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AZITHROMYCIN VERSUS CIPROFLOXACIN FOR THE TREATMENT OF UNCOMPLICATED ENTERIC FEVER IN BANGLADESH - A RANDOMIZED TRIAL

DURBA HALDER1, SAMIR KUMAR KUNDU2, M MATIUR RAHMAN3, M A AZHAR4

Abstract
Objectives: The study was carried out in Sir Salimullah Medical College and Mitford Hospital, Dhaka, in the last one and half year to see the efficacy of azithromycin in treatment of enteric fever and to compare the clinical efficacy of azithromycin with ciprofloxacin in enteric fever.

Methods: One hundred and twenty eight patients (> 12 years) admitted for a period of January 2006- June 2007, with symptoms and signs of uncomplicated enteric fever were initially enrolled for study. They were entered into a randomized trial and were treated with either oral azithromycin (Igm on the 1st day followed by 500 mg for the next 6 days) or oral ciprofloxacin (500 mg twice daily for 14 days). Blood culture for Salmonella typhi or Salmonella paratyphi were done in all cases. Total sixty patients were culture positive for either S. typhi or S. paratyphi which were finally studied. Out of sixty patients fifty three were culture positive for salmonella typhi and seven were culture positive for Salmonella paratyph. Multiple drug resistance (MDR: resistance to two or more antibiotics) was found in more than seventy percent patients.

Results: During the study period out of sixty patients, thirty three were receiving azithromycin and twenty seven were receiving ciprofloxacin. Clinical cure was achieved in thirty (90.90%) patients in the azithromycin group and in twenty one (77.78%) patients in the ciprofloxacin group. Mean fever clearance time in the azithromycin group was 4 ± 1.4 days and was 4 ± 1.55 days for ciprofloxacin group. There was no significant difference of clinical cure between the two treatment groups (p > 0.05). No clinical relapses were detected in any study subject. No major side effects of both drugs occurred in any study subject.

Conclusion: These results indicated that azithromycin and ciprofloxacin were effective against enteric fever caused by both sensitive organisms and MDR S. typhi & S. paratyphi. It is concluded that azithromycin is effective and can be a convenient alternative for the treatment of enteric fever, especially in developing countries like us where medical resources are scarce.

Introduction
Enteric fever (typhoid fever) is an acute systemic illness caused by bacterium Salmonella typhi, S. paratyphi A, B, sometimes C and occasionally by S. typhimurium.

The incidence of enteric fever has declined greatly with the provision of clean water and good sewage systems in Europe and the USA since the early 20th century, but the disease remains a serious public-health problem in developing countries, including Bangladesh. Poor water supply and sanitation systems are responsible for its prevalence throughout the year, either sporadically or epidemically in Bangladesh1-3.

It remains an underestimated important health problem in the developing countries4.

Enteric fever is estimated to have caused 21.6 million illness and 2,16,500 deaths globally in 2000 affecting all ages5. There is also one case of paratyphoid fever for every four of typhoid.

For decades chloramphenicol has been highly effective against S. typhi and S. paratyphi and it often remained the antibiotic of choice for the treatment of enteric fever6-7. In late 1980s and 1990s outbreaks of typhoid caused by organism resistant to chloramphenicol, co-trimoxazole, ampicillin, and amoxycillin were reported8.

MDR strains of Salmonella typhi (resistant to two or more than two antibiotics) have emerged in many countries, in many areas of Asia and have necessitated the search for other therapeutic options9. In 1992, a study in Bangladesh10 showed

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4. Professor. Department of Medicine, Sir Salimullah Medical College, Dhaka

Bangladesh J Medicine 2010; 21 : 7-13
Salmonella were sensitive to ciprofloxacin and to pefloxacin in 100% cases and to ceftriaxone in 97.54% cases and sensitivity to amoxycillin, co-trimoxazole and chloramphenicol were about 50% of cases. This study showed emergence of multidrug-resistant enteric fever in Bangladesh with changing antibiotic sensitivity pattern. Since then, ciprofloxacin or third generation cephalosporins (namely ceftriaxone) have become the first line of treatment of enteric fever. However, isolates of Salmonella typhi and paratyphi-A with reduced susceptibility to fluoroquinolones and also resistant to fluoroquinolones have been reported in Bangladesh, India, Thailand and Vietnam and Tajikistan.

In this situation ceftriaxone, cefixime and other 3rd generation cephalosporins are still highly effective against S. typhi but high cost and parenteral administration associated with ceftriaxone, renders them impractical for some patients. Furthermore, in a report from Bangladesh shows isolates of S. typhi with high level of resistance (MIC > 256.0 µg/ml) to ceftriaxone. Reports of infection with MDR and fluoroquinolone resistant Salmonella species have raised concern that soon no available oral medication will exist to treat the infection.

Azithromycin, the first drug of azalide class, has in vitro activity against many enteric intracellular pathogens, including S. typhi. Previous studies done in other countries demonstrated that a seven-day treatment of azithromycin was highly effective against uncomplicated enteric fever in adults and children.

We therefore, want to make a comparative study of ciprofloxacin and azithromycin in treating uncomplicated enteric fever. If azithromycin proves to be effective in treatment of enteric fever, it could be a promising alternative antibiotic for treatment of enteric fever. Since azithromycin is an oral drug, relatively cheaper, can be given to all age group including pregnant woman, it will be very useful for our people, particularly, poor rural community.

Materials and Methods

Patients: This study was conducted at the department of Medicine, Sir Salimullah Medical College and Mitford Hospital, Dhaka for a period of one and half years (from January 2006 to June 2007). Both males and females over 12 years of age admitted to this hospital with documented fever (oral temperature > 38.5°C) plus a history of fever for at least 4 days in addition to two or more of the following symptoms: abdominal tenderness, hepatomegaly, splenomegaly, coated tongue with sparing of margins, toxic physical appearance, relative bradycardia, rose spots, were eligible for enrollment in the study. Only patients with blood culture positive for salmonella typhi or S. paratyphi were finally evaluated. Patient’s informed consent was obtained before randomization of the study drug.

Patients were excluded from the study if any of the following criteria were present: pregnancy or lactation, allergy to ciprofloxacin or azithromycin, associated complications of enteric fever like severe gastrointestinal bleeding, intestinal perforation, visible jaundice, myocarditis, pneumonia, renal failure, shock, or coma etc., where oral medication was not suitable or inability to swallow oral medication, and treatment within the past 4 days with an antibiotic.

Methods: After study eligibility was determined and informed consent was obtained, patients were randomized to one of the two treatment groups. Patients were hospitalized during the entire treatment period and at admission evaluation was made by history and physical examination in a structured format. Culture of blood (15 ml) was performed prior to initiation of antibiotic therapy. After randomization, subjects were treated in an open label format with either azithromycin (1 g given orally on the 1st day followed by 500 mg given orally once daily for the next six days) or ciprofloxacin (500 mg given orally twice daily for fourteen days). Azithromycin was given one hour before or two hour after eating food. Blood were obtained for haematologic measurements like TC of WBC, Hb, ESR, platelet count, blood film for malarial parasite and biochemical measurements like S. bilirubin, AST, serum creatinine and urine was obtained for urine analysis before subjects receives a study drug. Chest x-ray and other radiological investigations including abdominal ultrasound, were performed as clinically indicated. Subjects were asked regarding changes in symptomatology and possible adverse events of the study drugs like nausea, anorexia, vomiting, diarrhoea, abdominal pain etc. During hospitalization, vital signs (including body temperature) were measured at every 8 hours, and thorough clinical examination based on a structured format was performed daily. Patients were discharged from the hospital after they became afebrile for at least two days. All patients were asked to return to the hospital after two weeks and four weeks for follow up or early if they became sick.

For blood culture 5-8 ml specimen of blood was inoculated into Bectec 6B aerobic bottles (Becton Dickinson) and incubated in the Bectec incubator system. Bottles giving a positive signal were subcultured onto Macconkey and blood agar. Nonlactose - fermenting colonies were then biochemically identified and were typed for Salmonella O antigen by slide agglutination with specific antisera. Antimicrobial susceptibilities was determined by disk diffusion. Strains were considered susceptible when zone diameters for azithromycin disks containing 15 µg were > 13 mm and those for ciprofloxacin disks containing 5 µg were > 21 mm.
Responses of patients to treatment were classified by clinical cure, which was defined as the resolution of all typhoid related symptoms within seven days of initiating antibiotic therapy. Clinical failure was defined as the persistence of > 2 typhoid related symptoms or signs present at study entry or as the development of a typhoid related complication. Clinical improvement was defined as partial resolution of illness.

Clinical relapse was defined as recurrence of fever and clinical features of typhoid within thirty days of completing therapy, along with isolation of S. typhi from the blood.

Defervescence was defined as the first day on which the maximum temperature was < 38.0°C with maintenance of the temperature at this level for at least 48 hours.

**Statistical Analysis:** The numerical data obtained from study were analyzed and significance of difference was estimated by using the statistical methods. Data were expressed in frequency, percentage, mean, and standard deviation as applicable. Comparison between groups were done by standard ‘t’ test, chi-square test as applicable. Proportions were compared with the chi-square test with yates’ correction. Normally distributed data were compared using the student t test. Variable with a p value of <0.05 were counted as significant & p value of > 0.05 were counted as insignificant. All statistics were calculated with SPSS software version 11.5.

**Results and Observations**

During the period from January 2006 to June 2007, one hundred twenty-eight patients (33 male, 23 females) ranging in age from 12 to 45 years (mean, 20 years) were enrolled in the study and randomly assigned to one of the two treatment groups. A total of 60 subjects had blood cultures from which S. typhi or S. paratyphi was isolated, and these subjects comprised the basis for analysis.

Among 60 (sixty) patients 33 (thirty three) were receiving azithromycin and 27 (twenty seven) were receiving ciprofloxacin. 53 (fifty three) patients grew S. typhi and 7 (seven) patients grew S. paratyphi from their blood samples. Demographic and pretreatment laboratory evaluations of the subjects with positive blood cultures are shown in Table 1. There were no significant differences between the treatment groups (Table-I).

In this study, according to culture report Salmonella typhi was sensitive to azithromycin in 90% cases and to ciprofloxacin in 78 % cases. Ceftriaxone was sensitive to 100% cases. Ampicillin/amoxycillin was sensitive only in 21% of cases, and co-trimoxazole was only in 27% cases. Nalidixic acid was resistant to all cases.

Clinical responses were cures or improvements within 5 days of starting treatment in 90.1% of patients treated with azithromycin and 77.7% of patients treated with ciprofloxacin (table-2). In both treatment groups response to treatment were significant, that means both the trial drugs were effective in treating enteric fever. Difference in response to both groups was statistically insignificant (p > 0.05).

Those patients of azithromycin group, who failed to respond at day 5 after starting treatment, we continued the same treatment. 1 patient had clinical improvement on day 7, but other 2 patients showed no further improvement. So we switched over the treatment to inj. ceftriaxone (2 gm/day intravenously for 10 days). No patients in azithromycin group developed complication. Among the ciprofloxacin group 6 patients

### Table-I

*Demographic and pretreatment laboratory evaluations of Azithromycin and Ciprofloxacin Groups*

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Azithromycin</th>
<th>Ciprofloxacin</th>
</tr>
</thead>
<tbody>
<tr>
<td>No of patients</td>
<td>33</td>
<td>27</td>
</tr>
<tr>
<td>Age(yrs) Range</td>
<td>16-45</td>
<td>16-45</td>
</tr>
<tr>
<td>Mean + SD</td>
<td>20 + 6.38</td>
<td>24 + 3.87</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>20</td>
<td>13</td>
</tr>
<tr>
<td>Female</td>
<td>13</td>
<td>14</td>
</tr>
<tr>
<td>Duration of fever before admission(days) Mean + SD</td>
<td>8.18 + 4.64</td>
<td>6.70 + 4.30</td>
</tr>
<tr>
<td>No. of patients with positive blood culture with S. typhi</td>
<td>30</td>
<td>23</td>
</tr>
<tr>
<td>No. of patients with positive blood culture with S. paratyphi</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Laboratory values in Mean + SD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Haemoglobin (g/dl)</td>
<td>11.89 + 1.15</td>
<td>11.73 + 1.17</td>
</tr>
<tr>
<td>Total count of WBC (×10³/cmm)</td>
<td>6.01 + 1.53</td>
<td>5.52 + 1.19</td>
</tr>
<tr>
<td>Platelet count (×10³/cmm)</td>
<td>231.36 + 33.37</td>
<td>239.88 + 36.49</td>
</tr>
<tr>
<td>Aspartate aminotransferase (IU)</td>
<td>46 + 34</td>
<td>41 + 21</td>
</tr>
<tr>
<td>Serum creatinine (mg/dl)</td>
<td>0.75 + 0.12</td>
<td>0.73 + 0.13</td>
</tr>
</tbody>
</table>
had no response at day 5 after starting treatment. For non responders we continued the same treatment for another 2 days. Subsequently 2 patients became afebrile on day 7. Two patients in ciprofloxacin group developed complication. One patient developed intestinal perforation and another patient developed meningitis. For those patients we switched over the treatment to inj. ceftriaxone (1 to 2 gm/day intravenously for 10 days).

Patients in both azithromycin and ciprofloxacin treatment groups who responded to therapy, the mean times to defervescence was more or less same (Table-2). It was 4 ± 1.4 days for azithromycin group and was 4.1 ± 1.55 days for ciprofloxacin group. Though percentage of response to treatment was 90.1% for azithromycin group and 77.8% for ciprofloxacin group was different, but there was no statistically significant difference in both treatment groups. There was no statistically significant difference in fever clearance time in both treatment groups.

### Table-II

<table>
<thead>
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<th>Variables</th>
<th>Azithromycin Group (n = 33)</th>
<th>Ciprofloxacin Group (n = 27)</th>
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<tr>
<td>Clinical cure on or before dav 5</td>
<td>Patients No.</td>
<td>Patients No.</td>
</tr>
<tr>
<td></td>
<td>Percentage (%)</td>
<td>Percentage (%)</td>
</tr>
<tr>
<td>No. of days to defervescence after start of treatment (Mean SD &gt;)</td>
<td>30</td>
<td>90.90</td>
</tr>
<tr>
<td></td>
<td>4 ±1.4</td>
<td>4±1.55</td>
</tr>
<tr>
<td>X Value =1.095, P&gt;0.50</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Relapse on follow up. Twenty seven patients were communicated over telephone at six months after completion of treatment but none complained of development of fever within that period. So it has been presumed that all of them were healthy.

### Discussion

Enteric fever is one of the common health problems of Bangladesh. Reports of infections with fluoroquinolone resistant *Salmonella* species have raised concern that soon no available oral medication will exist to treat the infection.

Multi-drug resistant enteric fever is now emerging throughout the world and more common in Indian subcontinent including Bangladesh. Enough research work has not been done to find out alternative antimicrobials for treatment of multi-drug resistant enteric fever in Bangladesh.

The present study was done to see the efficacy of azithromycin in treating uncomplicated enteric fever and it’s comparison with ciprofloxacin. Enteric fever may occur at any age, but the commonest age is between 10-30 years. In this present study the age of the patients was between 12-45 years. Maximum number of patients was in the age group of 18 years. This age group of people goes more outside home and eats frequent outside foods. That may led to development of enteric fever due lack of proper hygiene. This result is comparable to other workers.

The higher number of cases among male is probably due to the fact that females are brought less frequently to hospitals because of various social, financial and religious bars in our male dominated society and also due to the fact that male goes outside more, takes outside food more frequently than female.

All the patients in this study came with fever, and, the duration of fever varied from 3 days to 3 weeks. Maximum cases presented in the 2nd week. This is

### Table-III

<table>
<thead>
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<th>Adverse Effects</th>
<th>Azithromycin Group (n=33)</th>
<th>Ciprofloxacin Group (n=27)</th>
</tr>
</thead>
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<tr>
<td>Vomiting and Nausea</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>Diarrhoea</td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>Abdominal Pain</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Anorexia</td>
<td>7</td>
<td>9</td>
</tr>
</tbody>
</table>

Some adverse effects (table-3) of both study drugs, like vomiting, nausea and anorexia, diarrhoea, abdominal pain, were reported in both treatment groups. The adverse effects were not severe and did not result in change of study medication.
similar to the findings of another study in Bangladesh, where 13.1% of patients of enteric fever had presented during the 1st week of illness. In this study, according to culture report Salmonella typhi was sensitive to azithromycin in 90% cases and to ciprofloxacin in 78% cases. Ceftriaxone was sensitive to 100% cases. Ampicillin/amoxicillin was sensitive only in 21% of cases, co-trimoxazole was only in 27% cases. Nalidixic acid was resistant to all cases. In a study performed by Alam et al in Bangladesh 14 years back Salmonella were sensitive to ciprofloxacin and pefloxacin in 100% cases and to ceftriaxone in 97.54% cases and sensitivity to amoxycillin, co-trimoxazole and chloramphenicol in about 50% of cases. The present study and the study of Alam et al in 1992 showed the emergence of multi drug-resistant enteric fever in Bangladesh with the changing antibiotic sensitivity pattern. Since 1992, ciprofloxacin or third generation cephalosporin (namely ceftriaxone) have become the first line of treatment of enteric fever. But in 1999, ceftriaxone resistant Salmonella typhi was detected in Bangladesh. Ciprofloxacin resistant enteric fever was found in the western country in 2001. Ciprofloxacin or multi-drug resistant enteric fever seems to be on increase particularly in the developing countries including China, India and Pakistan.

In this study comparative randomized trial of azithromycin and ciprofloxacin for treatment of enteric fever indicates that the two treatments were effective and comparable. In azithromycin group 90.1% patients became clinically cured & in ciprofloxacin group 77% became clinically cured. In this study both the drugs were effective and comparable and it took average 5 days for remission of fever. Only few differences between the two treatment groups were observed. Though percentage responded to treatment were different in azithromycin (90.1%) and ciprofloxacin (77%) group, but they were statistically insignificant (p>0.05). Fever clearance time in both treatment groups was also similar. For azithromycin group it was 4 ± 1.4 days and for ciprofloxacin it was 4.1 ± 1.55 days. These differences were also statistically insignificant. Adverse effects of nausea or vomiting, lightheadedness, dry throat, etc. were reported occasionally in the both treatment groups. These events were mild or moderate and did not result in interruption of therapy and could be attributed in part to the enteric infections.

