium acetate group responded well than calcium carbonate group with respect to S.Calcium and S.Phosphate (8.5 ± 1.2 Vs 8.9 ± 0.7 mg/dl, P=0.03; 3.5 ± 0.8 Vs 4.1 ± 0.9 mg/dl, P = 0.01). iPTH & S.Creatinine also reduced in both groups but no significant intergroup difference was observed (188.1 ± 35.5 Vs 164 ± 28.4 pg/dl, P = 0.41 and 3.49 ± 1.6 Vs 3.35 ± 1.6 mg/dl, P = 0.52 respectively). (Table III)

Two months after intervention there was significant difference between the group with respect to S.Calcium (8.5 ± 0.97 Vs 9.10 ± 0.38 mg/dl, P =<0.001).

S.PO<sub>4</sub> of calcium acetate group decreased further and its difference with Calcium carbonate group was also significant (3.27 ± 0.69 Vs 4.21 ± 1.38 mg/dl, P = 0.001). But there was no significant difference between groups with respect to S.iPTH & S. Calcium. (Table IV)

Three months after intervention of the variable S.Ca<sup>++</sup> were significantly lower in S.Calcium acetate group than calcium carbonate group (P=<0.001).S.PO<sub>4</sub> of calcium acetate group also decreases faster causing a much wider difference with that of calcium carbonate group(p=0.005) No Significant difference between calcium acetate and calcium carbonate group with respect to iPTH and S.Creatinine (P>0.05). (Table V)

**Table-1: Demographic characteristics of the study population**

Demographic Characteristics	Group		p-value
	Calcium acetate (Group A) (n=33) Mean ± SD	Calcium carbonate (Group B) (n=35) Mean ± SD	
Age in yrs	54.09 ± 9.66	53.37 ± 10.42	0.76
Weigh (kg)	62.30 (± 3.55)	58.20 (± 5.69)	0.005
Height (m.)	1.69 (± 0.2)	1.65 (± 0.25)	0.03
BMI(mean ± SD)	21.78 (± 1.95)	21.32 (± 2.22)	0.39

# Data were analyzed using Student's t-Test and were presented as mean ± SD

**Table-2: Comparison of baseline values between groups**

Baseline variables	Group		p-value
	Calcium acetate (Group A) (n=33)	Calcium carbonate (Group B) (n=35)	
Serum calcium (mg/dl)	8.7 ± 1.07	8.9 ± 0.92	0.27
Serum phosphate (mg/dl)	3.8 ± 1.1	4.3 ± 1.1	0.10
Intact serum PTH (pg/ml)	234.5 ± 42.5	205 ± 36.2	0.65
Serum creatinine (mg/dl)	3.6 ± 1.8	3.7 ± 2.0	0.90

**Table-3: Changes of biochemical variables 1 month after intervention**

Biochemical variables	Group		p-value
	Calcium acetate (Group A) (n=33)	Calcium carbonate (Group B) (n=35)	
Serum calcium (mg/dl)	8.5 ± 1.2	8.9 ± 0.7	0.03
Serum phosphate (mg/dl)	3.5 ± 0.8	4.1 ± 0.9	0.01
Intact serum PTH (pg/ml)	188.1 ± 35.5	164 ± 28.4	0.41
Serum creatinine (mg/dl)	3.49 ± 1.6	3.35 ± 1.6	0.52

# Data were analyzed using Student's t-Test and were presented as mean ± SD

**Table-6: Comparison of changes in serum calcium between the study groups**

Group	Mean Serum calcium (mg/dl)				p-value
	0 month	1 month	2 month	3 month	
Calcium Acetate	8.7 ± 1.07	8.5 ± 1.2	8.5 ± 0.97	8.6 ± 1.06	0.003
Calcium Carbonate	8.9 ± 0.92	8.9 ± 0.7	9.10 ± 0.38	9.45 ± 0.44	

# Data were analyzed using Repeated measure ANOVA statistics and 'p' refers to the overall difference between the groups in terms of changes in serum calcium from baseline to end point of study.

**Table-7: Comparison of changes in serum phosphate between the study groups**

Group	Mean Serum phosphate (mg/dl)				p-value
	0 month	1 month	2 month	3 month	
Calcium Acetate	3.8 ± 1.1	3.5 ± 0.8	3.27 ± 0.69	3.13 ± 1.31	< 0.001
Calcium Carbonate	4.3 ± 1.1	4.1 ± 0.9	4.21 ± 1.38	3.98 ± 0.67	

# Data were analyzed using Repeated measure ANOVA statistics and 'p' refers to the overall difference between the groups in terms of changes in serum calcium from baseline to end point of study.

**Table-4: Changes of biochemical variables 2 month after intervention**

Biochemical variables	Group		p-value
	Calcium acetate (Group A) (n=33)	Calcium carbonate (Group B) (n=35)	
Serum calcium (mg/dl)	8.5 ± 0.97	9.10 ± 0.38	< 0.001
Serum phosphate (mg/dl)	3.27 ± 0.69	4.21 ± 1.38	0.001
Intact serum PTH (pg/ml)	158.5 ± 30.9	153.9 ± 27.7	0.62
Serum creatinine (mg/dl)	3.69 ± 1.87	3.34 ± 1.70	0.25

# Data were analyzed using Student's t-Test and were presented as mean ± SD

#### Group Statistics

**Table-5: Changes of biochemical variables 3 month after intervention**

Biochemical variables	Group		p-value
	Calcium acetate (Group A) (n=33)	Calcium carbonate (Group B) (n=35)	
Serum calcium (mg/dl)	8.6 ± 1.06	9.45 ± 0.44	< 0.001
Serum phosphate (mg/dl)	3.13 ± 1.31	3.98 ± 0.67	0.005
Intact serum PTH (pg/ml)	128.1 ± 17.8	148 ± 36.2	0.64
Serum creatinine (mg/dl)	3.35 ± 1.00	3.48 ± 1.79	0.42

# Data were analyzed using Student's t-Test and were presented as mean ± SD

**Table-8: Comparison of changes in serum intact PTH between the study groups**

Group	Mean Serum PTH (pg/ml)				p-value
	0 month	1 month	2 month	3 month	
Calcium Acetate	234 ± 42.5	188.1 ± 35.5	158.5 ± 30.9	128.1 ± 17.8	< 0.001
Calcium Carbonate	205 ± 36.2	164 ± 28.4	153.9 ± 27.7	148 ± 36.2	

# Data were analyzed using **Repeated measure ANOVA statistics** and 'p' refers to the overall difference between the groups in terms of changes in serum calcium from baseline to end point of study.

**Table-9: Comparison of changes in serum creatinine between the study groups**

Group	Mean Serum creatinine (mg/dl)				p-value
	0 month	1 month	2 month	3 month	
Calcium Acetate	3.6 ± 1.8	3.49 ± 1.6	3.69 ± 1.87	3.35 ± 1.00	0.70
Calcium Carbonate	3.7 ± 2.0	3.35 ± 1.6	3.34 ± 1.70	3.48 ± 1.79	

# Data were analyzed using **Repeated measure ANOVA statistics** and 'p' refers to the overall difference between the groups in terms of changes in serum calcium from baseline to end point of study.

### Discussion

The present study was under taken to observe the effects of calcium acetate versus calcium carbonate on CKD patients as phosphate binder and also to see the effects of these two drugs on iPTH in CKD patients.

It is generally believed that calcium acetate is better tolerated, binds phosphate efficiently and causes less incidence of hypercalcaemia as compared to calcium carbonate.<sup>11</sup>

In the study of Angel L.M.de Francisco et.al(2010),mean age of calcium acetate was 59.2±13 and mean age of sevelamer HCL was 55.9±11.75. There was also no significant difference between age of the two groups (p=.64). In the same study, BMI of calcium acetate was 27.0±3.8, p=.88, that was nearer to present study.<sup>10</sup>

In present study serum phosphate level was adequately controlled with both salts. The advantage we observed that this control was achieved using only less than half the amount of elemental calcium with the acetate formulation.

In our study, we used calcium acetate 1.3 gm/day and calcium carbonate 2.5 gm/day without calcitriol. There was significant reduction of serum phosphate (3.13 Vs 3.98) and S.Calcium (8.6 Vs 9.45) in acetate group and significant increase in serum calcium in calcium carbonate group than acetate group.

One author<sup>1</sup> conducted a randomized cross-over study over 24 weeks, in 7 selected hemodialysis patients to compare calcium acetate with calcium carbonate. In acetate form, less elemental calcium was used but there was no difference in phosphate control and the incidence of hypercalcaemia was also similar between the two treatments.

Navaneethan & associates<sup>9</sup> noted that there was no significant difference in the serum phosphate level with calcium acetate in comparison to calcium carbonate.

At the end of present study, there was significantly higher decrease of Serum phosphate in calcium acetate group compared to calcium carbonate group (3.13 ± 1.31 Vs 3.98±0.67), p=.005 (Table VII) and calcium acetate group exhibited a considerable reduction of serum calcium (8.6±1.06 vs 9.45±.44) than that of calcium carbonate group and their difference was significant. (Table VI)

Borrego and Colleagues<sup>2</sup> compared the efficacy of calcium acetate and calcium carbonate as phosphate binder in 28 patients with CKD. The authors found that both drugs were similarly effective as phosphate binder in lowering phosphate level. Four fold greater dose of elemental calcium was used in calcium carbonate than acetate group and exhibited more hypercalcaemia in carbonate group<sup>2</sup>



IN another study, Ketteler et al showed that sevelamer carbonate is effective in controlling serum phosphorus in CKD patients.<sup>8</sup>

Pflanz et al (1994) performed a randomized cross-over study in 23 patients over 14 weeks. Equimolar doses of calcium acetate and calcium carbonate were used. Serum phosphate was significantly lower with calcium acetate (1.51 Vs 1.80 mmol/l) and iPTH was also lower with calcium acetate (17.8 Vs 25.4 pmol/l). But Serum calcium was significantly higher in the calcium acetate (2.4 Vs 2.32 mmol/l) group than the calcium carbonate group.<sup>6</sup>

Our study also showed that both the drugs were effective as phosphate binder but acetate was more effective than calcium carbonate group. At the end of third month's intervention, calcium carbonate group had significant higher calcium level (Table 7). This can be explained by the use of three fold higher elemental calcium in calcium carbonate group than the acetate group.

#### **Conclusion**

Based on the findings of the present study, conclusions of this study is calcium acetate is more effective and safer than calcium carbonate in controlling hyperphosphatemia in patients of chronic kidney diseases (stage 3,4&5) not on maintenance haemodialysis. Apart from its superior phosphate binding activities, it causes less hypercalcemia than calcium carbonate. Both the salts of calcium are equally effective in keeping intact serum PTH to recommended level for CKD patients. Neither of the two drugs was found to produce any more deleterious effect on renal function as evidenced by no change in serum creatinine level during three months treatment.

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## Original Article

# Serum Magnesium Profile in different grades of malnutrition

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### Abstract

**Background:** Magnesium is the second most common intracellular cation in the body and plays an essential role in numerous biochemical reactions in vivo. Although magnesium supplementation is a time-honored pillar of management of PEM, the data on serum magnesium profile in PEM are conflicting and meagre. This study aims at evaluation of magnesium status in different grades of PEM.

**Objective:** For better management of PEM patients, to evaluate the role of magnesium in pathophysiology of PEM.

**Methodology:** A prospective comparative study was conducted in Dhaka Shishu Hospital nutritional rehabilitation unit. Serum magnesium level was estimated of a total no. of 183 children, suffering from PEM.

**Result:** Serum magnesium level of well-nourished, mildly malnourished and moderately malnourished children were 1.99 meq/L, 2.14 meq/L and 2.14 meq/L respectively. Serum magnesium level of marasmus, kwashiorkor and marasmic kwashiorkor were 2.03 meq/L, 1.95 meq/L and 1.84 meq/L respectively.

**Conclusion:** Children suffering from oedematous malnutrition had lower serum magnesium status compared to non-oedematous malnutrition whereas magnesium status of non-oedematous malnutrition were comparable to the control group.