Though there is limitation of frequent culture to confirm relapse, by doing frequent clinical follow up it was assumed that in both azithromycin and ciprofloxacin group there was no relapse.

In the present study the two study drugs were very different in regard to their administration, pharmacokinetics, and therapeutic principles. Azithromycin was given once daily in a dose of 1000 mg at 1st day, then 500 mg daily for next 6 days, whereas ciprofloxacin was given 500 mg twice a day for 14 days. Both drugs penetrate cells effectively, and this intracellular penetration explains the effective therapeutic activity against the predominantly intracellular pathogen S. typhi.

In azithromycin group 15% patients showed moderate sensitivity in culture sensitivity report. Despite moderate sensitivity in sensitivity reports those patients got azithromycin and became cured. In the other hand in spite of 78% disc sensitivity of ciprofloxacin, 6 patients among ciprofloxacin groups (out of 27 patients) were not clinically cured. Ciprofloxacin in spite of disc sensitivity showed poor clinical response than azithromycin. This indicates differences of in vitro & in vivo sensitivity in both treatment groups.

Another interesting finding was that in vitro resistance to azithromycin did not correlate well with it’s in vivo effectiveness against enteric fever. This is possibly because susceptibility testing is based on serum drug levels, where as for enteric fever, a major mechanism of action is thought to be intracellular killing, in which the azithromycin levels may be 100-fold greater than serum levels.

Several studies have demonstrated the effectiveness of azithromycin for the treatment of uncomplicated enteric fever in children, adolescents, and adults. In each of the studies, clinical and microbiological cure rates have exceeded 90% without any serious adverse effects or relapses of enteric fever. The present study also gives the same type result.

However complete clinical response at discharge and no relapse on follow up was considered as cure. During treatment, at the end of treatment and at follow-up, blood cultures were not done due to financial constraints. This is the major limitation of this study.

The result of this comparative randomized trial of azithromycin and ciprofloxacin for enteric fever indicated that the two treatments were effective and comparable by giving clinical cures and improvements. A 7 day course of azithromycin is effective against uncomplicated enteric fever in adults. Cost and compliance, as well as safety and efficacy, need to be considered when choosing regimens for treating enteric fever in countries with limited resources where the disease is endemic. Ciprofloxacin is cheaper than azithromycin, but due to emergence of
drug resistance, the optimum ciprofloxacin regimen for these resistant infections will require an increase in the dose and possibly also the duration of treatment. This will increase the cost. Patients with multi drug resistant enteric fever have been treated successfully with costly drugs like ceftriaxone, cefixime, aztreonam, On the other hand azithromycin is much less expensive than the third generation cephalosporins. The once daily administration of azithromycin, with the short duration of therapy, may improve compliance and also ease treatment of enteric fever. More over azithromycin will be cost effective and suitable for use in areas where medical resources are limited.

Conclusion
In this study, azithromycin appears to be as effective as ciprofloxacin in treating enteric fever. Further study with repeated culture facilities to prove both microbiological as well as clinical cure will be very much helpful for establishing azithromycin in treatment of enteric fever and testing whether the duration of therapy can be further shortened to minimize costs while maintaining efficacy.

References:


Introduction
Myokymia, a form of involuntary muscular movement, usually can be visualized on the skin as vermicular or continuous rippling movements in small muscles of hands, limbs, eyes and calf muscles. The word myokymia was used first more than 100 years ago, when Schultze described continuous, slow, undulating muscular contractions in small muscles of hands and feet. Kny used the term myoclonus fibrillaris multiplex to describe similar clinical manifestations. For the past century, different authors applied the term myokymia to different involuntary muscular movements. Most of them showed electromyographic (EMG) changes.

Case Report
This 13-year-old girl presented to us with pain in the left calf muscle for 2 months which was 1st started while playing badminton. Initially she was treated with different NSAIDs in adequate dose without any significant clinical improvement. For the last 15 days she also noticed that her calf was progressively increasing in size and became stiff with excessive sweating on overlying skin. On query she complained of discomfort feeling of left calf muscle for last 5 years. On examination her vitals were stable, the left calf is sweaty, swollen, firm and tender (Fig.-1). There was frequent rippling movement of the calf muscles. The other muscles of that limb including the thigh and leg including knee joint was normal. Her nervous system examination revealed no abnormality.

On investigation, CBC was normal. Muscle enzymes including aminotransferase (SGPT & SGOT), Creatinine kinase and Lactate Dehydrogenase were normal. S Electrolytes & calcium was also normal. Thyroid function test was also normal. USG of the left calf showed oedematous and thickened both Gastrocnemius & Soleus. X-ray chest and X-ray Lumbo-sacral spine was normal. MRI revealed oedematous and thickened gastrocnemius and soleus muscle (Fig 2a & 2b). Electromyogram (EMG) & NCV of the left limb was also normal. With these findings she was diagnosed as myokymia of the left calf muscle. After counseling the she was discharged with advice of relevant exercise. On her follow up after one month, her symptoms partially subsided.

Abstract
Myokymia, a form of involuntary muscular movement, usually can be visualized on the skin as vermicular or continuous rippling movements in small muscles of hands, limbs, eyes and calf muscles. Here we present a 13-year-old female who presented with pain and stiffness of left calf muscle for one month. Her calf muscle was swollen and tender. Muscle enzymes, Electromyography, Nerve Conduction studies revealed no abnormality. A diagnosis of myokymia of calf muscle was made on the basis of clinical scenario and exclusion of other relevant diseases and she was on physiotherapy with partial improvement over a period of 2 months.

Key words: Myokymia
Discussion
Myokymia may present with

• Pain, cramps, spasms, weakness, stiffness, or twitching of affected muscles.

• Sensory symptoms are reported rarely, unless the underlying etiology(ies) includes sensory nerve involvement.

• Typical myokymic discharges also can be seen in the EMGs of patients referred for totally unrelated complaints.

Physical
Findings of facial myokymia, segmental or focal myokymia in other areas of the body, and generalized myokymia are somewhat different in physical examination and in their potential etiologies; therefore, they are discussed separately.

• Facial myokymia
  o Affected muscles show slow, undulating, fine movements on the surface of the skin due to activation of the most superficial muscle layers. Facial weakness can be present in the involved muscles.
  o EMG study shows typical myokymic discharges of spontaneous, rhythmic/semirhythmic bursts of normal-appearing potentials of 30-60 Hz. The bursts of each group of potentials are followed by a period of silence, with subsequent repetition of grouped discharges of identical potentials. The spontaneous activities are not altered by voluntary activation of the muscles.

• Focal or segmental myokymia
  o These types of myokymia commonly are seen in the limbs or particular segmental level(s). Physical findings mostly are related to the underlying etiology(ies), which is usually asymptomatic and not a major concern of the patient.
  o EMG study shows myokymic discharges similar to those recorded in facial myokymia.

• Generalized myokymia
  o A triad of myokymia, muscular stiffness, and decreased deep tendon reflexes was first described by Isaacs in 1961; it also is called Isaacs syndrome. Muscle weakness and atrophy and excessive sweating are frequently associated features. Smooth muscles and cardiac muscles typically are spared.
  o Sensory symptoms are rarely present.
  o The muscular stiffness is different than that seen in myotonia, both clinically and electrodiagnostically. Although both can be exacerbated by cold, myokymia can be detected when the muscle is at rest and during sleep. Patients with myotonia are normal at rest; the stiffness is induced by mechanical stimulation.

  o The myotonic discharge recorded by EMG ceases upon relaxation of the muscle, while spontaneous grouped discharges of myokymia persist for some time, well above the abnormal pattern that was present before the voluntary contraction.
The EMG features encountered in patients with generalized myokymia include the previously described typical myokymic discharge or neuromyotonia, which has a much higher frequency of discharges (up to 300 Hz).

Generalized myokymia in other clinical entities shares less consistent clinical manifestations.

**Causes**

- Facial myokymia
  - This type of myokymia is seen more commonly than other types.
  - Facial myokymia has been reported to be associated with inflammatory demyelinating diseases, brainstem neoplasms, Guillain-Barré syndrome, or other intramedullary pontine lesions. Facial myokymia also has been reported in patients with history of radiotherapy, with findings similar to those of more common brachial or lumbar radiation plexopathies.

- Focal or segmental myokymia
  - The majority of patients with a history of radiation therapy have myokymic discharges detected within the field of radiation. Metastatic lesions generally are believed to be less likely to generate myokymia. The amount of radiation ranges widely, though myokymia rarely is reported with radiation doses less than 10 gray (Gy).
  - Electrodiagnostic findings are usually consistent with plexopathy. Other less common causes include acute or chronic inflammatory polyradiculoneuropathy (with or without coexistent systemic vasculitis), ischemic or traumatic focal neuropathy, and entrapment neuropathy, polyradiculopathy secondary to torticollis, syringomyelia, and chronic idiopathic plexopathy.

- Transient myokymia, described in the calf or hand muscles, was reported after brief strenuous exercise. It usually resolves spontaneously over weeks to months.

**TREATMENT:** Most of the cases do not require treatment. It will get better within weeks to months. But if the symptom persists or intolerable then we can add one of the following, Beta blockers, Carbamazepine, Gabapentin or Baclofen.

**Consent**

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

**Competing Interest**

The authors declare that they do not have any competing interests.

**References**

CHEST WALL DEFORMITY WITH SEVERE RESPIRATORY DISTRESS- A RARE PRESENTATION OF PARATHYROID ADENOMA

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Abstract
Primary hyperparathyroidism is a generalized disorder of calcium, phosphate, and bone metabolism due to an increased secretion of PTH. The elevation of circulating hormone usually leads to hypercalcemia and hypophosphatemia. There is great variation in the manifestations. Patients may present with multiple signs and symptoms, including recurrent nephrolithiasis, peptic ulcers, mental changes and extensive bone resorption. We present a 26 year old young man of Primary Hyperparathyroidism due to adenoma with severe respiratory distress due to chest wall deformity as a result of multiple vertebrae and rib fracture. His diagnosis was confirmed by Imaging and FNAC. He was referred to surgery department but due to poor respiratory and cardiac reserve and also fragile mandible he was repeatedly refused in preanesthetic check up.

Introduction
Primary Hyperparathyroidism (PHPT) is an unstimulated and inappropriately high secretion of parathyroid hormone for the concentration of plasma ionized calcium. Primary hyperparathyroidism is estimated to be prevalent in approximately 1% of adult population and the usual causes are parathyroid adenoma, hyperplasia and, rarely, parathyroid carcinoma. The diagnosis of PHPT is a rarity in developing countries probably because of the difficulty of making a diagnosis in an environment where there are limited facilities for serum calcium estimation, parathyroid hormone assay and parathyroid gland imaging. The diagnosis can be very perplexing especially because the expected hypercalcaemia associated with PHPT may be masked by calcium, protein or vitamin D deficiency. It is a case report of PHPT presenting with severe respiratory distress, due to chest wall deformity, fever, multiple fractures in different long and short bones with pneumonia secondary to parathyroid adenoma.

Case Report
A 26-year-old male hailing from Patuakhali presented to us with weakness, tingling and numbness of the limbs for the last 6 years, gradually developing deformity of chest wall with shortness of breath for 15 months, decreasing in height for the same duration, unable to walk for the last 2 months. This young man presented with weakness of the limbs for the last 6 years. At first there was proximal muscle weakness, later it became

Fig 1: Severe chest deformity

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generalized. Now he is unable to walk and cannot do his daily activities. He had multiple low trauma fractures which healed spontaneously. Now for the last 15 months his height is decreased which is due to multiple vertebral fracture. He also developed severe shortness of breath due to chest wall deformity. He had kyphoscoliosis with fracture of multiple ribs and clavicle. Other systemic examination including cardiovascular, respiratory and abdomen revealed no abnormality.

Investigation shows, Hb: 10.8gm/dl, ESR: 100 mm in 1st hour. Total count 8000/cmm. Thyroid Function test, TSH 1.92mIU/L, FT4: 8.94pmol/L, FT3: 2.28pmol/L, S Creatinine: 0.9mg/dl, S Alkaline Phosphatase: 1703 U/L, Serum corrected Calcium: 15.7mg/dl, S Inorganic Phosphate: 3.5 mg/dl, S PTH: more than 2500pg/ml, S Electrolytes and S urea in normal.

X-Ray Skull, hands, pelvis, both knees: Diffuse Osteopenia with absorption of distal phalanx in both hands. Bones of the pelvic cavity with thoracic cavity are deformed. Kyphoscoliosis with reduction of body height of dorsal vertebrae at different level is seen. All skeletal survey is competitive with Hyperparathyroidism.

SG of thyroid: A mixed echogenic area having internal calcification is noted within the both parathyroid gland, right one is measuring about 15x13 mm and left one is measuring about 38x22 mm. Both are suggestive of parathyroid mass. FNAC of parathyroid mass: Smear show mostly chief cells and cell with abundant eosinophilic cytoplasm arranged in clusters and small round nuclei suggestive of parathyroid adenoma. Spirometry: Severe restrictive airway disease. Echocardiography: within normal limit. Parathyroid Scintigraphy: Suggests suspected case of intrathyroidal parathyroid adenoma.

Table-I

<table>
<thead>
<tr>
<th>Laboratory variables</th>
<th>Patient’s value</th>
<th>Normal range</th>
</tr>
</thead>
<tbody>
<tr>
<td>S Calcium mg/dl</td>
<td>15.7</td>
<td>8.6-10.8</td>
</tr>
<tr>
<td>S Phosphate mg/dl</td>
<td>03.5</td>
<td>2.5-5.0</td>
</tr>
<tr>
<td>S Alkaline Phosphatase U/L</td>
<td>1703</td>
<td>100-290</td>
</tr>
<tr>
<td>S PTH pg/ml</td>
<td>&gt;2500</td>
<td>10-60</td>
</tr>
</tbody>
</table>
After the investigations we have diagnosed him as a case of primary hyperparathyroidism. We have treated him with optimum medical management by consultation with endocrinologist and latter referred him to endocrine surgery wing of surgery department of BSMMU. Who agreed for the surgical removal of the adenoma. But due to poor respiratory and cardiac reserve and also fragile mandible and chest he was repeatedly refused in the preanaesthetic checkup. So he was discharged with adequate medical management and return after improvement of general condition for anaesthesia fitness and adenoma removal.

**Discussion**

Primary hyperparathyroidism (PHPT) is a disease commonly due to solitary parathyroid adenoma. It was considered rare in developing countries but recent experience has shown that its apparent rarity may be due to paucity of reports from these countries and also to limited diagnostic facilities. Our case has shown that with adequate facilities, more reports of the disease may soon be emanating from developing countries. Primary hyperparathyroidism (PHPT) has protean manifestations. The advent of automated serum biochemical analysis has highly augmented its diagnosis. The incidence of metabolic bone disease in patients with PHPT in developing countries is very high. The reasons for this are the high prevalence of protein, vitamin D and dietary calcium deficiencies and the high dietary phytate and phosphates in some cultures. It is therefore pertinent for clinicians practicing in the developing countries to note that nutritional deficiencies can be seen in their patients, unlike those from the developed nations, making hypercalcaemia irrelevant in the diagnosis of PHPT.

**References**


18. Suh JM, Cronan JJ, Monchik JM. “Primary hyperparathyroidism: is there an increased prevalence of renal stone disease?” Am J Roentgen 2008; 191 (3); 908–911.


Introduction

Seborrheic dermatitis, also known as seborrheic eczema, is a chronic papulo-squamous dermatosis that is associated with increased sebum production (seborrhea) of the scalp and the sebaceous follicle-rich areas of the face and trunk. Seborrheic dermatitis is a common disease and occurring in 2% to 5% of the population. Dandruff, the mildest form of seborrheic dermatitis, is probably far more common and is present in an estimated 15-20% of the population. Seborrheic dermatitis is more common in patients with Parkinson’s disease or mood disorders and those with HIV/AIDS than in the general population. The prevalence of seborrheic dermatitis among HIV-positive and AIDS patients between 34% and 83%. The disease is characterized by scaling on an erythematous base. Itching may be severe. In extreme cases a greasy, dirty crust with an offensive odor covers the entire scalp. The lesions may also become generalized and progress to a generalized exfoliative erythroderma (erythroderma desquamativum). The cause of seborrheic dermatitis is unknown; immunological, nutritional, environmental and lifestyle factors that might increase the predisposition to seborrheic dermatitis. There may also be a hormonal influence, not only those the disease begin to develop at puberty, but seborrheic dermatitis is more common in men than in women, suggesting an influence of androgens on the pilosebaceous unit. Seborrheic dermatitis is also associated with chronic alcoholic pancreatitis, hepatitis C virus and various cancers. Arsenic, gold, methyldopa, cimetidine, and narcoleptics drugs; postencephalitic parkinsonism, epilepsy, poliomyelitis, syringomyelia, biotin deficiency and abnormal metabolism of essential fatty acids have been proposed as possible mechanisms. Seborrheic dermatitis may be coincident with other dermatological disorders, e.g. rosacea, ocular irritation or blepharitis. Diseases associated with Malassezia spp. are also commonly found in patients with seborrheic dermatitis, these include pityriasis versicolor and pityrosporum folliculitis. Seborrheic dermatitis in HIV-positive and

Abstract

A cross sectional study was carried out with total one hundred thirty seven patients of seborrheic dermatitis for a period of total two years from department of Dermatology and Venereology, Bangabandhu Sheikh Mujib Medical University (BSMMU) Dhaka, Bangladesh to assess the clinical-epidemiological profile of seborrheic dermatitis. The mean age of the patients was 36.6 years and among the patients, highest percentage of patients, 88(64.2%) were in between the 31-40 years old, 71(51.8%) had higher secondary level of education, 79(57.7%) had monthly family income >10,000 taka, 124(90.5%) were married, 79(57.7%) were male and 58(42.30%) were involve in business. It was observed that 88(64.2%) had complaints of itching, followed by 79(57.7%) had complaints of greasy crust and 58(42.3%) had complaints of seborrhea. It was seen that maximum 48(35.0%) had been suffering for less than 1 year of duration and 88(64.2%) had involvement of scalp, followed by eyebrow 37(27%) and other areas. It was observed that erythema was mild in 58(42.3%) cases; moderate in 31(22.6%) cases, severe in 27(19.7%) cases and 21(15.3%) had no erythema. It was showed that 77(56.2) % had mild type papular eruption, 16(11.7) had moderate and 7(5.1) had severe papular eruption and 37(27.0) had no papular eruption and it was observed that squamation was mild in 74(54.0) cases, moderate in 43(31.4) cases, and severe in 20(14.0) cases. It was showed that 58(42.3%) had no associated disease but 37(27.0) had pityriasis versicolor, 20(14.0) had acne vulgaris, 16(11.7%) had neurological disorder and some other disease associated with seborrheic dermatitis.