**Key words:** Protein-Energy malnutrition, serum magnesium profile.

### Introduction

Malnutrition, the silent emergency, is a crucial problem worldwide. Directly or indirectly, it is the main determinant of physical well-being of man, U-5 children of development countries are the most effected by the havoc of malnutrition.<sup>1</sup> The role of magnesium in pathogenesis and management of malnutrition is underscored. Magnesium is the second most common intracellular cation in the body (next only to potassium) and plays an essential role in numerous biochemical reaction in vivo.<sup>2</sup> It is involved in many enzymatic steps including synthesis of fatty acids and proteins, the glycolytic pathway, the formation of cAMP etc..<sup>3</sup> Magnesium depletion in PEM may remain asymptomatic or may produce symptoms such as tremors, athetoid movements, abdominal distension, seizure, psychomotor change etc..<sup>4</sup> Deficiency of magnesium is known to compromise primary and secondary immune responses.<sup>5</sup> Recently it has been demonstrated that hypomagnesemia may increase tissue susceptibility to lipid peroxidation, a process known to cause cellular injury which is main factor in pathogenesis of PEM.<sup>6</sup> Although magnesium supplementation is a timehonored pillar of management

of children with PEM, the data on serum magnesium levels in malnourished children are conflicting and meagre. Moreover such data in Bangladeshi children of different grades of malnutrition is not available. This study is aimed at evaluation of magnesium status of Bangladeshi children suffering from different grades of malnutrition.

### Patients and methods

This is a prospective comparative study conducted between 1<sup>st</sup> July 1997 to 31<sup>st</sup> December 1998 in Dhaka Shishu Hospital. About 1000 children are admitted every month in the hospital of which 50 are admitted in nutrition unit. Cases were selected randomly from among the hospitalized children aged 6-60 months who had been suffering from PEM. Controls were selected randomly from among the hospitalized children aged 6-60 months who were well-nourished. Children who received magnesium supplementation before or after admission to the hospital were excluded from this study.

### Result

Serum magnesium level was estimated of a total of 183 children and the values obtained were analyzed against

a number of variables to explore perturbation of serum magnesium level influenced by different epidemiological, clinical and biochemical conditions of PEM children.

First the patients were classified into six groups according to anthropometry and clinical criteria, as shown in Table-I.

**Table-I: Classification of study population.**

Group	Wt. for age	Oedema	Clinical classification
A	>90% OF NCHS mean	(-)	Well nourished (control)
B	75%-90% of NCHS mean	(-)	Mild malnutrition
C	60-74% of NCHS mean	(-)	Moderate malnutrition
D	<60% of NCHS mean	(-)	Marasmus
E	60-80% of NCHS mean	(+)	Kwashiorkor
F	<60% of NCHS mean	(+)	Marasmic Kwashiorkor

Number of children in each group with corresponding values of serum magnesium is depicted in Table-II.

**Table-II: Serum magnesium profile in different groups of study population.**

Group	No. of Children	S.magnesium in meq/L (mean)	Standard deviation
A	33	1.989	0.141
B	30	2.138	0.352
C	32	2.140	0.306
D	30	2.031	0.377
E	28	1.950	0.250
F	30	1.843	0.303
<b>Total</b>	<b>183</b>	<b>2.0015</b>	<b>0.285</b>

Serum magnesium in different groups of patients were compared to the control. Children with mild malnutrition had significantly higher magnesium than the control ( $P < 0.05$ ). Children with kwashiorkor and marasmic kwashiorkor had lower level of serum magnesium than the control but the difference in these groups are statistically not significant ( $P > 0.05$ ).

#### Discussion

In one study by P.N. Singla *et al* serum magnesium level was significantly low in children with moderate and severe malnutrition and even nearly half of the marasmic children had serum magnesium level in the hypomagnesemic range ( $<1.25$  meq/L).<sup>7</sup> In our study no value was in hypomagnesemic range. R.D montgomery in his study on 27 infants aged 9 to 24 months suffering

from kwashiorkor or the closely related clinical syndromes of PEM commonly observed in Jamaica (Jelliffe DB *et al*) found that blood levels of magnesium were normal despite evidence of magnesium depletion on muscle biopsy and urinalysis of these patients. They postulated that these techniques are better indices of body magnesium depletion than the blood level.<sup>8</sup> Geaffry C Linder *et al* studied magnesium balance in 13 male children aged 1-2 years with acute kwashiorkor and postulated that body's magnesium store is considerably depleted in these patients.<sup>9</sup> Joan L Caddel *et al* evaluated 28 patients of severe malnutrition and found abnormally low plasma or serum magnesium values in 24 of them (85.7%), the mean value was 1.29meq/L (0.43 standard deviation) and in 19 patients plasma values were less than 1.4 meq/L, the accepted lower limit of normal.<sup>10</sup> PJ Pretorius *et al* discovered in his magnesium balance study that there was low excretion of magnesium in the urine but magnesium content of serum and RBS was almost invariably within the normal range and did not differ significantly from the values obtained in control subjects. They used magnesium balance study by calculating the difference between intake and fecal urinary excretion.<sup>11</sup> They showed that whereas normal subjects promptly excreted in urine the equivalent of nearly 90% of an intravenous dose of magnesium, patients who were depleted of magnesium retained the equivalent of 40% or more of the dose. This time honored test "The Thoren's test" or "The loading test" is highly preferred by the investigators to assess body's magnesium status.<sup>12</sup> According to NK Mittal *et al*, rectal mucosa is a relatively rapidly turning over tissue, is a portion of the target organ (gut mucosa) primarily affected in diarrhea and is easy to sample. Therefore it can be a preferable site to evaluate serial change in magnesium status in acute and chronic diarrhea so frequently co-exist with PEM.<sup>13</sup> Magnesium content of biopsied muscle was used for analysis by RD Montgomery. Serum magnesium analysis by colorometric dye complexation method as was used in our study, is suitable particularly in pediatric testing because only very small volume of blood (1ml) is required.<sup>14</sup> P N singla *et al* opined that serum magnesium estimation could be a good practice because of its simplicity. Magnesium content of mononuclear blood cells (WBC) may provide a better index for magnesium status than serum concentration.<sup>15</sup> Atomic energy spectrophotometry test remains the most accurate method for magnesium determination. R A Reinhart stated that assessment of total body magnesium status is better because only a very small portion (about 1%) of body's magnesium content is present in the serum.<sup>16</sup>

### Conclusion

This study established serum magnesium profile in different PEM syndromes in Bangladesh. Children suffering from oedematous malnutrition had lower magnesium status compared to non-oedematous malnutrition. Magnesium status of non-oedematous malnutrition syndromes were comparable to the control group. Magnesium supplementation is practiced in management of PEM. Although serum magnesium estimation is an easy technique, atomic energy spectrophotometry, magnesium balance studies and magnesium loading test (Thoren's Test) are better indices of body's magnesium status.

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## Original Article

# Pattern of Lipid Profile in Patients with Cholelithiasis

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### Abstract

**Background:** Cholelithiasis is one of the most common surgical problem and gastrointestinal diseases throughout the world but its pathogenesis remains unclear. Lipid in the blood play a key role in the aetiology of cholelithiasis. Especially in cholesterol gallstones formation blood lipids are altered which is suggestive of metabolic syndrome. Multiple studies have shown that there is an association between gallstones and abnormal lipids. There is no previous study to explore the pattern of lipid profile in patients with cholelithiasis in Bangladesh. The aim of this study was to evaluate the pattern of lipid profile in patients with cholelithiasis.

**Methods:** This cross sectional study was carried out on patients based on clinical and imaging features confirming symptomatic cholelithiasis patients. In this study 100 confirmed patients of cholelithiasis aged 30 to 70 years of both male & female were included as cases & 100 age & sex matched healthy subjects were included as controls. Serum total cholesterol, HDL-cholesterol & serum triglycerides level were estimated by enzymatic method. Serum LDL-cholesterol was calculated by Friedwalds formula. The groups were compared by using Student's t-test,  $p < 0.05$  was considered statistically significant.

**Results:** There was a significant increase in serum total cholesterol, LDL- cholesterol, serum triglycerides and a significant decrease in HDL-cholesterol in cholelithiasis patients as compared to control subjects.

**Conclusion:** The study showed that elevated serum total cholesterol, LDL- cholesterol, serum triglycerides and decreased levels of HDL- cholesterol were present in patients with cholelithiasis.

**Keywords:** Cholelithiasis, Cholecystectomy, Lipid profile.

### Introduction

Cholelithiasis is one of the most common gastrointestinal disorders, prevalent in about 10-15% of adults in the developed countries.<sup>1</sup> Most of the patients with this disease are asymptomatic.<sup>2</sup> Approximately 1-2% of asymptomatic patients will develop symptoms requiring cholecystectomy per year, making cholecystectomy one of the most common operation performed by general surgeons.<sup>3</sup>

The risk factors for the development of cholelithiasis include repeated pregnancy, use of contraceptive pills, a family history of gall stones, serum lipids, dietary factors, chronic liver disease and possibly major abdominal surgery.<sup>4</sup> Cholelithiasis has been reported recently among female with advancing of age.<sup>5</sup> Age, gender, race, obesity, diabetes, dietary factors and parity have all been identified as significant risk factors for the development of gallstones.<sup>6</sup>

The role of serum lipids in the aetiology of cholelithiasis is very important and in cholesterol gallstones serum lipids are altered which is suggestive of metabolic syndrome.<sup>7</sup> The pathogenesis of cholesterol gallstones is known to be multifactorial with the key factors including cholesterol supersaturated bile, nucleation and growth of cholesterol monohydrate crystals and altered biliary motility.<sup>8</sup> The movement of cholesterol from the liver into the bile must be accompanied by the simultaneous secretion of phospholipid and bile salts. If this dual process is disrupted and more cholesterol enters the bile than can be solubilised by bile salts and lecithin present, the cholesterol may precipitate in the gall bladder, initiating the occurrence of cholesterol gallstone disease.<sup>9</sup> Of all gallstones found during cholecystectomy, cholesterol gallstones account for 80-90%.<sup>10</sup> Cholesterol gallstones are primarily made up of cholesterol crystals (70%) which are held together in an organic matrix of

glycoproteins, calcium salts, and bile pigments. They could be present either singly or multiply, in various sizes, shapes and surfaces.<sup>11</sup>

Patients of renal stones are most often evaluated for any underlying metabolic disorder but the same is not an established practice in gall stone patients. Evidence from 30 years ago show that about half of patients with gallstones will have an abnormal lipid profile. This would increase their risk of coronary artery disease and stroke.<sup>12</sup> Multiple studies have shown an association between gallstones and abnormal lipids. There is no previous study to explore the pattern of lipid profile in patients with cholelithiasis in Bangladesh. The aim of this study was to evaluate the pattern of lipid profile in patients with cholelithiasis & thereby determine the role of lipid abnormalities in pathogenesis of cholelithiasis.

#### Materials & Methods

This cross sectional study was carried out on patients with clinical and imaging features confirming symptomatic cholelithiasis admitted to Barakah General Hospital & Department of Surgery, Dhaka National Medical College from January 2015 to December 2015. A total number of 100 patients were included in this study, among which 76 were female and 24 were male in age group of 30-70 years. These were compared with 100 age and sex matched healthy controls. The patients with liver cirrhosis, viral hepatitis, renal failure, nephrotic syndrome, thyroid disease, asthma, diabetes mellitus, pancreatitis, gallbladder cancer & those taking antihyperlipidemic drugs were not included in this study.

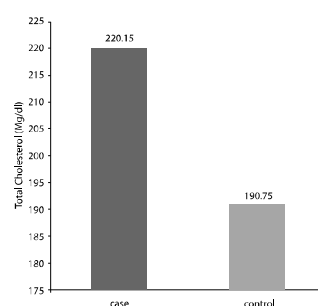
5 ml of fasting venous blood was withdrawn aseptically from antecubital vein and collected into sterile test tube with prior informed consent from patients & control subjects. Serum total cholesterol, HDL-cholesterol & serum triglycerides level were estimated by enzymatic method.<sup>13</sup> LDL-cholesterol was calculated by Friedwalds formula.<sup>14</sup> Data were processed and analyzed by using computer software SPSS (Statistical Package for Social Sciences), Version-16. Quantitative data were expressed as mean±SD. Values of the different parameters were compared to see the difference between two groups by using student's t-test. p<0.05 was considered as significant and p>0.05 was taken as non significant. 95% confidence limit was taken as the level of significance.

#### Results

**Table-I: Serum total cholesterol (mg/dl) in study subjects**

Groups	Serum total cholesterol (mg/dl)			P value
	Mean	SD	t	
Case	220.19	9.22	24.72	0.0001
Control	190.75	7.52		

Table: I shows mean serum total cholesterol was (220.19 ± 9.22) mg/dl in case and it was (190.75 ± 7.52) mg/dl in control. A statistically significant mean difference was found, indicating case had higher serum total cholesterol than control.