Key words: Seborrheic dermatitis, clinical profile, epidemiological profile.
AIDS patients is more severe than the usual immune deficiencies. Patients with seborrhoeic dermatitis may show up regulation of interferon (IFN)-g, expressed interleukin (IL)-6, expressed-IL-1a, and IL-4. Expressions of cytotoxicity activating ligands and recruitment of natural killer (NK) cells have also been noted. Unfortunately there is no data base study with the profile of disease over Bangladeshi people. Limited information is available regarding this. The present study was designed to assess the profile of seborrhoeic dermatitis.

**Materials and Methods**

This was a cross sectional study, carried out for a period of total two years from January 2008 to December 2009. Total one hundred thirty seven patients of seborrheic dermatitis were subjected purposively from department of Dermatology and Venereology, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh. Purposive type non-probability sampling technique was followed in this study. Questionnaire was developed for collection of relevant information. By face to face interview and also from clinical record data were collected from patient. The patient of seborrheic dermatitis was identified first and verbal and written consent was taken from patients. Then clinical conditions of the patient were recorded by us. After collection of data, all the data were analyzed by software SPSS (Statistical Package for Social Science) method.

**Results**

Total one hundred thirty seven patients were studied for a period of total two years. The mean age of the patients in table-I was 36±6.6 years and their highest percentage of patients, 88(64.2%) were in between the 31-40 years old, followed by 20(14%) were 21 to 30 years old, 16(11.7%) were 41-50 years old, 7(5.1%) were 51-60 years old and 6(16.2%) were in between the 11-20 years old. It was found that 15(10.9%) had primary level of education, 27(19.7%) had secondary level of education, 71(51.8%) had higher secondary level of education, 21(15.3%) had graduation level of education and 3(2.2%) were illiterate. Among the patients, more than half the patients 79(57.7%) had monthly family income >10,000 taka and 37(27%) had monthly family income 6000 to 10, 000 taka and 21(15.3%) had monthly family income 1000 to 5000 taka. The mean monthly family income was 10,432.43 taka with standard deviation of 4,186.88 taka and it was observed that 124(90.5%) were married and only 13(9.5%) were unmarried. It was found from figure I that majority of patients 79(57.7%) were male and 58(42.3%) were female. Figure II showed that majority of the patients 58(42.30%) were engaged in other types of occupation. The table II observed that 88(64.2%) had complaints of itching, followed by 79(57.7%) had complaints of greasy crust and 58(42.3%) had complaints of seborrhea. Among the 137 patients, 48(35.0%) had been suffering for less than 1 years of duration, 31(22.6%) had been suffering for 1 to 5 years of duration, 37(27%) had been suffering from 6 to 10 years and 21(15.3%) patient had been sufferings for more than 10 years. Regarding site of the lesion, maximum 88(64.2%) had involvement of scalp, followed by face 37(27%), trunk 21(15.3%), creases (naso-labial, submammary, axilla, groin and gluteal creases) 20(14%), ear 16(11.7%), and involvement of other area were 15(10.9%). Table III showed that erythema was mild in 58(42.3%) cases, moderate in 31(22.6%) cases, severe in 27(19.7%) cases and 21(15.3) had no erythema. It was observed that 77(56.2%) had mild type papular eruption, 16(11.75) had moderate and 7(5.1%) had severe papular eruption and 37(27.0%) had no papular eruption. Regarding grading of squamation of the patients, it was observed that squamation was mild in 74(54.0%) cases, moderate in 43(31.4%) cases, and severe in 20(14.0%) cases. Table IV showed the distribution of patients by associated diseases and it was observed that 58(42.3%) had no associated disease but 37(27.0) had pityriasis versicolor, 20(14.0) had acne vulgaris, 16(11.7%) had neurological disorder, 3(2.2%) had rosacea, 2(1.4%) had psychiatric disorder and 1(0.7%) had HIV infection.

**Table I**

<table>
<thead>
<tr>
<th>Distribution of the patient by epidemiological profile (n=137)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Epidemiological profile</strong></td>
</tr>
<tr>
<td><strong>Age(in years)</strong></td>
</tr>
<tr>
<td>11-20</td>
</tr>
<tr>
<td>21-30</td>
</tr>
<tr>
<td>31-40</td>
</tr>
<tr>
<td>41-50</td>
</tr>
<tr>
<td>51-60</td>
</tr>
<tr>
<td><strong>Level of educational</strong></td>
</tr>
<tr>
<td>Primary level</td>
</tr>
<tr>
<td>Secondary level</td>
</tr>
<tr>
<td>Higher Secondary level</td>
</tr>
<tr>
<td>Graduate and above</td>
</tr>
<tr>
<td>Illiterate</td>
</tr>
<tr>
<td><strong>Monthly income</strong></td>
</tr>
<tr>
<td>1000-5000</td>
</tr>
<tr>
<td>6000-10000</td>
</tr>
<tr>
<td>&gt;10000</td>
</tr>
<tr>
<td><strong>Marital status</strong></td>
</tr>
<tr>
<td>Married</td>
</tr>
<tr>
<td>Unmarried</td>
</tr>
</tbody>
</table>
Clinico-Epidemiological Profile of Seborrheic Dermatitis

Table II
Distribution of the patient by complaints, duration of lesions and site of lesions (n=137).

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complaints</td>
<td></td>
</tr>
<tr>
<td>Itching</td>
<td>88(64.2%)</td>
</tr>
<tr>
<td>Greasy crust</td>
<td>79(57.7%)</td>
</tr>
<tr>
<td>Seborrhea</td>
<td>58(42.3%)</td>
</tr>
<tr>
<td>Duration of lesion</td>
<td></td>
</tr>
<tr>
<td>Less than 1 year</td>
<td>48(35.0%)</td>
</tr>
<tr>
<td>1 to 5 years</td>
<td>31(22.6%)</td>
</tr>
<tr>
<td>6 to 10 years</td>
<td>37(27.0%)</td>
</tr>
<tr>
<td>More than 10 years</td>
<td>21(15.3%)</td>
</tr>
<tr>
<td>Site of lesion</td>
<td></td>
</tr>
<tr>
<td>Scalp</td>
<td>88(64.2%)</td>
</tr>
<tr>
<td>Face (eyebrow, eyelid etc)</td>
<td>37(27%)</td>
</tr>
<tr>
<td>Trunk</td>
<td>21(15.3%)</td>
</tr>
<tr>
<td>Creases area</td>
<td>20(14%)</td>
</tr>
<tr>
<td>Ear</td>
<td>16(11.7%)</td>
</tr>
<tr>
<td>Others</td>
<td>15(10.9%)</td>
</tr>
</tbody>
</table>

Table III
Distribution of patients by clinical findings (n=137).

<table>
<thead>
<tr>
<th>Clinical findings</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Erythema</td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>21(15.3%)</td>
</tr>
<tr>
<td>Mild</td>
<td>58(42.3%)</td>
</tr>
<tr>
<td>Moderate</td>
<td>31(22.6%)</td>
</tr>
<tr>
<td>Severe</td>
<td>27(19.7%)</td>
</tr>
<tr>
<td>Papular eruption</td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>37(27.0%)</td>
</tr>
<tr>
<td>Mild</td>
<td>77(56.2%)</td>
</tr>
<tr>
<td>Moderate</td>
<td>16(11.7%)</td>
</tr>
<tr>
<td>Severe</td>
<td>7(5.1%)</td>
</tr>
<tr>
<td>Squamation</td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>0(0.0%)</td>
</tr>
<tr>
<td>Mild</td>
<td>74(54.0%)</td>
</tr>
<tr>
<td>Moderate</td>
<td>43(31.4%)</td>
</tr>
<tr>
<td>Severe</td>
<td>20(14.0%)</td>
</tr>
</tbody>
</table>

Table IV
Distribution of patients of seborrheic dermatitis by associated diseases (n=137)

<table>
<thead>
<tr>
<th>Associated diseases</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>58(42.3%)</td>
</tr>
<tr>
<td>Pityriasis versicolor</td>
<td>37(27.0)</td>
</tr>
<tr>
<td>Acne vulgaris</td>
<td>20(14.0)</td>
</tr>
<tr>
<td>Neurological disorder</td>
<td>16(11.7)</td>
</tr>
<tr>
<td>Rosacea</td>
<td>3(2.2%)</td>
</tr>
<tr>
<td>Psychiatric disorder</td>
<td>2(1.4%)</td>
</tr>
<tr>
<td>HIV infection</td>
<td>1(0.7%)</td>
</tr>
</tbody>
</table>

Discussion
Total one hundred thirty seven patients were enrolled. The mean age of the patients was 36±6.6 years and their highest percentage of patients, 88(64.2%) were in between the 31-40 years old, followed by 20(14%) were 21 to 30 years old, 16(11.7%) were 41-50 years old, 7(5.1%) were 51-60 years old and 6(16.2%) were in between the 11-20 years old, similar to the study finding of Baysal et al. Where thirty two adult patients with seborrheic dermatitis were recruited for the study with mean age 33.3±9.03 years and age ranged from 18-57 years. It was found that majority of patients 79(57.7%) were male and 58(42.3%) were female, similar to the study finding of Baysal et al where
among thirty two adult patients 19(59.4%) were male and 13(40.6%) were female and also similar to the study finding of Koca et al where among eighty four adult patients 52(61.9%) were male and 32(38.1%) were female. 

It was observed that 88(64.2%) had complaints of itching, followed by 79(57.7%) had complaints of greasy crust and 58(42.3%) had complaints of seborrhea and regarding site of the lesion, maximum 88(64.2%) had involvement of scalp, followed by face 37(27%) and trunk 21(15.3%), similar finding observed by Freedberg and James. 

Table III showed that erythema was mild in 58(42.3%) cases, moderate in 31(22.6%) cases, severe in 27(19.7%) cases and 21(15.3) had no erythema. It was observed that 77(56.2%) had mild type papular eruption, 16(11.75) had moderate and 7(5.1%) had severe papular eruption and 37(27.0%) had no papular eruption. Regarding grading of squamation of the patients, it was observed that squamation was mild in 74(54.0%) cases, moderate in 43(31.4%) cases, and severe in 20(14.0%) cases, similar finding observed by Freedberg. 

It was observed that 58(42.3%) had no associated disease but 37(27.0) had pityriasis versicolor, 20(14.0) had acne vulgaris, 16(11.7) had neurological disorder, 3(2.2%) had rosacea, 2(1.4%) had psychiatric disorder and 1(0.7%) had HIV infection, similar finding observed by Gupta et al, where seborrheic dermatitis were associated with rosacea and acne vulgaris. 

Conclusion
The study revealed that majority of patients of seborrheic dermatitis were within the thirty one to forty years old, higher secondary level of education, monthly family income more than ten thousand taka, married, male and engaged in business mainly. Among the patients, most patients had itching and greasy crust than seborrhea, duration of lesion mainly less than one year, involve mainly scalp and then face and trunk. It was observed that majority of patients had mild type erythema, papular eruption and squamation and associated with pityriasis versicolor and acne vulgaris mainly.

References:
ORIGINAL ARTICLES

COMPARATIVE PREVALENCE OF IRRITABLE BOWEL SYNDROME (IBS) USING MULTIPLE DIAGNOSTIC CRITERIA

IRIN PERVEEN1, MAHMUD HASAN2

Abstract
Object : The variation in the prevalence of IBS may be due to the application of different diagnostic criteria. This study aimed to find out the comparative prevalence of IBS in an urban community using different standard definitions (Rome and Manning criteria) and to determine the degree of agreement between these definitions.

Methods: This population-based cross-sectional survey involved interview of 1503 persons (15 - 97 years) in an urban community using a valid questionnaire based on internationally accepted Manning and Rome criteria. The threshold for a positive diagnosis varied from two to three Manning criteria, Rome I and Rome II criteria. Statistical analysis was performed with Statistical package for social science (SPSS) programmers and the level of significance was set at P < 0.05. A Kappa (κ) statistics were calculated to assess the agreement between the study definitions.

Results : A response rate of 97.2% yielded 1503 questionnaires for analysis. Prevalence estimates of IBS according to Manning > 2, Manning > 3, Rome-I and Rome-II criteria were 7.3, 1.8%, 7.7% and 8.1% respectively. IBS was 1.3 to 1.7 times more prevalent in females than males irrespective of the diagnostic criteria used. A ‘substantial’ to ‘near perfect’ agreement between all commonly used definitions of IBS with highest level of agreement between Rome-I and Rome-II (κ of 0.912) were found in the present study.

Conclusion: The prevalence of IBS varies significantly depending of the diagnostic criteria employed. It can be assumed that nearly all the standard definitions (Manning >2, Rome I and Rome II) are almost equally sensitive in identifying IBS subjects in the community.

Introduction
Functional gastrointestinal disorders and in particular irritable bowel syndrome is a common disorder and has a world wide distribution. The overall prevalence rate is similar (approximately 10-20%) in most industrialized countries1, 2, 3. A few studies conducted in Bangladesh reported that IBS is a common disorder in this population4, 5, 6. However their sample sizes were small and included selected groups of subjects. In the first community based survey using Rome II criteria, authors reported a prevalence of IBS of 24.4% in a rural population4.

It has been suggested that the variation in the prevalence of IBS may be due to the application of different diagnostic criteria. The prevalence estimates for IBS from population survey among American, European and Australian adults vary from 2.1-32% due to the diversity of definitional criteria used7, 8, 9, 10, 11. The prevalence estimates varies even in the same population when different diagnostic criteria are used simultaneously9,12, 13, 14. In general, studies requiring only two Manning criteria gave a higher prevalence estimates than those requiring more stringent criteria, such as 3 Manning or Rome criteria. Although Masud et. al.4 used Rome II and Manning criteria in the rural survey, no comparative study was conducted in Bangladesh using multiple criteria in the same population.

The aim of the present study was to find out the overall prevalence of IBS in an urban community of Bangladesh using different standard definitions (Rome and Manning criteria). This study also aimed to assess how the use of different diagnostic criteria influences estimated IBS prevalence.

Materials and Methods
This observational study was conducted from the months of November 2004 to March 2005. A valid

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2. Former Chairman and Professor, Department of Gastroenterology, BSMMU

Bangladesh J Medicine 2010; 21 : 1-6
questionnaire was administered, using home-based personal interviews, to 1503 subjects aged > 15 years in a defined area of Dhaka city of Bangladesh.

**Questionnaire:** The questionnaire was based on previously published study conducted abroad and internationally accepted Manning and Rome criteria for diagnosis. Bengali translation of the questionnaire was validated by the method of forward and backward translation. For quality assurance, and to evaluate the comprehensibility and appropriateness of the information, an initial survey with the questionnaire was done on 30 selected samples. That initial survey showed that the questions were easily understandable by the study population.

**Study definitions:**
For the study, 4 main definitions of IBS were considered: “Manning ≥ 2”, “Manning ≥ 3”, “Rome-1”, and “Rome-II”. “Manning ≥ 2” required the presence of recurrent abdominal pain (more than six times in the past one year) and two or more of the six “Manning” criteria occurring at least 25% of time in the past one year. “Manning ≥ 3” required recurrent abdominal pain and three or more Manning criteria (appendix-1).

“Rome-I” criteria required recurrent abdominal pain (more than six times in the past one year) and at least one of the three abdominal pain symptoms as outlined in appendix-1 occurring more than a quarter of the time in the past one year, plus two or more of the five Rome defaecation symptoms occurring more than 25% of the time in the preceding one year. “Rome-II” criteria required abdominal pain and at least two or more of the three abdominal pain symptoms (appendix-1) occurring more than a quarter of the time in the preceding one-year.

**Appendix I**
*Diagnostic Criteria for Irritable Bowel Syndrome.*

<table>
<thead>
<tr>
<th>Manning Criteria</th>
<th>Rome I Criteria</th>
<th>Revised Rome Criteria (Rome II)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two or more of the following symptoms:</td>
<td>At least 3 months of continuous or recurrent symptoms of</td>
<td>*At least 12 weeks, which need not be consecutive, in the preceding 12 months of abdominal discomfort or pain that has 2 of 3 features:</td>
</tr>
<tr>
<td><em>Abdominal pain relieved by defaecation.</em></td>
<td>*Abdominal pain or discomfort – 1. Relieved with defaecation; and/or 2. Associated with a change in frequency of stool; and/or 3. Associated with a change in consistency of stool; and/or</td>
<td>1. Relieved with defaecation; and/or 2. Onset associated with a change in frequency of stool; and/or 3. Onset associated with a change in form (appearance) of stool.</td>
</tr>
</tbody>
</table>
| *Looser stools with onset of pain.* | *Two or more of the following, at least on one-fourth of occasions or days: 1. Altered stool frequency (for research purpose “altered” may be defined as >3 bowel movements each day or <3 bowel movements each week); 2. Altered stool form (hard /lumpy or loose/watery ); 3. Abnormal stool passage (straining, urgency, or feeling of incomplete evacuation); 4. Passage of mucous; and Usually with: 5. Bloating or feeling of abdominal distension.* | *Symptoms that cumulatively support the diagnosis of IBS: 1. Abnormal stool frequency (for research purposes, “abnormal” may be defined as greater than 3 bowel movements per day and less than 3 bowel movements per week); 2. Abnormal stool form (lumpy /hard or loose/watery stool); 3. Altered stool passage (straining, urgency, feeling of incomplete evacuation); 4. Passage of mucous;*
| *More frequent stools with the pain onset.* | | |
| *Passage of mucous with stools.* | | |
| *Abdominal distension (visible).* | | |
| *Sensation of incomplete rectal evacuation.* | | |
No laboratory tests or endoscopic examinations were done in the study due to lack of feasibility.