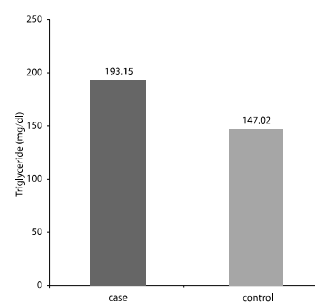


**Fig I: Serum total cholesterol (mg/dl) in study subject**

**Table-II: Serum triglycerides (mg/dl) in study subjects**

Groups	Serum triglycerides (mg/dl)			P value
	Mean	SD	t	
Case	193.15	6.33	59.79	0.0001
Control	147.02	4.40		

Table: II shows mean serum triglyceride was (193.15 ± 6.33) mg/dl in case and it was (147.02 ± 4.40) mg/dl in control. A statistically significant mean difference was found, indicating case had higher serum triglyceride than control.

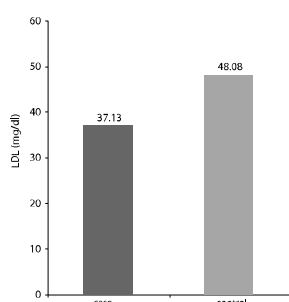


**Fig II: Serum triglycerides (mg/dl) in study subjects**

**Table-III: Serum HDL-cholesterol (mg/dl) in study subjects**

Groups	Serum HDL-cholesterol (mg/dl)			P value
	Mean	SD	t	
Case	37.13	2.27	-21.88	0.0001
Control	48.08	4.45		

Table: III shows mean serum HDL-cholesterol was (37.13 ± 2.27) mg/dl in case and it was (48.08 ± 4.45) mg/dl in control. A statistically significant mean difference was found, indicating case had lower serum HDL-cholesterol than control.

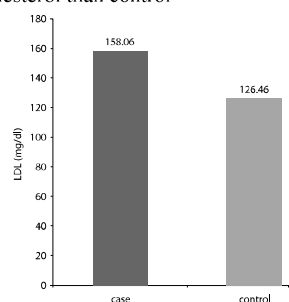


**Fig III: Serum HDL-cholesterol (mg/dl) in study subjects**

**Table-IV: Serum LDL-cholesterol (mg/dl) in study subjects**

Groups	Serum LDL-cholesterol (mg/dl)			P value
	Mean	SD	t	
Case	158.06	4.92	48.29	0.0001
Control	126.46	4.30		

Table: IV shows mean serum LDL-cholesterol was (158.06 ± 4.92) mg/dl in case and it was (126.46 ± 4.30) mg/dl in control. A statistically significant mean difference was found, indicating case had higher serum LDL-cholesterol than control.



**Fig IV: Serum LDL-cholesterol (mg/dl) in study subjects**

## Discussion

Cholelithiasis is one of the commonest surgical problems and one of the most common gastrointestinal diseases throughout the world but its pathogenesis remains unclear. Many theories have been proposed forward to explain the mechanism of stone formation. It is not fully clear that symptomatic gallstone disease is associated with a specific pattern of some biochemical abnormalities like lipid profile.<sup>15</sup>

Bile is the only significant pathway for elimination of excess cholesterol from the body, either as free cholesterol or as bile salts. Cholesterol is water insoluble and is rendered water soluble by aggregation with bile salts and lecithin co secreted into bile. When cholesterol concentration exceeds the solubilising capacity of bile, cholesterol can no longer remain dispersed and nucleates into the solid cholesterol monohydrate crystals. Three conditions must therefore be met to permit the formation of cholesterol gallstones: (i) Bile must be supersaturated with cholesterol, (ii) Nucleation must be kinetically favorable, (iii) Cholesterol crystals must remain in the gall bladder long enough to aggregate into stones. Nucleation is promoted by micro precipitated of inorganic or organic calcium salts, serving as nucleation sites for cholesterol stones. Gall bladder stasis plays a key role in permitting stone formation and growth. As bile becomes more concentrated during storage in gall bladder, cholesterol saturation of bile also may further increase. Since around half of the patients of cholelithiasis have abnormal lipid profile this would increase the incidence of coronary artery disease and stroke. Recent European studies have shown that hypertriglyceridaemia, hypercholesterolemia and low level of high density lipoprotein cholesterol (HDL) a common finding in patients with cholelithiasis.<sup>12</sup>

The present study was conducted to evaluate the pattern of lipid profile in patients with cholelithiasis. A total number of 100 diagnosed cases of cholelithiasis patients were included in this study. Among them 76 were female and 24 were male in age group of 30-70 years. These were compared with 100 age and sex matched healthy controls.

Virupaksha HS et al<sup>16</sup>, Channa NA et al, found that lipids elevation in cholelithiasis, seems to play a major contributing role in the pathogenesis of gallstones in females of up to 45 years age.<sup>17</sup> The elevation of serum total cholesterol and TG levels in patients may be due to: Gallstone patients have abnormal secretory mechanism for bile acids and phospholipids, decrease bile acids and phospholipids (which solubilize cholesterol in the bile)

will increase cholesterol precipitation<sup>18</sup> and some of gallstone patients may present with metabolic syndrome which is a cluster of symptoms such as glucose intolerance, high total cholesterol, hyperinsulinemia, increased VLDL and/or total cholesterol, decrease HDL and hypertension who indicate that the metabolic syndrome is one of the risk factors for gallstone disease.<sup>19</sup>

In the present study, the mean serum total cholesterol was (220.19 ± 9.22) mg/dl in case and it was (190.75 ± 7.52) mg/dl in control. A statistically significant mean difference was found, indicating cholelithiasis patients had higher serum total cholesterol than control. This result agrees with results of the study of Dwivedi S et al<sup>20</sup>, Naseem AC et al<sup>21</sup> & Rajaa NA et al.<sup>22</sup> The positive association between total cholesterol and cholelithiasis or gallstone disease had been seen not only in females but also in males.<sup>23</sup> One of the case-control studies reported lower concentrations for total cholesterol in gallstone patients than in control subjects in both genders separately<sup>24</sup> or collectively.<sup>25</sup> Population studies based on gallbladder screening had reported a positive relation,<sup>26</sup> an inverse relation<sup>27</sup> or no relation between total cholesterol and gallstone disease in both genders combined.<sup>28</sup> Some similar studies had found an inverse association with prevalent gallstones in females<sup>29</sup> but not in males.<sup>30</sup>

The mean serum triglyceride was (193.15 ± 6.33) mg/dl in case and it was (147.02 ± 4.40) mg/dl in control in present study. A statistically significant mean difference was found, indicating cholelithiasis patient had higher serum triglyceride than control. Some investigators reported a positive association between gallstone and serum triacylglycerol levels<sup>27,28</sup> whereas, others found no such association<sup>29,30</sup> Naseem AC et al<sup>21</sup> showed that positive association between gallstone disease and serum cholesterol and triacylglycerol levels.

In the present study, the mean serum HDL-cholesterol was (37.13 ± 2.27) mg/dl in case and it was (48.08 ± 4.45) mg/dl in control. A statistically significant mean difference was found, indicating cholelithiasis patients had lower serum HDL-cholesterol than control. Several epidemiologic studies have linked that the high serum triglyceride and low HDL-cholesterol due to increased activity of 3-hydroxy-3-methyl glutaryl-CoA reductase associated with gallstone formation.<sup>31</sup> Lower HDL-cholesterol increases biliary cholesterol secretion there by raising the level of cholesterol precipitation and gallstone formation.<sup>32</sup> Chen et al, found a positive association between gallstone disease and decreased

HDL- cholesterol levels.<sup>33</sup>

The present study showed that the mean serum LDL-cholesterol was (158.06 ± 4.92) mg/dl in case and it was (126.46 ± 4.30) mg/dl in control. A statistically significant mean difference was found, indicating cholelithiasis patients had higher serum LDL-cholesterol than control. Pettiti D.B et.al.<sup>34</sup> Carl, Thijs and co-workers<sup>35</sup> observed that low serum HDL cholesterol levels and high serum LDL levels in patients with cholelithiasis which is consistent with the present study.

#### Conclusion

The present study demonstrates that elevated serum total cholesterol, LDL cholesterol, serum triglycerides and decreased levels of HDL cholesterol were present in patients with cholelithiasis. Considering the role of this altered lipid profile in pathogenesis of coronary artery disease, it would be prudent to screen all patients with cholelithiasis for dyslipidemia. This might be of value in the prevention & treatment of cholelithiasis.

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## Case Report

# Rare Presentation of HAV infection in 7 year old child

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### Abstract :

Hepatitis A (HAV) infection is one of the most common forms of hepatitis in the pediatric age group in developing countries. It is usually self limiting and rarely accompanied by extrahepatic complication. In this article, we report one child with hepatitis A who had associated pleural effusion, ascites and acalculus cholecystitis. The child improved with resolution of hepatitis after symptomatic treatment. Although uncommon extra hepatic manifestations can occur with hepatitis. However this child resolve completely. Paediatricians in developing countries should be aware of this rare association to avoid unnecessary investigations.

**Key Words:** Pleural effusion, Ascites, Acalculous cholecystitis, Hepatitis A virus, Hepatitis.

### Introduction:

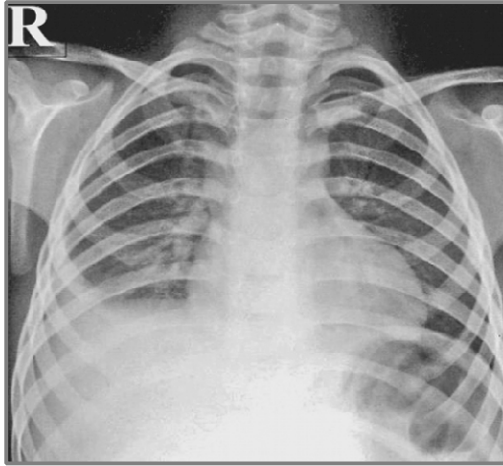
Acute hepatitis A virus (HAV) infection is a self limiting viral disease in childhood. The most important cause of transmission is contamination of water with feces. Although hepatitis A usually presents with mild symptoms or is asymptomatic in children, extrahepatic manifestations are reported in 6.4-8% of cases.<sup>1,2</sup> These manifestations are arthralgia, cutaneous vasculitis, cryoglobulinemia, hemo-phagocytic syndrome, acalculus cholecystitis, pancreatitis, aplastic anemia, Guillane- Barre syndrome, transverse myelitis, acute tubular necrosis, nephrotic syndrome, vasculitis, reactive arthritis and pleural effusion.

Among these pleural effusion and acalculus cholecystitis are rare complications of acute viral hepatitis A especially in childhood. Pleural effusion occurs during early period of the disease and resolves spontaneously with resolution of hepatitis.<sup>3,4,5</sup> Ascites is a known complication of HAV infection. Pleural effusion accompanying ascites in the course of hepatitis. A is reported only in three cases in literature.<sup>6,7,8</sup> However there is not a single case in the literature with all these three complications being presented simultaneously. Here in we present a case of hepatitis A complicated by pleural effusion, ascites and acalculus cholecystitis.

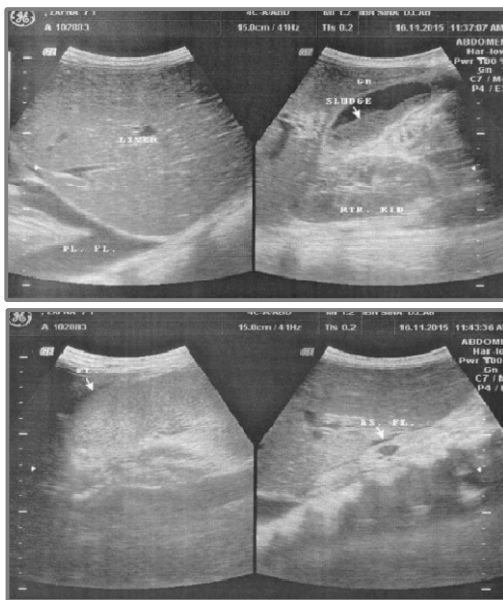
### Case report

A seven year old, previously well, female child presented with fever, nausea, vomiting, anorexia and right upper abdominal pain of one weeks' duration, yellowish discolouration of eyes and urine and difficulty in breathing for the last three days. On examination the