**Statistical analysis:** The statistical analysis was performed with computer-based Statistical package for social science (SPSS) programmers. Age and sex specific prevalence of IBS was found out by each of the three criteria. Six comparisons were made between the criteria i.e. each of the two Rome definitions were compared separately to the Manning definitions and comparisons were also made between Manning definitions and Rome definitions. Kappa ($k$) values, along with 95% confidence interval, were calculated for each comparison. Significance value during comparisons were assessed using Chi-squared test with Yates’ correction, whenever necessary, and the level of significance was set at $P < 0.05$.

### Results

The area included in this study had 1547 persons aged 15 years and above. Of them, 744 were male and 793 were female, out of which 726 males (97.58%) and 777 females (97.98%) were interviewed and included in this study. The mean age of the study population was $32.18 \pm 12.98$ years with an age range of 15 to 97 years.

### Prevalence of IBS

The sociodemographic characters and the crude, age and gender specific, prevalence estimates of IBS subjects are described in table-I. The overall, unadjusted estimates ranged from 1.8 (Manning $>3$) to 7.3 (Manning $>2$) cases per 100 using Manning definitions, and from 7.7 to 8.8 cases per 100 using the Rome study definitions. When more liberal

<table>
<thead>
<tr>
<th>Table-I</th>
<th>Sociodemographic characteristics, prevalence, and individual symptom of IBS segregated by different study definitions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable</td>
<td>Manning &gt; 2</td>
</tr>
<tr>
<td>Mean age, years</td>
<td>33.65 + 13.24</td>
</tr>
<tr>
<td>Gender; n (prevalence)</td>
<td>Male</td>
</tr>
<tr>
<td></td>
<td>41(6.5%)</td>
</tr>
<tr>
<td></td>
<td>(P&lt; .016)</td>
</tr>
<tr>
<td>Pain with more bowel movement, n, (%)</td>
<td>110 (100%)</td>
</tr>
<tr>
<td>Pain with less bowel movement, n, (%)</td>
<td>7(6.36%)</td>
</tr>
<tr>
<td>Pain associated with loose stools, n, (%)</td>
<td>56 (50.9%)</td>
</tr>
<tr>
<td>Pain associated with hard stools, n, (%)</td>
<td>19 (17.2%)</td>
</tr>
<tr>
<td>&gt;3 bowel motions per day , n, (%)</td>
<td>4 (3.6%)</td>
</tr>
<tr>
<td>&lt; 3 bowel motions/ week, n, (%)</td>
<td>56 (50.9%)</td>
</tr>
<tr>
<td>Loose stools, n, (%)</td>
<td>19 (17.2%)</td>
</tr>
<tr>
<td>Hard stools, n, (%)</td>
<td>10(9.1%)</td>
</tr>
<tr>
<td>Straining, n, (%)</td>
<td>4 (3.6%)</td>
</tr>
<tr>
<td>Urgency, n, (%)</td>
<td>25(22.7%)</td>
</tr>
<tr>
<td>Incomplete Evacuation, n, (%)</td>
<td>51(38.6%)</td>
</tr>
<tr>
<td>Mucous, n, (%)</td>
<td>9(8.2%)</td>
</tr>
<tr>
<td>Bloating/ distension, n, (%)</td>
<td>59(53.6%)</td>
</tr>
</tbody>
</table>

ns- Not significant
criteria were used, such as Manning >2 without pain, prevalence estimate rose to 27.9% and when more strict criteria were used, such as pain with Manning >3, prevalence estimate dropped to 1.8%. The gender-specific prevalence ranged from 2.6 (Manning >3) to 10.2 cases per 100 in women (Rome-I), and from 1 (Manning >3) to 7.3 (Rome-I) cases per 100 in men. IBS was 1.3-1.7 times more prevalent in females than in males irrespective of the diagnostic criteria used (P<0.016 in Manning >2, 0.019 in Rome-I). No other sociodemographic variable (occupation, financial status) was found to affect IBS prevalence estimates irrespective of the diagnostic criteria used.

**Overlap of IBS Diagnostic Categories:**
There was considerable overlap applying the different diagnostic definitions. For example, 132 subjects met criteria for Rome I and, of them, 114 also met the Rome II criteria (k=0.91). On the other hand, 12(10.9%) of the subjects who met the Manning criteria did not meet Rome-II criteria. Table- 2 shows the concordance / agreement between the different diagnostic criteria. Highest level of agreement was found between Rome-I and Rome-II comparison by k-value of 0.912 (95% confidence interval: 0.875-0.949). Lowest agreement was seen in the Manning >3 versus Manning >2 comparisons by k value of 0.301 (95% CI: 0.201-0.401) in this study.

**Table- II**

*Degree of agreement between the Manning and Rome criteria*

<table>
<thead>
<tr>
<th>a) Manning &gt;2 vs. Rome-I</th>
<th>Rome-I</th>
<th>No IBS</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>IBS</td>
<td>109</td>
<td>1</td>
<td>110</td>
</tr>
<tr>
<td>No IBS</td>
<td>23</td>
<td>1370</td>
<td>1393</td>
</tr>
<tr>
<td>Total</td>
<td>132</td>
<td>1371</td>
<td>1503</td>
</tr>
</tbody>
</table>

Kappa (95% CI) = 0.89 (0.85-0.93); P<0.022

<table>
<thead>
<tr>
<th>b) Manning &gt;2 vs. Rome-II</th>
<th>Rome-II</th>
<th>No IBS</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>IBS</td>
<td>98</td>
<td>12</td>
<td>110</td>
</tr>
<tr>
<td>No IBS</td>
<td>18</td>
<td>1375</td>
<td>1393</td>
</tr>
<tr>
<td>Total</td>
<td>116</td>
<td>1387</td>
<td>1503</td>
</tr>
</tbody>
</table>

Kappa(95% CI) = 0.856 (0.805-0.907); P<0.000

c) Rome-I vs. Rome-II

<table>
<thead>
<tr>
<th>Rome-I</th>
<th>No IBS</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>IBS</td>
<td>114</td>
<td>18</td>
</tr>
<tr>
<td>No IBS</td>
<td>2</td>
<td>1369</td>
</tr>
<tr>
<td>Total</td>
<td>116</td>
<td>1387</td>
</tr>
</tbody>
</table>

Kappa (95% CI) = 0.912 (0.875-0.949); P<0.000

d) Manning >2 vs. Manning >3

<table>
<thead>
<tr>
<th>Manning &gt;3</th>
<th>Rome &gt;3</th>
</tr>
</thead>
<tbody>
<tr>
<td>IBS</td>
<td>22</td>
</tr>
<tr>
<td>No IBS</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>27</td>
</tr>
</tbody>
</table>

Kappa (95% CI) = 0.301 (0.201-0.401); P<0.000

e) Rome-I vs. Manning >3

<table>
<thead>
<tr>
<th>Rome-I</th>
<th>Manning &gt;3</th>
</tr>
</thead>
<tbody>
<tr>
<td>IBS</td>
<td>27</td>
</tr>
<tr>
<td>No IBS</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>116</td>
</tr>
</tbody>
</table>

Kappa (95% CI) = 0.319 (0.227-0.411); P<0.000

f) Manning > vs. Rome II

<table>
<thead>
<tr>
<th>Manning &gt;3</th>
<th>Rome II</th>
</tr>
</thead>
<tbody>
<tr>
<td>IBS</td>
<td>27</td>
</tr>
<tr>
<td>No IBS</td>
<td>89</td>
</tr>
<tr>
<td>Total</td>
<td>116</td>
</tr>
</tbody>
</table>

Kappa (95% CI) = 0.59 (0.259-0.459); P<0.000

**Discussion**

This is the first study to obtain comparative prevalence on IBS using multiple diagnostic criteria in an urban population of Bangladesh. In the present study an IBS prevalence of 1.8%, 7.3%, 8.8% and 7.7% were found using Manning >3, Manning >2, Rome I

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Comparative Prevalence of IBS Using Multiple Diagnostic Criteria

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and Rome II criteria respectively. The prevalence of IBS varied from 16.5-24.4% in three surveys conducted in Bangladesh. The studies by Rahman et al. and Raihan et al. were not population based. Although the authors reported a prevalence of 30.5% and 24.4% using Manning criteria and Rome II criteria respectively in the only rural community-based survey; Manning criteria did not require the persistence of symptoms (>25% of the time) in their study. The prevalence was 8.5% when strict Rome II criteria were used. This is similar to Rome II study definition of the present survey. Studies from other developing countries reported IBS prevalence of 4.4-30.2% using Manning criteria. But none of these were population-based and only a few were in the urban area involving selected subjects. When more stringent criteria were used in this study, such as Rome-I or Rome-II, prevalence estimates were 7.7-8.8%, which is comparable to other studies conducted in western urban areas. A lower prevalence of IBS (7.3%) was found in the present study in comparison to that of other urban studies conducted in western countries (13.6-22%) using two or more Manning criteria. But Boice et al. did not use the pain criteria where as others did not require the persistence of symptoms (i.e. >25% of time). In this survey data were collected by personal interview with a high response rate and accuracy rate. Besides all the persons in the locality were included in the survey, so the data of present study likely to reflect the true prevalence of IBS.

A greater preponderance of IBS symptoms in women compared to men in the present study (1.3 to 1.7 times) supports the previous findings of female preponderance of IBS in Bangladesh and also in western countries. Like in other studies a downward trend of IBS prevalence with increasing age was also noted in the present data. Due to lack of feasibility, no investigation was done on the IBS subjects. Studies showed that in the absence of alarm symptoms diagnostic criteria have a positive predictive value of approximately 98% and that additional diagnostic tests have a yield of 2% or less.

**Overlapping of IBS study definitions**

The diagnostic thresholds of IBS vary on two dimensions: duration and severity. Although the original publication by Manning did not require the duration criteria, in the present study Manning definitions required symptoms to be chronic or recurrent for at least 12 weeks which may or may not be consecutive in the past one year. The present study demonstrated good agreement between all commonly used definitions of IBS according to Kappa values (table-2). Highest level of agreement was found between Rome-I and Rome-II: for which a k of 0.912 (95% confidence interval: 0.875-0.949) was calculated. This finding is consistent with that of Thompson et al. in Canadian population. Lowest agreement was seen in the Manning >3 versus Manning >2 comparisons by k value of 0.301 (95% CI: 0.201-0.401) in this study. Saito and Kay calculated k values of 0.72 and 0.76 respectively, when comparing two or more Manning symptoms (no pain required in the study of Kay et al.) with the original Rome criteria (Rome-I). The results were similar to the k value of present study (k-0.89). But they found lower k-values of 0.25 and 0.43 compared to our k of 0.85 when comparing two or more Manning with the revised Rome criteria (Rome-II). From the data of present study it can be assumed that nearly all the standard definitions (Manning >2, Rome I and Rome II) are almost equally sensitive in identifying IBS subjects in the urban community of Bangladesh.

**Conclusion**

This study demonstrated that prevalence of IBS in urban population of Bangladesh is similar to most other recent population-based studies. Prevalence estimates varied widely depending on the diagnostic criteria used and we support the previous finding that the prevalence of IBS is greatly influenced by how the requirement for abdominal pain is defined. Rome-I proved more sensitive than the Rome-II in the community-based survey for diagnosing IBS. Substantial to near perfect agreement was found between different study definitions. There seems to be little advantage in applying the new criteria in clinical practice but more restrictive Rome-II criteria are the most relevant to use in research. More research is required and preferably with some appropriate investigations to find out the exact prevalence of IBS in urban population.

**Acknowledgement**

We would like to thank to Dr. Saidur Rahman Mashreky, BMRC, Dhaka, Bangladesh for Statistical analysis, Dr. Md. Nowfel Islam, Dr. Shabnam Akhter, Md. Shahidul Islam, Md. Shafiqul Islam and the Habitants of ward-41, Dhaka City Corporation for kind co-operation.

**References**


EVIDENCE BASED NON PHARMACOLOGIC MANAGEMENT OF OSTEOARTHRITIS: A REVIEW

ROWSAN ARA¹, MD ZAHID ALAM², MOHAMMAD FERDOUS UR RAHAMAN³, MONZOOR QUADER³, JANNATARA SHEFA⁴

Abstract:
Osteoarthritis (OA) is a leading cause of disability in the elderly. The management of OA can be divided into non pharmacologic interventions, pharmacologic interventions, and surgical options. There are, at present, no specific pharmacologic therapies that can prevent the progression of joint damage due to OA. Non pharmacologic therapies remain the main stay of management of OA patients. There are varieties of conventional and non conventional non pharmacological options are available. Among them, there is reasonably strong evidence of efficacy for exercise programs, weight loss, patient education, and wedged shoe insoles is available.

Key words: Osteoarthritis, non pharmacologic therapy, management.

Introduction:
Osteoarthritis (OA) is a leading cause of disability in the elderly.¹ It is more common in women than in men.² People with OA use health-care services at a higher rate than a representative group of all adults.³⁴⁵ The number of people with OA disability is expected to be doubled by the year ²⁰²⁰.⁶

The goals of management of patients with osteoarthritis are to control pain and swelling, minimize disability, improve the quality of life, and educate the patient about his or her role in the management team. Management should be individualized to the patient's expectations, level of function and activity, to the joints involved and the severity of the patient's disease, to occupational and vocational needs, and to the nature of any coexisting medical problems.⁷

The management of OA can be divided into non-pharmacologic interventions, pharmacologic interventions, and surgical options. There are, at present, no specific pharmacologic therapies that can prevent the progression of joint damage due to OA.

This review will discuss available evidences for non pharmacologic management of osteoarthritis.

Non pharmacologic therapy:
There are varieties of conventional and non conventional non pharmacological options are available (Table 1)⁸. Among them, there is reasonably strong evidence of efficacy for exercise programs, weight loss, patient education, and wedged shoe insoles is available for knee OA.⁹

<table>
<thead>
<tr>
<th>Conventional Options</th>
<th>Unconventional Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient education</td>
<td>Transcutaneous electrical nerve stimulation</td>
</tr>
<tr>
<td>Arthritis self-help courses</td>
<td>Pulsed electromagnetic fields</td>
</tr>
<tr>
<td>Weight loss</td>
<td>Static magnets</td>
</tr>
<tr>
<td>Temperature modalities</td>
<td>Acupuncture</td>
</tr>
<tr>
<td>Exercise</td>
<td>Spa therapy</td>
</tr>
<tr>
<td>Orthotics</td>
<td>Yoga</td>
</tr>
<tr>
<td>Modified activities of daily living</td>
<td></td>
</tr>
</tbody>
</table>

Table-I
Non pharmacologic Management of Osteoarthritis

1. MD (Rheumatology) final part student, Bangabandhu Sheikh Mujib Medical University, Dhaka.
2. Junior consultant, Cardiology, BIRDEM, Dhaka
3. Medical Officer, Dept of Medicine, Bangabandhu Sheikh Mujib Medical University, Dhaka.
4. Lecturer, Department of Community Medicine, Enam Medical College, Dhaka.

Bangladesh J Medicine 2010; 21: 41-45
Patient Education and Psychosocial Support:

Patient education is an important first step in OA therapy. The patient should be an integral part of the decision-making team. To do this effectively, the patient should understand the nature of OA, including its natural history and treatment options. Some patients may develop significant emotional disturbances related to the pain and changes in normal daily activities. These may include mood disorders, such as depression, or sleep disorders. The patient evaluation should include an assessment of current coping mechanisms such as activity avoidance and denial. Some authors have suggested that the impact of psychosocial support may be as substantial as that of medical therapy. As an example, regular reinforcement of management issues with patients by telephone has been associated with decreased joint pain and increased functional status. A meta-analysis of self-management for OA of the knee in 2006 concluded that such interventions produced significantly better psychologic outcomes than those achieved by control subjects. However, pain and function may not be substantially improved by instruction in self-management.

Weight loss:

Obesity is an important risk factor in the development of OA of the knee. One study noted an increased risk of developing OA of the knee in patients with high body mass indices (1.5 and 2.1 for men and women, respectively). In a follow-up study using the same population, the risk of developing OA was reduced following weight loss; a ten-pound weight loss over 10 years decreased the odds for developing knee OA by 50 percent.

Regimens of weight loss and exercise have been associated with improvement in pain and disability in OA of the knee. In addition to reducing the risk of progression of OA, weight loss of even modest degree, may produce improvement in joint pain and function. In a prospective study 316 overweight people with symptomatic and radiographic OA of the knees were randomly assigned to one of four groups: diet alone, exercise alone, diet and exercise, or education in healthy living. The combination of diet and exercise was the most effective and was associated with decreased knee pain and improved self-reported and measured function. Another study suggested that a reduction in the percentage body fat, rather than weight, may be significant in reducing pain from OA of the knee. The symptom-relieving effects of weight loss have been shown to last as long as 1 year.

Temperature modalities:

Heat and cold modalities have been used for many years in the treatment of OA despite the paucity of adequate controlled, randomized clinical studies. Moist superficial heat can raise the threshold for pain, produce analgesia by acting on free nerve endings, and decrease muscle spasm. Warm applications can be in the form of warm soaks or heating pads. Individual sessions should not exceed a temperature of 45°C or last more than approximately 30 minutes.

Exercise

An appropriate exercise program is an integral part of the optimal, multidisciplinary management of OA. The relationship between exercise and arthritis has been the subject of considerable controversy. This issue has been well addressed in two large, randomized trials of the impact of exercise on the disability associated with OA. In one study, 102 patients with documented OA of one or both knees were randomized to receive either a combined program of supervised fitness walking and education or routine medical care and telephone contact showed that a program of supervised fitness walking and patient education can improve functional status without worsening pain or exacerbating arthritis-related symptoms in patients with osteoarthritis of the knee. “The Fitness Arthritis and Seniors Trial (FAST)” compared the impact of 18 months of aerobic exercise, resistance exercise, or a health education program on several measures of disability, physical performance, and pain in elderly subjects with OA of the knee concluded that older disabled persons with osteoarthritis of the knee had modest improvements in measures of disability, physical performance, and pain from participating in either an aerobic or a resistance exercise program and exercise should be prescribed as part of the treatment for knee osteoarthritis.

A systematic review of randomized clinical trials, which investigated the effectiveness of exercise therapy for OA of the hip or knee, concluded that there is evidence of modest benefits from exercises. Meta-analyses of randomized trials focused on OA of the knee, appeared in 2006 and 2009. The authors of the meta-analyses concluded that exercise regimens for patients with OA of the knee led to improved physical health and an at least short term beneficial effect on OA. Home-based exercise interventions also significantly improve symptoms in those with knee OA.
Patients with moderate to severe OA may not have as much symptomatic benefit from exercise as those with mild disease. This was illustrated in a study that randomly assigned middle aged adults with symptomatic and radiographically apparent (grade III of IV) OA of the knee to aerobic exercise or to no intervention. After six weeks there were no significant differences between groups in knee pain or function. Self-reported quality of life was significantly better in those who exercised and this difference persisted for up to six months, at which time observations were ended.\textsuperscript{32}

**Orthotics and Bracing**
Orthotics ranging from insoles to braces can be effective in providing symptomatic relief and are probably underused by most physicians. Studies have demonstrated that lateral wedged insoles provide substantial relief to those with medial compartment knee OA, particularly those with varus deformity.\textsuperscript{33} In some studies, those with milder symptoms obtained greater benefit.\textsuperscript{34} Knee braces have been evaluated as well. Valgus bracing of patients with medial compartment OA can reduce pain and increase levels of activity.\textsuperscript{35} In one study, medial taping of the patella reduced the pain of those with patellofemoral compartment OA by 25\%.\textsuperscript{36}

Heel lifts have been tried in those with hip OA. In one uncontrolled study, most patients reported diminished symptoms. Time to improvement lengthened with the radiographic stage of OA.\textsuperscript{37} Those with carpometacarpal joint arthritis should initially be offered conservative management, including the use of splints. In one trial, 70\% of patients treated with a 7-month intervention that included the use of splints were able to improve their symptoms considerably and avoid surgical intervention.\textsuperscript{38}

The appropriate use of a cane can be an important adjunct, particularly in OA of the hip. It has been estimated that a cane can provide up to a 40\% reduction in hip contact forces during ambulation.\textsuperscript{39} The cane should be used in the hand contralateral to the affected hip or knee and should be advanced with the affected limb while walking. The appropriate cane size is that which results in about a 20-degree flexion of the elbow during use.\textsuperscript{41}

**Modification in Activities of Daily Living**
Physician advice and occupational therapy can provide useful insights into modifications of daily activities to reduce OA symptoms. These interventions can range from using an elevated toilet seat or shower bench in someone with lower extremity OA to using appliances designed to open jars in patients with hand OA. Assistance from occupational therapists can be valuable.\textsuperscript{8}

Transcutaneous electrical nerve stimulation (TENS)
A double-blind, randomized, controlled study of 78 patients with knee OA found that daily TENS for four weeks resulted in significant short-term improvement in knee pain, flexion, and duration of morning stiffness.\textsuperscript{42} A double-blind, cross-over trial of 36 patients with knee OA was unable to confirm a positive response to TENS.\textsuperscript{43} TENS use for 3 weeks was compared with 3 weekly hyaluronic acid injections in 60 patients with OA of the knee. Pain relief was observed in both groups through the 6 months of follow-up.\textsuperscript{44}

**Pulsed electromagnetic fields:**
Pulsed electromagnetic fields have been tested in double-blind, placebo-controlled trials. In one study, a primary end point of pain reduction was not achieved.\textsuperscript{45} Another study did not meet its primary end point but reported an improvement in knee stiffness in subjects younger than 65 years, without an accompanying reduction in pain.\textsuperscript{46}

**Static magnets:**
In one double-blind, randomized, placebo-controlled trial of 43 patients, the WOMAC pain and physical function subscales, along with a 50-foot walk, demonstrated a statistically significant benefit of static magnets at 2 weeks.\textsuperscript{47} Another 29-patient double-blind, placebo-controlled trial in knee OA reported a benefit over placebo after 4 hours of use, but there were no significant differences between groups at 6 weeks of continued treatment.\textsuperscript{48}

**Acupuncture:**
Early clinical trials and one literature review concluded that acupuncture shows promise in the treatment of knee pain from OA.

**Spa therapy:**
Spa therapy also has advocates. It has been touted for low back pain and for lower extremity OA.\textsuperscript{52} However, randomized, controlled studies are lacking.\textsuperscript{53}

**Yoga:**
Yoga has also shown some symptomatic benefit in OA of the hands, based on limited testing.\textsuperscript{54}

**Conclusion:**
The treatment of OA includes a variety of possible non-pharmacologic and pharmacologic interventions. This review discusses only evidences of non pharmacologic aspect of management. Treatment
should be tailored to the individual and consists of a combination of modalities. These provide symptom relief but have no proven effect on the progression of disease. Structure and disease modification has yet to be achieved in OA. Trials that are under way could determine whether this is a realistic goal.

References:


FEEDING PRACTICE AMONG ANEMIC AND NON-ANEMIC INFANTS AND YOUNG CHILDREN IN A SELECTED RURAL AREA

MITHUN ALAMGIR¹, JANNATARA SHEFA², KHAN SHAKIL AHMED³, SHAFINAZ GAZI⁴, MOHAMMAD FERDOUS UR RAHAMAN⁵, MD. ABUL KALAM AZAD⁶

Abstract:
Background: Iron deficiency is a major public health problem worldwide especially in developing countries. It is now a major public health problem in Bangladesh & leading cause of morbidity and mortality of in young children (6-23months). Recent surveys in Bangladesh show very high prevalence figures of anemia ranging from 70%-90% among young children. Objective: To find out the feeding practice among the anemic & non anemic infants (6-11months) & young children (12-23months) in rural Bangladesh. Methods: This cross sectional comparative study was conducted on purposively selected anemic and non-anemic 150 infants and young children residing in a rural area (Village: Shadapur, Thana: Nowabgonj) of Bangladesh to determine the association between feeding practice and anemia status. Infants ranging from 6-11 months & children ranging from 12-23 months were the enrollment criteria for the study. Pre tested structured questionnaire was used to collect the data from parents & anemia status was determined by the field level Spectrophotometer. The test statistics used to analyze the data were descriptive statistics and Chi-square ($\chi^2$) test. Result: Of the 150 children in the study, 77(51.3%) were infants and the rest 73(48.7%) were young children. Among the breast fed (67%) babies nearly 74% was fed on demand, the rest 26% was given scheduled feeding. 60% of the respondents started complimentary feeding from 6 months, 26.7% before 6 months and 13.3% after 6 months. 53.3% of the respondents followed standard guideline (WHO/UNICEF guidelines) in feeding their babies. The prevalence of anemia was 55.3% in 6-23 months children. The prevalence of anemia was a bit higher in the infants then young children. Breast-fed on demand was found to be significantly higher in non-anemic infants. About 85% non-anemic infants & 90% children were given WHO/UNICEF guidelines in giving complementary food. Conclusions: the best solution as it is evident from the present study that anemia was significantly less prevalent among children whose mothers followed the guideline than those children whose mothers did not follow it.

Introduction:
Iron deficiency is a major public health problem worldwide especially in developing countries. There are about 2 million individual are affected by various types of anemia, most of them are in IDA (Iron deficiency anemia) in developing countries. It is now a leading cause of morbidity and mortality of in young children. Anemia is a major public health problem in Bangladesh; under 6-23 months aged children are the most vulnerable group. Recent surveys in Bangladesh show very high prevalence figures of anemia ranging from 70%-90% among young children.¹ The last anemia survey in Bangladesh describes in 6-11 months children 76% are anemic. In 12-23 months the prevalence is 58%.² In rural area, 61% children are anemic as compared to 73% in urban area, in age group 6-23 months.

In country like India, Nepal and Sri Lanka the prevalence of IDA also high in this group (India 77%, Nepal 88%, Srilanka 55%).³

Improper feeding, early weaning, insufficient breast feeding, low birth weight etc are the main cause of IDA in children 6-23 months of age. In these age group children cannot depend on breast milk alone to meet their iron requirements.

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Generally IDA is due to two of bioavailability of dietary iron and large loss of iron from the body. Food containing ascorbic acid (Vitamin C) and haem iron increase absorption of iron from whole meal. Ascorbic acid is very important for absorption of non-haem iron. National nutrition survey in Bangladesh showed dietary iron is quite high in poor but 86% was anemic. For infant and young children, IDA has potentially irreversible effect on cognitive motor and language development, future learning capacity, school performance and immunity.

Proper feeding and caring practice has a role on IDA of children. WHO suggested that after exclusive breast feeding up to 4-6 months of life the evolving nutritional requirements of infants should be met by nutritionally adequate and safe complementary feed while breast feeding continues for up to 2 years of age as beyond. However in developing countries giving a hygienic food to a baby is sometimes difficult in poor society can increase their risk of infection. In these cases WHO recommend exclusive breast feed up to 6 months of age and after that proper caring practice is needed to caring a child.

The cause of high prevalence of IDA in 6-23 months of age is defective feeding practice. 6-23 months children cannot depend only on breast milk alone. To meet their iron requirements WHO and UNICEF have suggested that 6 months old infant should give in addition of breast milk, frequent small complementary meal that rich in energy, protein and micronutrients. However, survey show that while breast-feeding is generally continued well into the second year of life, infants are given food that rarely contains item supply adequate nutrients. In addition complementary food is heavily shaded with cereal that contains high amount of phytates, which is a potent iron absorption –inhibitor. This makes infants highly susceptible to IDA. In developing countries 39% children were given complementary feeding from 4 months age, that is early weaning, which is also a risk factor of IDA. 41% of infants aged over 6 months are fed virtually nothing else but breast milk until the age of 2 years, which is late weaning and another risk factor of IDA. Apart from these feeding problems the young children are affected by worm infestation of poor hygiene one of the important factors of caring practice. Helminthes infection is also a major cause of IDA in young children. Globally food fortification as iron supplementation has proven to be a useful strategy to address the IDA. WHO has recommended blanket supplementation, without screening in all children 6-24 months of age. Education and treatment of infection are given more importance in developing countries.

It is evident in several studies that an Iron intervention has rarely been effective due to a number of reasons, mainly low compliance. It can result in gastric irritation and abdominal discomforts.

**Methods and Materials:**

**Study design**
Cross Sectional Comparative study.

**Study place**

**Study population**
Infants and young children of selected rural area of Bangladesh.

**Study period**
March – June '2007

**Sample size**
Purposively 150 samples have been taken from study area.

**Sampling Technique**
Purposive sampling technique (Non Probable)

**Ethical implication**
As the study was conducted in a rural area, first of all a written permission was taken from the local authority. Then both verbal and written consent was taken from the respondent parents.

**Data Collection instrument**
A questionnaire was prepared as a research instruments in such a way that the interview could flow as naturally as possible. They were designed according to objectives of the study and were made simple and easily understandable manner. The questionnaire was pre-tested on a small number of respondents at Keranigonj, Dhaka similar to the study population to identify and difficulty for understanding by the respondents. Then modified and finalized the questionnaire for data collection.

**Data collection technique**
The purpose of the study was explained to the local authority and to the respondents. Data was collected from respondent through face to face interview by using the Bangla pre-tested structured questionnaire. To determine the anemia status blood was collected from the baby by field level spectrophotometer.

**Data processing and analysis**
After completion of data collection data were processed and edited manually to reduce error. Both descriptive and analytical statistics were done by SPSS (11.5 version)
Selection criteria
For anemic inclusion:
1. Study population was within 6 – 23 months of age
2. Hemoglobin level below 11 gm/dl
3. Free from any acute or chronic illness
4. Parents willing to participate

For non-anemic inclusion:
1. Study population was within 6 – 23 months of age
2. Hemoglobin level equal or more than 11 gm/dl
3. Free from any acute or chronic illness
4. Parents willing to participate

Results:
The findings of the study intended to investigate the association between anemia and feeding practice of infants and young children are documented below.

Of the 150 children participated in the study, 77 (51.3%) were infants ranging from 6 – 11 months and the rest 73 (48.7%) were young children ranging from 12 – 23 months. Fig. 1 shows the distribution of the children by sex. Males and females were almost equally distributed giving a male to female ratio of roughly 1:1.

Table II shows the educational status of parents’ of participating children. About 23% of the fathers were illiterate, 13% primary level educated, 13.7% secondary level educated, 35.1% SSC to HSC level educated and 15.3% graduate and higher level educated. In terms of mothers’ education, 35.3% were illiterate, 18% primary, 14.7% secondary, 24.7% SSC to HSC and only 7.3% graduate and postgraduate level educated.

Table III shows the distribution of the respondents by feeding practice of their babies. Two-third (66.7%) the babies were breast fed. Of the breast fed babies nearly three-quarter (74%) was fed on demand, while the rest (26%) was given the same 2 times daily. Sixty percent of the respondents informed that they started complimentary feeding from 6 months, 26.7% before 6 months and 13.3% after 6 months. Over half (53.3%) of the respondents followed standard guideline (WHO/UNICEF guidelines) in giving complimentary feeding to their babies as opposed to 26.7% of the mothers of anemic infants.

Table IV shows the association between breast feeding status and anemia in infants. Anemia was not found to be associated with whether the baby was breast-fed or not (p = 0.918). Table V shows the association between frequency of breast feeding and anemia in infants. Breast-fed on demand was found to be significantly higher in non-anemic infants (90.5%) than that in anemic infants (66.7%) (p = 0.046).

Table VI shows the association between complimentary feeding related variables and development of anemia in young infants. More than 80% of the non-anemic infants were given complimentary feeding from 6 months compared to 37.8% of the anemic infants (p = 0.001). About 85% of the mothers of non-anemic infants followed standard guidelines (WHO/UNICEF guidelines) in giving complimentary feeding to their babies as opposed to 26.7% of the mothers of anemic infants (p < 0.001).

Table I

<table>
<thead>
<tr>
<th>Age (months)</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infant (6 – 11 months)</td>
<td>77</td>
<td>51.3</td>
</tr>
<tr>
<td>Young children</td>
<td>73</td>
<td>48.7</td>
</tr>
</tbody>
</table>

Fig.-1: Distribution of the children by sex (n = 150)
### Table II

*Distribution of children by parents’ educational status*

<table>
<thead>
<tr>
<th>Parents educational status</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fathers’ education</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Illiterate</td>
<td>30</td>
<td>22.9</td>
</tr>
<tr>
<td>Primary</td>
<td>17</td>
<td>13.0</td>
</tr>
<tr>
<td>Secondary</td>
<td>18</td>
<td>13.7</td>
</tr>
<tr>
<td>S.S.C &amp; H.S.C</td>
<td>46</td>
<td>35.1</td>
</tr>
<tr>
<td>Graduate &amp; above</td>
<td>20</td>
<td>15.3</td>
</tr>
<tr>
<td><strong>Mothers’ education</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Illiterate</td>
<td>53</td>
<td>35.3</td>
</tr>
<tr>
<td>Primary</td>
<td>27</td>
<td>18.0</td>
</tr>
<tr>
<td>Secondary</td>
<td>22</td>
<td>14.7</td>
</tr>
<tr>
<td>S.S.C &amp; H.S.C</td>
<td>37</td>
<td>24.7</td>
</tr>
<tr>
<td>Graduate &amp; above</td>
<td>11</td>
<td>7.3</td>
</tr>
</tbody>
</table>

### Table III

*Distribution of the respondents by baby feeding practice*

<table>
<thead>
<tr>
<th>Feeding practice</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baby breast fed (n = 150)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>100</td>
<td>66.7</td>
</tr>
<tr>
<td>No</td>
<td>50</td>
<td>33.3</td>
</tr>
<tr>
<td>Frequency of breast feeding (n = 100)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feeding on demand</td>
<td>74</td>
<td>74.0</td>
</tr>
<tr>
<td>Scheduled feeding</td>
<td>26</td>
<td>26.0</td>
</tr>
<tr>
<td>Complimentary feeding started (months)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 6</td>
<td>40</td>
<td>26.7</td>
</tr>
<tr>
<td>From 6</td>
<td>90</td>
<td>60.0</td>
</tr>
<tr>
<td>&gt; 6</td>
<td>20</td>
<td>13.3</td>
</tr>
<tr>
<td>WHO/Unicef guidelines followed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>80</td>
<td>53.3</td>
</tr>
<tr>
<td>No</td>
<td>70</td>
<td>46.7</td>
</tr>
<tr>
<td>Frequency of CF* in infants with BF**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 3</td>
<td>14</td>
<td>25.6</td>
</tr>
<tr>
<td>≥ 3</td>
<td>40</td>
<td>74.1</td>
</tr>
<tr>
<td>Frequency of CF in infants without BF</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 5</td>
<td>15</td>
<td>40.5</td>
</tr>
<tr>
<td>≥ 5</td>
<td>22</td>
<td>59.5</td>
</tr>
<tr>
<td>Frequency of CF in young children</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 5</td>
<td>22</td>
<td>29.7</td>
</tr>
<tr>
<td>≥ 5</td>
<td>52</td>
<td>70.3</td>
</tr>
</tbody>
</table>

* CF = Complimentary feeding; **BF = Breast feeding

### Table IV

*Association between breast feeding status and anemia in infants*

<table>
<thead>
<tr>
<th>Breast feeding</th>
<th>Status of anemia p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breast-fed</td>
<td>Anemic (n = 45)</td>
</tr>
<tr>
<td></td>
<td>Non-anemic (n = 30)</td>
</tr>
<tr>
<td></td>
<td>32 (71.1) 21 (70.0)</td>
</tr>
<tr>
<td>Not Breast-fed</td>
<td>13 (28.9) 9 (30.0)</td>
</tr>
</tbody>
</table>

* Data were analyzed using Chi-square ($\chi^2$) Test. Figure in the parentheses denoted corresponding percentage.

### Table V

*Association between frequency of breast feeding and anemia in infants*

<table>
<thead>
<tr>
<th>Frequency of breast feeding</th>
<th>Status of anemia p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feeding on demand</td>
<td>Anemic (n = 33)</td>
</tr>
<tr>
<td>cheduled feeding</td>
<td>Non-anemic (n = 21)</td>
</tr>
<tr>
<td>22 (66.7) 19 (90.5)</td>
<td></td>
</tr>
<tr>
<td>11 (33.3) 2 (9.5)</td>
<td></td>
</tr>
</tbody>
</table>

* Data were analyzed using Chi-square ($\chi^2$) Test. Figure in the parentheses denoted corresponding percentage.