child had icterus and the liver was palpable 3 cm below the right costal margin. Breath sounds were decreased on the right side of the chest. Laboratory studies revealed. Hb10.6g/dl, RBC 4.92 million/cmm, ESR 37mm, WBC counts of 10,854/cmm, platelet count 279400/cmm with lymphocyte predominance. Renal function test and serum electrolytes were normal. Liver functions showed an elevated bilirubin level of 4.70mg/dl, serum alanine aminotransferases 1138 U/L, serum aspartate amino transferases 678 U/L, total protein of 5.73gm/dL and serum albumin 2.68gm/dL. Prothombin time 14 second. Coagulation studies were normal. Anti HAV Ig M antibodies were positive. Other viral markers including hepatitis B, C and E were negative. Chest Xray showed right sided pleural effusion (Figure1). Serological analysis for Dengue and Enteric fever infections were negative. Leptospirosis and Rickettsial infections were not evaluated. An abdominal ultrasound confirmed hepatomegaly with altered echogenicity, biliary sludge, thickening of the gall bladder wall with minimal ascites and right sided pleural effusion. Thoracocentesis was undertaken and pleural fluid analysis was suggestive of transudative effusion with no leucocytes or atypical cells and protein of 20g/L. Pleural fluid for tuberculosis and culture were negative. The child was given supportive treatment. Repeat chest X-ray and ultrasonography of abdomen after three weeks was normal and the child is on regular follow-up. Further follow up after another three weeks showed complete resolution of the hepatitis, ascites, pleural effusion and changes in gall bladder.



**Fig. 1:** Chest X-ray reveal pleural effusion.



**Fig. 2:** USG showing hepatomegaly, Biliary sludge, thickening of the gallbladder wall, mild ascitic fluid and mild pleural fluid.

**Discussion:**

Hepatitis A virus (HAV) causes acute hepatitis associated with significant morbidity and occasional mortality. Although it can infect other tissues clinical manifestations are associated solely with liver inflammation. The severity of disease is age dependent.

In children it manifests usually with mild symptoms or remaining asymptomatic and jaundice is usually absent. In this self limiting infection in which 85% of patients recover completely in three months mortality risk increases with age.<sup>9</sup> HAV infection may present also with rare complications such as acalculous cholecystitis pleural effusion and ascites. Pleural effusion is known to be an early and benign complication of the disease.<sup>8</sup> The exact pathogenesis of the effusion is unknown but it seems likely to be related with inflammation of the liver immune complexes or secondary to ascites.<sup>8,10</sup> In all cases pleural effusion resolved spontaneously except the case reported by Tesovic et al which resulted in death.<sup>3</sup> Ascites that has been reported in later stages of disease especially in older children and adults is thought to occur from venous or lymphatic obstruction due to liver involvement or reduction of osmotic pressure due to hypoalbuminemia during the course of infection.<sup>9,10</sup> Acalculous cholecystitis rare in children has an uneventful course and usually recovers in two to three weeks. Very little is known about the exact pathogenesis of this manifestation.<sup>11,12</sup> Mourani et al detected HAV antigen in bile duct epithelium and the gall bladder wall suggesting a direct effect of viral antigen rather than a secondary phenomenon.<sup>13</sup> Gallbladder changes may be variable during the course of HAV infection. Gallbladder thickening is the most common finding.<sup>14</sup> In our patient pleural effusion, ascites and acalculous cholecystitis were detected in HAV infection. Since acalculous cholecystitis is transient and gradually disappears when viremia becomes low surgical intervention was not required in our case similar to other previously reported cases in literature.<sup>15</sup> To our knowledge this is the case that present with three rare complications in single patient in the early period of disease. We can explain the recovery of signs with supportive therapy by occurrence of pleural effusion due to transport of fluid from diaphragmatic lymphatics or directly through a diaphragmatic defect secondary to ascites or hypoalbuminemia that was present in our patient.

Since these three complications were seen at the same time serosal involvement due to immune complexes gains importance as the possible etiological agent.

**Conclusion**

Clinical presentation of HAV infection may vary over a wide spectrum from anicteric to fulminant hepatic failure. Rarely it can be accompanied by extrahepatic complications such as renal failure, arthritis, vasculitis, ascites and pleural effusion. This may result in performing unnecessary diagnostic tests. One should remember, especially in developing countries, children

vaccinated against HAV in infancy can be protected from unnecessary laboratory investigations and atypical complications of HAV infection.

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## Review Article

# Hypothyroidism and dysfunction of peripheral nervous system

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### Abstract:

Current research indicates peripheral nerve dysfunction is a well-documented feature of clinical hypothyroidism. In hypothyroid patients, median motor and sensory nerves are most commonly affected. Sensorimotor nerve conduction impairment occurs in hypothyroidism and the degree of impairment might be related to the degree of thyroid deficiency. It is suggested that neuropathy is not an uncommon manifestation in the newly diagnosed hypothyroidism.

### Introduction:

Hypothyroidism is a clinical condition resulting from reduced circulating levels of free thyroxine (FT<sub>4</sub>) and triiodothyronine (FT<sub>3</sub>).<sup>1</sup> However, the thyroid hormones increase the metabolic activities of almost all tissues of the body. The basal metabolic rate can increase 60 to 100 percent above normal when large amount of hormones are secreted.<sup>2</sup> The thyroid gland is not essential for life, but its absence or hypo function during fetal and neonatal life results in severe mental retardation and dwarfism.<sup>3</sup> The prevalence of primary hypothyroidism is 10/1000 but increases to 50/1000 if patients with sub-clinical hypothyroidism (normal FT<sub>4</sub>, raised TSH) are included and the female: male ratio is approximately 6:1.<sup>4</sup> Clinical features of hypothyroidism depend on the duration and severity of the diseases. A consequence of prolonged hypothyroidism is the infiltration of many body tissues by the mucopolysaccharides, hyaluronic acid and chondroitin sulphate, resulting in a low-pitched voice, poor hearing, slurred speech due to a large tongue, and compression of median nerve at the wrist.<sup>4</sup> However, Hypothyroidism might be reversible at early stages; on the other hand irreversible cases might have longer duration of diseases or might present etiologies other than hypothyroidism. Long term accumulation of mucinous tissue is the possible cause of irreversibility.<sup>5</sup>

In hypothyroidism, delayed distal latencies with lower nerve conduction velocities were observed in median and ulnar nerves for both motor and sensory conduction, in peroneal nerves for motor conduction and in sural nerve for sensory conduction in nerve conduction study by using electromyogram machine.<sup>6</sup> Majority of the hypothyroid female patients with a diagnosis of polyneuropathy had electrophysiological evidence of prominent sensory neuropathy involving the median nerve.<sup>7</sup>