### Table VI

*Association between complimentary feeding and anemia in infants*

<table>
<thead>
<tr>
<th>Complimentary feeding started</th>
<th>Status of anemia p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below 6 months</td>
<td>Anemic (n = 45)</td>
</tr>
<tr>
<td></td>
<td>Non-anemic (n = 32)</td>
</tr>
<tr>
<td>19 (42.2) 5 (15.6)</td>
<td></td>
</tr>
<tr>
<td>From 6 months</td>
<td>17 (37.8) 9 (20.0)</td>
</tr>
<tr>
<td>26 (81.3) 0.001</td>
<td></td>
</tr>
<tr>
<td>After 6 month</td>
<td>1 (3.1)</td>
</tr>
<tr>
<td>Standard guide-line followed</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>No</td>
</tr>
<tr>
<td>12 (26.7) 27 (84.4)</td>
<td></td>
</tr>
<tr>
<td>33 (73.3) 5 (15.6)</td>
<td></td>
</tr>
</tbody>
</table>

* Data were analyzed using Chi-square ($\chi^2$) Test. Figure in the parentheses denoted corresponding percentage.
Discussion:
The present study showed that 55.3% of 6–23 months children were anemic. The prevalence of anemia was a bit higher in 6–11 months infants (58.4%) compared to 12–23 months children (52.1%). Recent survey in Bangladesh shows very high prevalence of anemia ranging from 70%–90% among young children. The last anemia survey in Bangladesh described 76% of 6–11 months children and 58% of 12–23 months children as anemia. In rural area 61% of children are anemic in the age group of 6–23 months. In country like India, Nepal and Sri Lanka the prevalence of IDA are also high in these age group (India-77%, Nepal-88%, Sri Lanka-55%). As of feeding practice, two-thirds (66.7%) the babies were breast-fed. 60% of the mothers started complementary feeding from 6 months, 26.7% before 6 months and 13.3% after 6 months. About 75% of the breast-fed infants and 60% of non-breast-fed infants were given 3 and 5 complementary feeds (CFs) respectively in 24 hours, while 70.3% of the mothers of young children gave 5 or more CFs in 24 hours. Over half (53.3%) of the mothers followed standard guideline (WHO/UNICEF guidelines). A nationwide community based cross sectional study was conducted in Bangladesh on a representative sample of 3049 children of 0-2 years and on their mothers showed that half of the mothers initiated breast feeding more than 1 hour after birth. Prevalence of exclusive breast feeding among 6 months and or below was 61%. More than half (50.8%) of the children were given complementary feeding before 4 months and about 40% at 4–5 months of age. Among 1463 infants of 6-11 months, 51.4% were given 3 feeds a day. Among 506 children 12–24 months over 56% were given 3 feeds a day. It was reported that about 95% of the children of one year of age and 82.7% of two years of age were breast fed throughout. About 2.8% of the children were suffering from severe nutritional deficiency disorder and 14.1%-18% were suffering from moderate nutritional deficiency disorder respectively. The findings are consistent with the findings of the present study. Contrary to these findings that majority (97.8%) of children was breastfed but only 10.4% of them were exclusively breastfed up to 6 months. Weaning was started at the age of 6 months in about 20% cases. 50% continued breast feeding for a period 1-2 years.

A hospital based analytic study was conducted in Brisbane Australia in the year 2001; Data were obtained from records held at Maternal and Infant Health Clinics in the cities of Brisbane (population 100000). 80-90% of mothers brought their infants to the clinics after 6 months of delivery. On the first visit to the clinic social, family, feeding practice history were recorded. At each subsequent visit, the data, presents weight and feeding of the infant and young children, status of health (especially anemia) was assessed. Percentage of breast feeding at first visit and subsequent 2 visits after 6 months was 67%, 68% and 69% which is fairly comparable to the findings of the present study. Prevalence of anemia after 6 months was 30%, almost that found in our study (58.5%). Those who practices breast feeding as well as proper complementary feeding (according to hospital guideline), rate of anemia was only 10% which is also much less compared to our sampled population with similar characteristics. Rest of 20% was among those who did not practice breast feeding, complementary feeding regularly. The data of infants and young children, who attended the Maternal and Infant Health Clinics for 2 years, were used to test the relationships of infant breast feeding with secular trend and social class at 6-11 months and 12-23 months. At each of these age group, there was a highly significant (p < 0.001) increase in the level of breast feeding from 1982 to 1993. In the 1982 data, there was a trend for more primiparous and upper class mothers to breast feed during the first three months than multiparous and lower class mothers but this trend did not show the statistical significance. In 1993, the general prevalence of breast feeding had increased and same trends were present. This study showed that there has been a marked increase in the prevalence of breast feeding amongst mothers so that rate of nutritional anemia has been decreased a lot. The prevalence of anemia among the infants who were breast fed on demand was significantly less compared to the scheduled breast feeding. The infants who were given complementary feeding according WHO guidelines were also less anemic compared to those who did not follow the guideline meaning that it is a standard one to prevent the infants being anemic. The same was found true for young children too. The findings of the study also revealed that time of starting complementary feeding is also no less important, because prevalence of anemia was significantly less among the children who were given complementary feeding from 6 months as opposed to those who were given earlier or later than 6 months. However, feeding the babies according to WHO/UNICEF guidelines was much lower which might be one of the reasons of more than half of the infants and young children (53.3%) being anemic. The guideline that WHO and UNICEF recently endorsed as Global Strategy for infant and young child feeding is to fulfill all the
nutrients needed by the growing children and also to protect them from vicious cycle of malnutrition and infection. Once some of the determinants of good nutrition are not fulfilled, children start to suffer from malnutrition and nutritional deficiency anemia. When foods other than milk are introduced into the infant diet, the situation is more complex because these foods vary considerably in protein content and protein quality within same country and among different countries. Furthermore amount of weaning food consumed and amount of milk consumed varies among individuals. Most of the international recommendation use protein: energy ratio (P: E) when assessing the protein quality of weaning food. There is assumption also in these calculations because both the safe level of protein intake and the mean requirement of energy at each age are included. As it is mentioned that different country has different feeding practice so worldwide WHO guideline is acceptable. WHO shows the requirement of accurate protein, energy and calorie requirement for specific age group.

Conclusion & Recommendations

It has already been reflected in the discussion that the children from 6 months onward become more vulnerable to develop anemia because of increased physiological demand for iron to form hemoglobin. The mothers should therefore give their babies ideal combination of complementary feeds along with breast feeding. After the first year, though the daily need of iron slightly decreased, 0.5 mg of iron still needed each day until the end of two years. So the children at this age too are at greater risk of developing anemia fortifying further the need of complementary feeding and continuation of breast feeding. At these two age groups (6-11months and 12-23months) as iron demand to be fulfilled from the exogenous source complementary feeding to be given to the children must be scientifically sound both in terms of frequency and content. As long term iron therapy and the intake of iron fortified food have got the deleterious effect on the health, it is better avoiding them unless otherwise indicated. Since feeding practice varies from culture to culture, following WHO/UNICEF guideline could be the best solution as it is already evident from the present study that anemia was significantly less prevalent among children whose mothers followed the WHO/UNICEF guideline than those children whose mothers did not follow it.

In the light of findings of the present study and discussion thereof, the following recommendations are put forward

1. Mothers should breastfeed their babies on demand and should be exclusive for the first 6 months.
2. Complementary feeding should be started at completion of month 6 along with breast feeding.
3. Mothers must prepare the complementary feeds in accordance with WHO/Unicef guidelines.
4. The diet should be rich in energy dense bioavailability iron to prevent child from being anemic.
5. Mothers should be discouraged to give iron in the form medication or food fortified with iron as it carries the risk iron poisoning.

References

Introduction
Periodontitis is an infection of the tissues that hold the teeth in place. In periodontitis, plaque builds and hardens under the gums. The gums pull away from the teeth, forming “pockets” of infection. The infection leads to loss of the bone that holds the tooth in its socket and might lead to tooth loss. There are often no warning signs of early periodontitis. Pain, abscess, and loosening of the teeth do not occur until the disease is advanced. Since periodontitis affects more than just the gums, it cannot be controlled with regular brushing and flossing. Periodontitis should be treated by a periodontist (a gum disease specialist) or by a general dentist who has special training in treating gum diseases.

Diabetes mellitus is a systemic disease with several major complications affecting both the quality and length of life. One of these complications is periodontal disease (periodontitis). Periodontitis is much more than a localized oral infection. Recent data indicate that periodontitis may cause changes in systemic physiology. The interrelationships between periodontitis and diabetes provide an example of systemic disease predisposing to oral infection, and once that infection is established, the oral infection exacerbates systemic disease.

Material and methods
This was a prospective cross-sectional study carried out during the period of July’07 to June’08. Two hundred and seventy six patients with type 2 DM were studied. Clinical data like periodontitis, gingivitis, dental carries, oral ulcer, periodontal abscess were examined and baseline characteristics were recorded. Fasting plasma glucose (FPG), 2-h post-prandial glucose (PPG), glycated haemoglobin (HbA1c) were estimated. The mean of glycosylated hemoglobin measurements (HbA1c) was used to indicate the long-term control of DM. The study participants were divided into well- (HbA1c <7%) and poorly- (HbA1c >7%) controlled diabetics.

Results

![Graph showing the glycemic status of patients with periodontitis](image)

Fig.-1: Patients with Periodontitis (*n*=101) and their glycemic status

Summary
It is thought that poor oral health is associated with type 2 diabetes mellitus (DM). There has been relatively little data to date concerning oral health and periodontal disease with glycaemic status among DM patients in our country. The purpose of this cross-sectional study was to investigate the oral hygiene and periodontal status among type 2 diabetes patients and found that dental caries and periodontitis are strongly associated with poorly controlled of DM.
Of the 276 patients 141(51.0%) were male, age was 53.6 ± 10.9 years. Duration of DM was 9.6 ± 7.1 years. The percentage of periodontitis, dental carries, gingivitis, periodontal abscess, oral candidiasis, glossitis, oral ulcer and leukoplakia were 37.0%, 32.2%, 5.1%, 1.4%, 1.4%, 1.1%, 1.1% and 0.7% respectively. A significantly increased frequency of dental caries with poorer control of diabetes was observed (p<0.001). The extent of periodontitis also increased with poorer control of diabetes was observed (p<0.001).

Discussion

In chronic periodontitis, the tooth supporting structures (alveolar bone and the periodontal ligament) are destroyed. The disease has a multifactorial origin. Complexes of commensal oral anaerobic bacteria and perhaps viruses are thought to interact with risk factors, such as smoking, diabetes and depression, to create the conditions which make a person susceptible to periodontitis. The patient’s immuno-inflammatory response to the bacteria causes the tissue destruction which occurs in chronic periodontitis.

It is useful to distinguish chronic gingivitis from periodontitis. Chronic gingivitis is the very common inflammatory reaction occurring in the gingival tissues in response to the accumulation of dental plaque. It usually precedes the development of periodontitis, but chronic gingivitis does not inevitably progress to periodontitis.

The relationship between diabetes, gingivitis and periodontitis

Although periodontitis is a recognised complication of diabetes, people with well-controlled diabetes who have good oral hygiene are not at increased risk of periodontitis. However, their susceptibility to periodontitis is significantly increased when their diabetes is poorly controlled, particularly if they also smoke. Recent epidemiologic evidence shows that the prevalence of diabetes in patients with periodontitis is significantly greater (by two times) than in people without periodontitis. The gingival and periodontal signs which may alert the clinician that the patient has previously undiagnosed diabetes or that the patient’s diabetes is poorly controlled, include:

- persistence of gingival inflammation after standard periodontal treatment (thorough supra- and subgingival scaling and cleaning, oral hygiene instruction)
- severe gingival inflammatory response to plaque and proliferation of gingival tissues at the gingival margin
- continuing alveolar bone loss despite periodontal treatment (fig. 3)
- simultaneous formation of multiple periodontal abscesses fig. 4)

![Fig.-1: Patient with poorly controlled diabetes shows extensive alveolar bone loss involving most teeth. The destruction of bone has been rapid even though the patient has been undergoing periodontal therapy.](image)
Diabetes increases susceptibility to periodontitis

- Advanced glycation end products deposited in the tissues as a result of hyperglycaemia can alter the phenotype of macrophages and other cells via a specific cell-surface receptor. Macrophages are key cells in the pathogenesis of periodontitis through their ability to produce a large array of cytokines. They also influence the inflammatory response, the metabolism of fibroblasts and lymphocytes and stimulate bone resorption via prostaglandin E₂. It is thought that the advanced glycation end products transform the macrophages into cells with a destructive phenotype, producing pro-inflammatory cytokines in an uncontrolled fashion.

- Neutrophils are the primary defence cells of the periodontium. The reduced neutrophil function observed in patients with diabetes is therefore another mechanism increasing the susceptibility to periodontitis.

Relationship between periodontitis and the ability to control diabetes?

While periodontitis is a recognised complication of poorly controlled diabetes, it has been proposed that severe periodontitis may make the metabolic control of diabetes more difficult. The process may be mediated through the systemic release of inflammatory cytokines (e.g. TNF-α) from periodontitis lesions, and chronic low-level systemic exposure to Gram negative organisms. periodontitis may contribute to elevated proinflammatory cytokines/serum lipids and potentially to systemic disease arising from chronic hyperlipidemia and/or increased inflammatory mediators. These cytokines can produce an insulin resistance syndrome similar to that observed in diabetes and initiate destruction of pancreatic beta cells leading to development of diabetes. Thus, there is potential for periodontitis to exacerbate diabetes-induced hyperlipidemia, immune cell alterations and diminished tissue repair capacity.

What can the patient do?

- People with diabetes need to practise high standards of daily oral hygiene, including brushing and flossing.

- Adjunctive use of a chlorhexidine mouthwash (0.12%) or chlorhexidine gel (0.2%) twice daily (used independently of toothpaste so that the chlorhexidine is not inactivated) may be useful in controlling the more severe disease.

- Medical practitioners who suspect a patient has diabetes-related gingivitis or periodontitis should ensure that an early referral is made to a dentist. Dentists in turn need to refer advanced or suspect cases to a periodontist.

Therefore, Medical and dental practitioners need to be aware of the interrelationship between poorly controlled or undiagnosed diabetes mellitus and chronic gingivitis and periodontitis. This is particularly important because of the rising prevalence of diabetes in the community.

References


PSYCHIATRIC MORBIDITY AMONG WOMEN WHOSE HUSBANDS ARE LIVING ABROAD

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Abstract:
Introduction: A large number of people working abroad leave their wives home in rural areas of Bangladesh. Husbands living abroad apart from their wives, play a significant role on the mental health status of these married women. This study was carried out to see the Psychiatric morbidity among those women whose husbands were living in abroad. Methods: This is a cross-sectional study. A total number of 960 female patients came for psychiatric consultation in the out-patient department of a private hospital from January 2008 to December 2009. Among them, 150 patients were included in this study whose husbands were living abroad. Diagnoses were made as per criteria of Diagnosis and Statistical Manual for Mental and Behavioral Disorder (DSM-IV). Results: Majority of the patients (76.52%) were in 15-30 years of age group and most of the female were housewives. Regarding socio-economic status 61.73% were lower middle and 13.04% were low socio-economic condition respectively. It was found that 51.30% of the patients were major depressive disorder, 27.83% were somatoform disorder (of which 13.04% had conversion disorder and 12.17% had psychogenic headache), 06.08% were schizophrenic, 06.95% had bipolar disorder and 04.35% had anxiety disorders. Conclusion: This study reveals significant number of women suffering from psychiatric illness in rural areas. More emphasis should be given in psychiatric health care services in primary health care level in Bangladesh.

Key words: Women mental health, Primary health care.

Introduction:
Women mental health is an important issue nowadays. The World Health Organization (WHO) observed women mental health as their theme of World Mental Health Day in 1996. Mental health is not a priority and women mental health is much neglected in Bangladesh. Majority of the people of Bangladesh are living in the rural areas where psychiatric services are not available. In these areas people are not aware of the scientific management of psychiatric problem rather these patients are thought to have possessed by spirit or deity. In a study it was found that even people near Mitford Hospital in old Dhaka city were not still aware of the availability of psychiatric services in that hospital. Lack of awareness about the illness and proper training of the physicians, low education, poor socio-economic status, prevailing superstitious and stigma of mental illness may be the strong reasons of these beliefs.

Recently several studies have reported worldwide higher prevalence of some mental illness among the women population. In an epidemiological study on mental illness in Bangladesh, the prevalence of psychiatric illness was found to be 16.1% and depression was found to be 6.40%². In last few decades there is an uprising trend of migration of workers from rural and urban areas from the different regions of Bangladesh. Majority of the workers are unskilled and migrate mostly to Middle-East countries. Most of the migrants are from low and lower-middle income groups. They leave behind their wives at home in villages of Bangladesh as wages are very low. They stay on average for a period of 3-5 years in abroad, keeping their wives and other family members in the villages. From a study it was found that the lack of some one to confide in acts as a vulnerable factor for development of depression in women in rural areas³.

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The wives of the persons who migrated abroad for jobs are the population of the present study. This group of people dwells in poverty has poor education, early marriage, adjustment problem and has lack of social support. So, psychiatric assessment of these women was done to see the psychiatric illness. This study was carried out at a district level private hospital in Comilla district, which is situated in the eastern part of Bangladesh, 100 kilometer away from Capital city Dhaka. This town lies in the adjacent areas of Dhaka-Chittagong Highway and Dhaka-Chittagong inter-district train has a stopover in this town. The trend among many physicians in Bangladesh is as such that specialist doctors on weekly holidays (Friday) visits to the different areas of other districts from major city especially from Dhaka to deliver service. The patients also come to the town on weekly holiday to take the specialists’ service. Good communication network drags people from the adjacent areas to come to and take the opportunity of seeking medical help from the town. So, a good number of patients come to seek specialist service at weekend.

Methods:

This is a cross-sectional study. A total number of 960 new female patients came for psychiatric consultations for the first time to the out-patient department of a private hospital from January 2008 to December 2009. Data were collected from the registrar book of the patient. Out of 960 female patients, 115 female patients were included in this study whose husbands went abroad for job. These patients were interviewed by a qualified psychiatrist and psychiatric diagnoses were made as per criteria of Diagnosis and Statistical Manual for Mental and Behavioral Disorder (DSM-IV). The collected data were cleaned, sorted and analyzed and the results were presented in tables and figures.

Results:

Table I showed that the majority of the patients (76.52%) were in 15-30 years of age group followed by 31-40 year (18.26%) of age group. Regarding occupation most of the female were house wives (95.65%). About 90.43% of the female are living the rural areas. In Table II it was found that 47.82% have primary education and 22.60% are illiterate. Regarding socio-economic status 61.73% are lower middle and 13.04% are low socio economic condition respectively.

In Table III, it was found that 51.30% of the patients were Major Depressive Disorder and 27.83% were Somatoform Disorder (of which 13.04% had Conversion Disorder and 12.17% had Psychogenic Headache), 06.08% were Schizophrenic, 06.95% had Bipolar Mood Disorder and 04.35% had Anxiety Disorders.
Discussion:
The aim of this study was to find out the psychiatric morbidity among female patients whose husbands are doing jobs in abroad. Service delivery model of mental health care in the low income countries like in Bangladesh is to provide most of the formal mental health care in primary mental health care settings as suggested by the World Health Organization (WHO). Consultations for complex cases and inpatients can be managed in primary care center. In many settings informal care is provided by the families, other community resources and care by traditional healers may assure central importance.

In Bangladesh, the first mental hospital was established in Pabna, north to the capital of Bangladesh as Mental Hospital Pabna. Besides, most of the government medical colleges in Bangladesh are situated in urban cities and have their psychiatric departments with either outpatient or both out and inpatient facilities. Mental health care is not incorporated in the primary care setting in Bangladesh. So majority of Bangladesh who are residing in rural areas that need specialist mental health services are inaccessible to the government mental health facilities. With this existing reality in this country, an alternate service model is growing up. That is, the specialists residing in urban areas come to the upazilla (previously known as thana) and district town to deliver specialist mental health service in weekly holidays (Friday). Thereby, providing some form of mental health care in the primary care level.

In present study, the highest numbers of psychiatric patients were in age group 15-30 years (76.52%), which was consistent with other studies like, in a study done to see the diagnostic criteria group attending in satellite consultation services in rural area it was seen that 30.57% of the females were of 21-30 year age. Regarding psychiatric morbidity it was observed that about 58.26% of the patients were suffering from the Mood Disorder. Of them 51.30% (59) were suffering from Major Depressive Disorder. Researchers have found in a study that depression was twice as common as in men. The reasons for the difference have been hypothesized to involve hormonal differences, the effects of child birth, differing psychosocial stressors for women. Another study done in Bangladesh showed that 51.59% were suffering from Mood Disorder, 16.18% were suffering from Anxiety Disorder, 12.66% Somatoform Disorder, 12.14% were Schizophrenia which was very much close to this study.

The reason for the high percentage of depression among women in Bangladesh can be explained in many ways. Women in rural areas in Bangladesh have to take a major role in household activities. In addition they marry early, have to take of more than

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Table- III

Distribution of psychiatric illness among the subjects (n=115)

<table>
<thead>
<tr>
<th>Types</th>
<th>Subtypes</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schizophrenia and other psychotic disorders</td>
<td>Schizophrenia</td>
<td>2</td>
<td>07</td>
</tr>
<tr>
<td></td>
<td>Delusional disorder</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Brief psychotic disorder</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Mood disorders</td>
<td>Major depressive disorder</td>
<td>59(51.30%)</td>
<td>67</td>
</tr>
<tr>
<td></td>
<td>Bipolar disorder</td>
<td>8(06.95%)</td>
<td></td>
</tr>
<tr>
<td>Anxiety disorders</td>
<td>Generalized anxiety disorder</td>
<td>1</td>
<td>05</td>
</tr>
<tr>
<td></td>
<td>Panic disorder</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Specific and Social phobia</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Obsessive compulsive disorder</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Somatoform disorders</td>
<td>Conversion disorder</td>
<td>15(13.04%)</td>
<td>32</td>
</tr>
<tr>
<td></td>
<td>Somatoform disorder NOS</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Psychogenic headache</td>
<td>14(12.17%)</td>
<td></td>
</tr>
<tr>
<td>Adjustment disorder</td>
<td>Migraine</td>
<td>2</td>
<td>02</td>
</tr>
<tr>
<td>Organic disorder</td>
<td>Seizure disorder</td>
<td>11</td>
<td>02</td>
</tr>
</tbody>
</table>

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Psychiatric Morbidity among Women Whose Husbands are Living Abroad
2 to 3 children at home. They are the victim of many maladjustment problems. High level of uneducated women is also assumed to be associated with low skill as well as poor coping mechanism. These factors altogether perhaps play role in precipitating psychiatric problems.

In Bangladeshi culture women are less rewarded for their contribution in spite of their hard work and contribution in the families. In this study the husbands of the respondents were staying abroad and used to come back home very seldom. Moreover, having care of children 03 or more age below 14 is vulnerable for depression. This could be a major factor for the high rate of depression among the respondents. Deprivation of mental support from the spouse and deprivation of physical needs may play a major role in causation of depression. It was also observed that about 27.83% of the respondents were suffering from Somatoform disorder. It included conversion disorder 13.04% and psychogenic headache 12.17%. Majority of the patients were of age 15-30 years. This age group is very significant in our cultural background. Early marriage, conflict in social circumstances, social stigma all contribute to produce physical symptoms of above diseases. Schizophrenia and Bipolar Mood Disorder were 06.09%, and 06.96% respectively. Adjustment disorder was 1.74% and Anxiety disorder 4.35%.

Conclusions:
This study showed that psychiatric morbidity among the female patients is very considerable. It is a global problem including Bangladesh. We know that majority of the female psychiatric patients do not come to the psychiatrists or hospital for treatment. However this significant proportion of female psychiatric patients indicates that there is an urgent need to provide psychiatric services in all district level hospital in Bangladesh.

References:
SEPTIC ARTHRITIS IN A RENAL TRANSPLANT PATIENT

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Abstract
Infectious complications in the renal transplant patient are common but the incidence of septic arthritis in transplant patient is less documented. The knee was most commonly infected joint. We report a case of monoarticular septic arthritis in a renal transplantation recipient. The ankle joint was involved in our case. Septic arthritis may be missed as other rheumatological disorders may mimic in transplant patient. If proper attention is not given to locomotor system it may not be diagnosed early. Besides as pt is on immunosuppressive therapy prolonged antibiotic therapy is warranted. Prompt and prolonged antibiotic therapy resulted in quick resolution of the joint infection in our patient. Impaired host defenses, possible inadequate and delayed prior antibiotic therapy, and intrinsic joint alterations are potential contributing factors to the development of septic arthritis following renal transplantation. So in spite of the low frequency of occurrence of septic arthritis, persistent attention to the locomotor system in the transplant patient is warranted.

Introduction
Infectious complications after renal transplantation (RT) may lead to prolonged hospitalization, sepsis, and death.¹,² The majority of infections appear to be due to gram-negative bacteria associated with urinary tract infection or deep wound infection.³,⁴ Fungal and other opportunistic infections may also occur.²,⁵,⁶ Despite the propensity for infection in these patients, reports of septic arthritis have been uncommon. We report a case of septic arthritis in a renal transplant recipient on immunosuppressive therapy who responded well after prolong parenteral antibiotic therapy.

Case Report
A 35-year-old man with a history of chronic glomerulonephritis and resultant End-stage renal disease had a renal transplant from a live related donar in April, 2009. Prior to transplantation he was on MHD for 5 months. He had an uncomplicated postoperative course. Immunosuppressive treatment included prednisolone, cyclosporine and mycophenolate mofetil.

The patient did well until late September 2009, when he began to experience. Continued fever along with rigors, malaise, myalgia and night sweats that responded little to antipyretics. A dry cough began 10 days later which became productive with purulent sputum with occasional haemoptysis within the next week. The scenario was further complicated by development of pain and swelling in the right ankle joint without any history of trauma 10 days prior to admission. Bowel and bladder habit was normal throughout the course. He was non diabetic with no previous history of tuberculosis, joint symptoms or recent skin infection. Treatment with several oral antibiotics failed to control symptoms. His immunosuppressive therapy consisted of prednisone 15mg, cyclosporine 175 mg and mycophenolate mofetil 1 g daily. When the patient was admitted to our institution for evaluation and treatment on 1st October 2009, he was found ill-looking and distressed with frequent purulent cough. His pulse was 130/min, BP-100/70mm Hg, temp-103°F and Respiratory rate-25/min, mildly anaemic with normal JVP. Chest examination revealed creps on the left upper area. Red, hot, swelled right ankle had Grade-III tenderness with limited active and passive movements. Otherwise, the results of his examination were normal, and his transplanted kidney was not tender.

Initial investigation showed Hb-10.1g/dl with WBC-25000/cm³, CXR showed left upper zone consolidation.

References
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In view of the above clinical and laboratory data, the patient was diagnosed as a case of pneumonia and septic arthritis and empirical parenteral antibiotic treatment commenced with Inj. Meropenem, Inj. Flucloxacillin, Inj. Metronidazole without stopping immunosuppressive treatments. Cough disappeared within 7 days with resolution of creps but intermittent fever persisted along with joint symptoms till 20th day of treatment and then gradually settled down. Patient became symptom free from 25th day onwards. Parenteral antibiotics were continued for 28 days. Follow up investigations revealed resolution of consolidation while CBC revealed WBC-12600/cm³ on 20th day of treatment. He was discharged on 3rd December.

Discussion:
Bacterial, fungal, mycobacterium, and viral infections have been well documented in RT patients. Bacteria are the major cause of infections, which usually occur in the urinary tract, although septicemia, skin, and wound infections are common. Recent series from different institutions, 50 (29%) of 174 and 164 (32%) of 518 RT patients developed infections.

In contrast, despite the high frequency of these other infections, the incidence of septic arthritis appears quite low. In one series, Bomalaski et al reported only 6 of 800 transplanted patients developed septic arthritis. and in 11 reported studies of RT patients covering the period from 1964 through 1980, only 1 case of septic arthritis in 1,033 patients was reported. E. coli, Enterococcus, S. marcescens, P. aeruginosa, M. tuberculosis and atypical mycobacterial organisms are common bacterial etiology. Fungus Cryptococcus and CMV were reported. In all series, knee was the most common site of infection. Synovial fluids commonly showed WBC within 4000-70000/cm³ with PMN predominance and raised peripheral WBC count. Most responded to antimicrobials and aspirations, open drainage and arthrotomy were required in some cases mainly in mycobacterial etiology.

Our patient had ankle arthritis which was not commonly found in other studies. But he presented 6 month post transplant which was close to the median time of presentation (5.5 months) and also had immunosuppressive therapy and concomitant chest infection as predisposing agents. High peripheral WBC counts further supported the diagnosis and respond to antibiotics suggested bacterial infection though organisms could not be identified. Joint and systemic symptoms concomitantly disappeared along with normalization of WBC count and relapses not occurred yet.

Conclusion:
Infections are common in RT patients; however, infectious arthritis occurs infrequently. Reinfection or relapsing infection may occur despite an apparently adequate regimen of antibiotic therapy. If not treated early, it may lead to open drainage, arthrotomy and amputation. But early diagnosis and proper antimicrobial therapy can alone effective as in our patient. Immunosuppressives need not to withdraw to clear the infection.

References:
SERUM ZINC LEVEL IN PATIENTS WITH VITILIGO IN A TERTIARY HOSPITAL IN BANGLADESH

RUBAIYA ALI1, NARGIS AKHTAR 2, MOHAMMAD S. AHSAN3, AYESHA HASSAN4, MOHAMMAD ASIFUZZAMAN5

Abstract

Background: Vitiligo is a common and chronic skin disease in dermatological practice. It is found that there is deficiency of anti-oxidant substances in vitiliginous skin. Zinc is considered as an anti oxidant and also plays an important role in the process of melanogenesis. So far, studies have shown a variation in zinc level in patients with vitiligo. Objective: The present study was done to see the serum zinc level in patients with vitiligo. Methods: Total 30 patients with vitiligo were purposively taken from the department of Dermatology and Venereology of Bangabandhu Sheikh Mujib Medical University (BSMMU) and 30 healthy controls were taken and zinc level was estimated in both groups. The duration of the study was six months from 1st September 2007 to 29th February 2008. Results: The study result showed that mean zinc level of vitiligo patients were 1.06 ± 0.08 and that of controls were 0.91± 0.33. Mean zinc level in both groups was found within normal reference range. However, In vitiligo patients mean zinc level was observed higher than that of controls. This difference was found statistically significant (p<0.05). Conclusion: In this study serum zinc level in patients with vitiligo was found within normal range and higher than that of control. However, further studies with larger sample size may give a more significant relation of serum zinc and vitiligo.

Key words: Vitiligo, serum zinc.

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Methods
This was a case control study. Sampling technique was purposive. Sample size (n) was 60 (30 case, 30 control). This study was conducted in the Department of Dermatology and Venereology, BSMMU, Shahbagh, Dhaka, Bangladesh. The study period was of six months (1st September 2007 to 29th February 2008). Patients of vitiligo of any age and both sexes were selected as cases. As controls, age and sex matched healthy individual who were not on any form of zinc medication were included. However, patients having leukoderma secondary to other causes, or history of suffering from other obvious skin diseases, or undergoing treatment with Zn or any history of zinc intake for 04 months prior to this study, or suffering from other systemic diseases such as cirrhosis of liver, viral hepatitis, neoplastic condition, myocardial infarction, steatorrhea and renal failure were excluded from the study. Patients who were pregnant or consuming oral contraceptive pills were also excluded.

Patients were diagnosed clinically and Wood’s lamp examination was carried out to confirm it. Informed written consent was taken from every one. A questionnaire consisting of particulars of the participants, socio-demographic data, clinical data and laboratory findings was used. 5 ml of venous blood was collected from both case and control group in special sterile tubes and was centrifuged for 15 minutes at 2000 rpm (Rotations per minute). The supernatant serum was transferred to a separate sterile tube (Appendorf tube) and kept at -20°C in the deep freezer till the analysis. The serum zinc level was measured by Atomic absorption spectrophotometry (AAS) [Flame method] at Centre for Advanced Research in Physical Chemical, Biological and Pharmaceuticals Sciences, University of Dhaka. Data was checked for inadequacy, irrelevancy, and inconsistency. Irrelevant data were discarded. For the statistical analysis, one Microsoft Windows- based software package was used (SPSS 13 for Windows, SPPS Incorporation, Chicago, IL, USA). Data process on categorical scale was presented as frequency and percentage and was analyzed by c² tests. While the data present on continuous scale was presented as mean and SD and analyzed with the help of Student ‘t’ test (Unpaired). Statistical significance is set at 0.05 level and confidence interval at 95% level.

Results
The mean age of the case group patients was 30.27 years with a standard deviation of ±11.09 and that in controls 32.27 years with a standard deviation of ±11.08. As it was an age and sex matched study, so distribution of respondents within different age ranges were kept in equal number (Table-I).

<table>
<thead>
<tr>
<th>Age (year)</th>
<th>Group</th>
<th>P value*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Case</td>
<td>Control</td>
</tr>
<tr>
<td>11-20</td>
<td>18.00±1.73§</td>
<td>19.40±.89</td>
</tr>
<tr>
<td>21-30</td>
<td>26.07±3.31</td>
<td>27.31±2.06</td>
</tr>
<tr>
<td>31-40</td>
<td>37.50±2.08</td>
<td>35.17±3.31</td>
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<tr>
<td>41-50</td>
<td>46.25±1.5</td>
<td>47.50±3.79</td>
</tr>
<tr>
<td>51-60</td>
<td>51.00±.0</td>
<td>57.50±3.54</td>
</tr>
<tr>
<td>Total</td>
<td>30.27±11.09</td>
<td>32.27±11.08</td>
</tr>
</tbody>
</table>

§ Mean ± Standard deviation
* Unpaired t test was used to measure the level of significance. p value <.05 was considered as a level of significance

Most of the participants were in the age group of 21-30 (50%) (Table-II).

No significant difference was observed between groups in term of frequency distribution of respondents in different age groups (p>0.05) (Table-II).

<table>
<thead>
<tr>
<th>Age (year)</th>
<th>Group</th>
<th>p value*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Case</td>
<td>Control</td>
</tr>
<tr>
<td>11-20</td>
<td>5 (16.7)#</td>
<td>5 (16.7)</td>
</tr>
<tr>
<td>21-30</td>
<td>15 (50.0)</td>
<td>15 (50.0)</td>
</tr>
<tr>
<td>31-40</td>
<td>4 (13.3)</td>
<td>4 (13.3)</td>
</tr>
<tr>
<td>41-50</td>
<td>4 (13.3)</td>
<td>4 (13.3)</td>
</tr>
<tr>
<td>51-60</td>
<td>2 (6.7)</td>
<td>2 (6.7)</td>
</tr>
<tr>
<td>Total</td>
<td>30 (100.0)</td>
<td>30 (100.0)</td>
</tr>
</tbody>
</table>

# Figure within parenthesis denoted corresponding percentage.
* Chi square test was used to measure the level of significance. p value <0.05 was considered as a level of significance
Female respondents outnumbered their male counterpart and male and female ratio is 1:1.7. 25 (83.3%) among the cases were nonsmoker, 04 (13.3%) smoker and 01 (3.3%) ex-smoker. However among controls the numbers were 23 (76.7%), 5 (16.7%) and 2 (6.7%) respectively. No statistical significance difference was found in term of smoking habit of both groups (p>0.05).

**Table III**
*Features of vitiligo patients (n=30)*

<table>
<thead>
<tr>
<th>Distribution</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symmetrical</td>
<td>14</td>
<td>46.7</td>
</tr>
<tr>
<td>Asymmetrical</td>
<td>16</td>
<td>53.3</td>
</tr>
</tbody>
</table>

**Morphological pattern**

- Localized or focal: 18 (60.0)
- Acrofacial: 5 (16.7)
- Generalized: 7 (23.3)
- Koebner sign: 10 (33.3)
- Itching over patches: 7 (23.3)
- Scaling: 3 (10.0)

**Fig.-I:** *Family history of Vitiligo among the case group (n=30)*

Twenty one patients (70%) had been suffering for 1-5 months; whereas, 07 (23.4%) patients for 6-10 months, patients (3.3%) for 11-15 months and one patient (3.3%) had illness for 16-20 months of illness (Fig-II).