Some investigators reported that, there is sub-clinical peripheral nerve involvement in new hypothyroid patients. They found slow sensory nerve conduction in sural and median nerves of hypothyroid female compared to euthyroid control.<sup>8</sup>

### Clinical manifestation of hypothyroid neuropathy:

Most of the hypothyroid patients complain some sensory symptoms like tingling sensation, numbness, paraesthesia, burning pain and some motor symptoms like weakness, muscle fatigability, stiffness and cramp.<sup>9</sup> Again, decreased tendon reflexes, decreased muscle strength, positive Phalen's test and Tinel's sign at the wrist (test for clinical diagnosis of carpal tunnel syndrome) were also found in some hypothyroid female.<sup>10</sup>

### Consequences of conventional therapy:

Some investigator revealed that, sensory and motor sign/symptoms such as tingling sensation, numbness, loss of vibration, pain, decreased muscle strength and delayed tendon reflexes were still persisted in hypothyroid patients even after 1 year of thyroxine replacement therapy.<sup>12</sup>

However, For clinical diagnosis of peripheral neuropathy, elicitation of reflexes, assessment of strength of major muscle groups on both side to evaluating motor system and fine/crude touch, two point discrimination test, pin prick, vibration sense to evaluating sensory system were observed in some study and they found the significant alteration in maximum newly diagnosed hypothyroid patients.<sup>10</sup>

After thyroxine therapy, the central and peripheral nerve conduction velocities returned to normal limits, whereas the abnormalities in amplitude were still persisted<sup>11</sup>. In a follow-up study, Kasem et al. (2014) demonstrated that abnormalities related to entrapment neuropathy and

polyneuropathy in hypothyroid patients can be reversed within 3 months of thyroid hormone replacement therapy. But the researchers also found that, 13.8% of the patients still had carpal tunnel syndrome after 3 months of thyroxine replacement therapy and were subjected to surgical decompression.

Again, motor conduction studies were done bilaterally on median, ulnar and posterior tibial nerve with respect to distal latency (DL). Moreover, amplitude of compound muscle action potential (CAMP) and motor nerve conduction velocity (MNCV) were also observed.<sup>9</sup>

**Effects of thyroid hormone deficiency on single nerve:**

In hypothyroidism, major affected nerve is median nerve. The mechanism involved in the development of neuropathy in hypothyroidism still remains unclear. Some investigator suggested that the weight gain in hypothyroids may be the contributory factors for the nerve conduction abnormalities.<sup>13</sup> The increased body weight and BMI in hypothyroids might be due to accumulation of mucopolysaccharides, hyaluronic acid and chondroitin sulphate in the interstitial spaces which, because of their hydrophilic nature retain water along with them resulting in weight gain.<sup>4</sup> In addition, decreased rate of basal metabolism also causes increased body weight in hypothyroidism.<sup>2</sup> On the other hand, an overall slowness in all metabolic pathways is seen in hypothyroidism. Due to the reduction of the carbohydrate metabolism, glycosaminoglycans cannot be broken down, instead accumulate in the entrapment regions leading to entrapment neuropathy.<sup>14</sup> Hypothyroidism produces alteration of fluid balance and peripheral tissue edema, which may lead to carpal tunnel syndrome development.<sup>15</sup>

It has been suggested that carpal tunnel syndrome (CTS) in hypothyroidism develops as a result of the mucinous infiltration in the perineurium and endoneurium of median nerve. The increased pressure as results of this infiltration is transferred to the median nerve and causes focal demyelination.<sup>16</sup> However, long term accumulation of mucinous tissue is a possible cause of irreversibility of CTS to replacement therapy.<sup>5</sup> Again, the cause of irreversibility to replacement therapy in hypothyroid patients may be related to duration and severity of illness and also to treatment regimens<sup>5</sup> Moreover, some researchers also explained that, deposition of glycosaminoglycans in nerves and soft tissues surrounding them with resultant axonal degeneration and segmental demyelination forms the pathological basis of alteration in peripheral nerve function in thyroid hormone deficiency.<sup>17</sup>

**Effects of thyroid hormone deficiency on multiple nerve:**

Hypothyroidism may affect the multiple peripheral nerves of our body, depresses the gene activation for synthesis of myelin basic protein, required for myelination thereby causes impairment of nerve conduction velocities as well as loss of tendon reflexes.<sup>18</sup> In hypothyroidism, the deficiency of ATP, reduced ATPase and Na<sup>+</sup> K<sup>+</sup> pump activity cause subsequent alteration of pump dependent axonal transport and may leads to peripheral neuropathy.<sup>19</sup> The peripheral nerve dysfunction was also linked to the morphological evidence of primary axonal degeneration in the form of shrinkage of axons, disintegration of neurotubules and neurofilaments and active axonal breakdown.<sup>20</sup> However, a decrease in density of sodium channel causes a decrease in peripheral nerve conduction velocity and increase in latencies of evoked potential in hypothyroidism<sup>21</sup>. Whereas, decreased core temperature in hypothyroidism is another cause of reduced nerve conduction velocities due to reduced sodium and calcium currents.<sup>21</sup> The common complaints of hypothyroid neuropathy are usually pain, cramps, paresthesia in the finger due to median sensory nerve involvement.<sup>7</sup> Whereas, muscle weakness and decreased tendon reflexes due to involvement in median and ulnar motor nerve of upper limbs and common peroneal nerve of lower limbs.<sup>9</sup> In hypothyroidism, most frequent cause of peripheral nerve damage is median nerve entrapment at wrist but sensory-motor polyneuropathy such as ulnar, common peroneal and sural neuropathy can also be seen.<sup>19</sup> However, the mononeuropathy i.e. involvement of single nerve may be secondary to compression due to deposition of myxedematous tissue and the polyneuropathy i.e. involvement of more than one nerve may be due to either a demyelinating process or the axonal degeneration. The combination of both this two factors results in the development of the peripheral neuropathy.<sup>22</sup>

**Conclusion:**

Despite limitations in existing knowledge and need for further research, it is suggested that peripheral nerve dysfunction is a well-documented feature of clinical hypothyroidism. In hypothyroid patients, median motor and sensory nerves are most commonly affected. Sensorimotor nerve conduction impairment occurs in hypothyroidism and the degree of impairment might be related to the degree of thyroid deficiency. So, according to the recent research, it has been stated that, thyroid hormones deficiency affect not only our central nervous system but also it's a hidden threat for our peripheral nervous system.

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