**Table IV**
*Distribution of the respondents of both case and control group by serum Zn level (n=60)*

<table>
<thead>
<tr>
<th>Zinc level</th>
<th>Mean±SD (mg/L)</th>
<th>p value*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case</td>
<td>1.06±0.08</td>
<td>0.014</td>
</tr>
<tr>
<td>Control</td>
<td>0.91±0.33</td>
<td></td>
</tr>
</tbody>
</table>

* Unpaired ‘t’ test was done to measure the level of significance.

**Fig.-II:** *Duration of illness of the patients (n=30)*

Fifteen (50%) patients had 1-5 depigmented patches and 08 (26.7%) patients had 6-10 patches, 04 (13.3%) had 11-15 numbers of patches and 03 (10%) patients had 16-20 no of patches. (Fig-III).

**Fig.-III:** *Depigmented white patches of the patients*

Only 04 (13.4%) patients had positive family history of vitiligo (Fig-I).

14(46.7%) patients had symmetrical distribution of vitiligo patches and 53.3% had asymmetrical distribution. Localized or focal pattern vitiligo was observed more. Eighteen (60%) patients had localized or focal pattern vitiligo followed by 7 (23.3%) generalized pattern and 5 (16.7%) had acrofacial pattern. Ten (33.3%) patients had koebner sign, 7 (23.3%) patients had itching over patches and 3 (10.0%) patients had scaling (Table-III).

Mean zinc levels of both case and control groups were within normal reference level. In vitiligo patients mean zinc level was observed higher than that of control group. Mean serum zinc level in case group was 1.06±0.08 and in control group was 0.91±0.33. This
difference was found statistically significant (Table-IV).

**Discussion**

Zinc is categorized as a trace element as it constitutes less than 0.005% of total body weight. Normal serum zinc level ranges from 0.7-1.6 mg/L. No statistically significant difference in mean values of serum zinc levels was observed in relation to sex, age, race, food habits and diurnal variation. Zinc is an integral part of as many as 40 metalloenzymes. It takes part in virtually all body functions from spermatogenesis to growth to abstract thought processes. Zinc deficiency characteristically causes the cutaneous disorder of acrodermatitis enteropathica manifesting as acral and periorificial skin eruptions, alopecia, diarrhoea and growth retardation. Some zinc investigators have also reported low serum zinc levels in cutaneous leg ulcers etc, while others have not found the same. Some authors have found abnormalities of serum zinc level in cutaneous disorders like psoriasis and lichen planus. In our study zinc level was found significantly higher in vitiligo patients than controls. This finding was not agreed with the finding of Shameer et al (Zinc level was found reduced in 13 of 60 patients - 26.6%). But Helmy et al aimed in his study to evaluate whether the activity of the disease was associated with a systemic oxidative stress manifested as apoptosis of Peripheral Blood Mononuclear Cells (PBMC) and also aimed to evaluate the role of Zinc and copper in the pathogenesis of vitiligo. They found that serum Zinc and copper levels were significantly higher in active vitiligo patients than controls due to higher percentage of apoptotic PBMCs in active vitiligo with increased release of zinc and copper in serum. Their results also confirmed that a systemic oxidative stress had a role in active vitiligo leading to melanocyte degeneration.

Serum zinc levels were studied in 75 patients of different cutaneous disorders and 24 healthy controls by Arora et al. No significant correlation was found in the cutaneous disorders studied i.e. vitiligo and aphthous ulcers where serum zinc levels were found to be 97.3 ±26.6 μgm/100 ml and 105.2 ± 23.5 igm/100 ml respectively. In this study, mean age of the case group patients was 30.27 years with a standard deviation of ±11.09 and in control group 32.27 years with a standard deviation of ±11.08. As it was an age and sex matched study, so distribution of respondents within different age ranges were kept in equal number. Maximum respondents of the case and control groups were within 21-30 years age range (50.0 vs. 50.0) followed by 11-20 years (16.7 vs. 16.7). This result was comparable with Shameer et al. Mean age of their respondents was 33.8 years. Male and female ratio of their series was 4.5:1. But in our series it was 1:1.7.

Within case group only 04 (3.4%) patients had positive family history of vitiligo. In Shameer et al series 33% of the patients had positive family history of vitiligo.

Mean duration of suffering from vitiligo was 5.0 months with a standard deviation of ±3.79 months. Maximum patients (70.0%) had been suffering from vitiligo for 1 to 5 months.

Mean duration of suffering from vitiligo was 2 years in Shameer et al series.

**Conclusion**

In some earlier studies variable degree of correlation between serum zinc level and vitiligo were observed. In a recent study conducted in India has shown low level of serum zinc is a significant risk factor for vitiligo. But this study on the contrary showed significant higher level of serum zinc in vitiligo patients than that of controls.

Limitations of the study
- Sample number was small.
- Period of study was short.
- Confounders were not addressed.
- As purposive sampling was done, findings were not free from biasness.

**Recommendation**
- Study with longer duration should be carried out with larger sample size.
- Multicenter study should be carried out to reveal accurate pattern of zinc status in vitiligo.

**References:**


8. Scottish Trace Element and Micronutrient Reference Laboratory.

STUDY ON AETIOLOGY AND OUTCOME OF
FULMINANT HEPATIC FAILURE IN BANGLADESHI PATIENTS

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Abstract
Fulminant hepatic failure is although uncommon but not rare in Bangladesh. It is the severe form of acute hepatitis. This study was done to know the clinical presentation, aetiological background, various complications and outcome of fulminant hepatic failure in Bangladesh. Total 28 patients were included in the study, of them 71% were female and 29% were male. Half of the total patients were in the age group of 16-25 years. Among the female patients 7 (35%) patients were pregnant. The chief symptoms were jaundice, anorexia, nausea, vomiting and encephalopathy and 25% developed bleeding manifestations. 19% patients developed renal failure, 40% had hyponatraemia and 15.7% had hypoglycaemia. The known causes were hepatitis E virus (45.8%), hepatitis B virus (25%), hepatitis A virus (4.1%) and antitubercular drugs (Isoniazide/Rifampicin) in 7.1% cases. Pregnancy appears to be a risk factor for HEV induced fulminant hepatic failure. Prolonged prothrombin time and raised serum bilirubin level were important prognostic factors but grade of encephalopathy failed to be proved as a prognostic factor. Thereby improving sanitary facilities, active immunization against HBV and HAV can prevent the incidence of fulminant hepatic failure and close monitoring of renal function, serum electrolytes and blood glucose can reduce significant mortality.

Key words: Fulminant hepatic failure, aetiology, outcome

Introduction
Acute liver failure is defined as the presence of acute liver disease associated with significant coagulopathy, which has been arbitrarily defined by a prothrombin time or factor V level of less than 50% of normal. Fulminant hepatic failure is acute liver failure associated with hepatic encephalopathy developing within 8 weeks of illness.¹ It is a multiorgan failure syndrome with dramatic clinical features and often fatal outcome. Acute viral hepatitis is the most common cause.² Others are drugs, chemical, poisons, ischemia, hypoxia and metabolic abnormality.³ Histologically it is characterized by massive parenchymal necrosis. Altered mental status accompanied by jaundice is a hallmark of acute liver failure. Most patients with fulminant hepatic failure demonstrate features of multiorgan failure including shock, renal failure, respiratory distress syndrome and infection. Since there is no specific treatment with proven efficacy, the principle of therapy in acute liver failure includes intensive care for maintenance of blood glucose, serum electrolytes and other biochemical parameters and supportive therapy for complications.⁴ Hepatic transplantation is considered for patients reaching grade III or IV encephalopathy due to FHF. The prognosis depends on aetiology, level of consciousness at presentation and prothrombin time. In FHF the hepatic pathology is potentially reversible and survivors usually recover completely.¹
The aims and objectives of the study were to evaluate the clinical features, complications, prognostic indices and outcome of fulminant hepatic failure in Bangladeshi patients. Also to find out the aetiology of the disease and to compare its features with that of other studies at home and abroad.

Materials and methods
This study comprised of 28 patients with fulminant hepatic failure of whom 20 were female and 8 were male patients. The patients were collected from different units of medicine wards (n=27) and pediatric

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ward (n=1) of Dhaka Medical College Hospital from January 2005 to January 2006. History taking and physical examination of each patient were done properly and was recorded in a printed data sheet. During physical examination attention was given to find out the stigmata of chronic liver disease to exclude preexistent liver disease. Biochemical, hematological investigations were done to establish the diagnosis and for prediction of prognostic and development of complications. Viral markers for hepatitis A, B, C and E were done to find out the aetiology. Patients were treated by supportive therapy and followed up in the ward till they recovered or expired. Improvements were assessed clinically (reduction of jaundice, increase in liver span and improvement of grade of encephalopathy) and biochemically (by S. bilirubin, prothrombin time). The mean duration of follow up was 3±1 week.

Data were entered systematically into computer with Microsoft Excel and the test statistics used to analyze the data were descriptive statistics.

The study was approved by the ethical review committee of the institution.

Results and observations

Total 28 patients of fulminant hepatic failure were selected for the study. 14 (50%) patients were in the age group of 16-25 years and 7 (25%) patients were in 26-35 years. (Figure1). 20 (71%) patients were female and the rest 8 (29%) patients were male. The male to female ratio was 2:5 (Figure2). Among the female patients 7 (35%) patients were pregnant.

Regarding the duration of illness from the onset of jaundice to the time of presentation, 12 (42.8%) patients presented within 7 days, 8 (28.5%) patients from 8th to 14th day, 5 (17.8%) patients from 15th to 21st day and the rest 3 (10.7%) patients presented from 22nd to 28th day.

All patients presented with jaundice with anorexia, nausea, vomiting and encephalopathy. 7 (25%) patients developed bleeding manifestations in the form of haematemesis, melaena, haematuria or pervaginal bleeding. 6 (21.4%) patients had hepatomegaly and fever. 4 (14.2%) patients had ascites. Table 1 showing the presenting features of the patients

<table>
<thead>
<tr>
<th>Features</th>
<th>Number of patients</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jaundice</td>
<td>28</td>
<td>100</td>
</tr>
<tr>
<td>Encephalopathy</td>
<td>28</td>
<td>100</td>
</tr>
<tr>
<td>Anorexia/nausea/vomiting</td>
<td>28</td>
<td>100</td>
</tr>
<tr>
<td>Hepatomegaly</td>
<td>6</td>
<td>21.4</td>
</tr>
<tr>
<td>Ascites</td>
<td>4</td>
<td>14.2</td>
</tr>
<tr>
<td>Bleeding(Gastrointestinal or genitourinary bleeding)</td>
<td>7</td>
<td>25</td>
</tr>
<tr>
<td>Fever</td>
<td>6</td>
<td>21.4</td>
</tr>
</tbody>
</table>

During presentation 1 (3.5%) in grade ², 6 (21.4%) in grade ²², 7 (25%) in grade ²²² and the rest 14 (50%) patients were in grade IV encephalopathy.

Serum bilirubin level of the study population showed two third (74.9%) patients had between 5 and 20 mg/dl, 4 (14.2%) had below 5 mg/dl and 3 (10.7%) had above 20 mg/dl. Serum ALT level of 25 patients showed 12 (48%) patients had between 200 and 1000 U/L, 4 (16%) had less than 200 U/L and 3 (12%) patients had above 2000 U/L. Prothrombin time was done in 24 cases showing two third patients had level below 50 sec and one third patients had above 50 sec. Serum electrolytes were done in 20 patients had level below 50 sec and one third patients had above 50 sec. Serum creatinine was done in two third (75%) patients, among them 4 (19%) patients had renal failure. Serum creatinine was done in two third (75%) patients, among them 4 (19%) patients had renal failure. Blood sugar was estimated in 19 (67.8%) patients and 3 (15.7%) of them had hypoglycaemia.
Viral markers for hepatitis A, B, C and E were done in 24 (85.7%) cases. Among them 11 (45.8%) were hepatitis E virus positive, 6 (25%) patients were hepatitis B virus positive and 1 (4.1%) patient was positive for hepatitis A virus. No patient was hepatitis C virus positive. In 2 (7.1%) cases fulminant hepatic failure was due to drug (antitubercular) toxicity. In 4 (16.6%) cases no cause could be identified.

Among 28 patients outcome of 4 patients could not be known as they left the hospital by discharge on risk bond. Of the remaining 24 patients, 14 (58.3%) patients survived and 10 (41.6%) expired.

Of the 24 patients with known outcome, 7 patients were in grade I or II encephalopathy and among them 4 (58%) recovered from the disease. 17 patients were grade III or IV encephalopathy and 10 (59%) recovered from the disease.

10 patients presented within 7 days of illness and 2 (20%) of them expired. 14 patients presented after 7 days and 8 (57%) of them expired (Figure3).

Prothrombin time was measured in 24 cases and among them outcome of 21 patients could be known. 15 patients had prothrombin time <50 seconds and 3 (20%) of them died. 6 patients had prothrombin time >50 seconds and 5 (83.3%) of them died (Figure4).

11 patients had serum bilirubin <10 mg/dl and 3 (27.2%) of them died. 13 patients had serum bilirubin >10 mg/dl and 8 (61.5%) died (Figure5).

13 patients had serum ALT <1000 U/L and 7 (53.8%) of them survived. 8 patients had serum ALT >1000 U/L and 7 (87.5%) of them survived.

Among the female patients 7 were pregnant during the attack, 5 (71.4%) patients of them were due to hepatitis E virus and 3 (60%) of them expired.

Discussion

Acute liver failure is a dramatic, unpredictable and often devastating clinical condition. Acute viral hepatitis is the most common cause. In the study most of the patients (75%) were in the age group of 16-35 years. It is similar to the finding of Khan M et al. 71% were female and 29% were male with M:F=2:5. It is contrary to the finding of Khan M et al where M:F was 3:1.3

Anorexia, nausea, vomiting, jaundice and altered conscious level were the predominant features. These features have also been recognized in studies by Lee WM 5 and Khan M et al. In the current study all the patients presented within 4 weeks of the onset of illness which is consistent the finding of Khan M et al where all patients presented within 2 weeks of the onset of illness.3 Bleeding from different sites is the end result of the coagulopathy. Marison G et al. reported bleeding from 50% cases but in our study 28.5% patients showed bleeding manifestation.6

Wilkinson SP et al. recorded 55% functional renal failure in patients of fulminant hepatic failure.7 In the present study 19% patients developed renal failure which is much lower. We found hyponatraemia in 40% patients but Khan et al9 reported 66% patients with hyponatraemia which is much higher than our observation. 15.7% of our patients developed hypoglycaemia which is consistent with the result of Khan M et al.3 They recorded hypoglycaemia in 8% patients.
In this study hepatitis E virus was the causative agent in 45.8% cases and hepatitis B virus in 25% cases. Fulminant hepatic failure due to hepatitis E virus is rare in Western countries, reports from developing countries showed that HEV is the common cause of FHF. Sallic R et al reported only 16.6% of patients with FHF in UK due to HEV infection but no cases of FHF due to HEV from France, Germany and USA. Acharya SK et al showed 62% cases of HEV was the causative agent of FHF. Mathiesen LR et al showed hepatitis B virus as a causative agent of FHF in 30-40% cases in western population. Khan et al. recorded 38.7% of FHF was due to HBV in Bangladesh.

Among the 7 pregnant patients 71.4% were due to HEV infection and 60% of them died. This is clearly related to the observation of Acharya SK et al. who showed that HEV induced FHF is more common in pregnancy and carries a high mortality rate. Hepatic encephalopathy of varying grades is the hallmark of FHF. In this study there was no significant difference in survival among the patients of different grades of encephalopathy. Survival rate of patients having encephalopathy grade 1 and 2 was 58% and grade 3 and 4 was 59%. Khan et al showed none of grade 4 encephalopathy survived and Trey et al showed only 17.6% of their patients from Grade 4 encephalopathy. These results are in contrary to our findings.

83.3% of the patients having prothrombin time >50 sec died and 20% of the patients having prothrombin time <50 sec expired. So prolonged prothrombin time appears to be a bad prognostic factor which is consistent with the finding of O'Grady JG et al. They found 98% of patients with prothrombin time >50 sec were expired. 27.2% of the patients with S. bilirubin <10 mg/dl expired and 61.5% of the patients with S. bilirubin >10 mg/dl expired. So high S. bilirubin is found to be a bad prognostic factor which is in contrary to the finding of Khan M et al as they showed no prognostic role of S. bilirubin level. Patients who presented within 7 days of onset of illness, 20% of them expired and 57% of the patients who presented after 7 days of illness expired. This is also similar to other study. Khan M et al showed death rates of these groups are 46.7% and 85.1% respectively.

Acharya SK et al reported Isoniazide/ Rifampicin is the major cause of drug induced acute hepatic failure in India which is also consistent with our observation as 8.3% of the FHF were due to antitubercular drug (Isoniazide/ Rifampicin) and 50% of them died.

**Conclusion**

Fulminant hepatic failure is a serious complication of acute viral hepatitis in Bangladesh. In the present study HEV was the leading cause of FHF followed by HBV. It reflects the observation that HEV is the main cause of acute viral hepatitis in Bangladesh. Poor sanitation and ignorance regarding food hygiene may be precipitating factors. Pregnancy appears to be a risk factor for HEV induced fulminant hepatic failure. Blood glucose level should be regularly monitored and appropriate measures should be taken promptly as hypoglycaemia is common in FHF which may complicate the disease outcome. Maintenance of input, output chart, monitoring of renal function and serum electrolytes are also important as alteration of renal function as well as S. electrolytes are common complication in FHF. Prolonged prothrombin time is an important prognostic factor but grade of encephalopathy failed to be proved as a prognostic factor. This may reflect the frequent alteration of the grade of encephalopathy which needs more close monitoring.

As there is no specific therapy and significant mortality rate we should try to prevent acute viral hepatitis by creating awareness oh people, improving sanitary facilities and by active immunization against HBV and HAV. Thus we can reduce morbidity and mortality related to it. Also we should actively think of establishment of specialized liver unit by which we can provide proper care to fulminant hepatic failure patients as well as facility for liver transplantation for the selected group of patients who have least chance of survival with conservative therapy.

**References**


