DENGUE HEMORRHAGIC FEVER / DENGUE SHOCK SYNDROME

ORIGINAL
PROF-1939

DR. AMIR RASHID
Assistant Professor,
Department of Pediatrics,
Lahore General Hospital / PGMI ,Lahore.

DR. HUMAYUN IQBAL KHAN

DR. NADEEM-UR-RASOOL

ABSTRACT... Objective: To study the clinical spectrum of Dengue Hemorrhagic Fever (DHF) and Dengue Shock Syndrome (DSS) in children admitted in a tertiary care center during 2011 dengue epidemic in Lahore. **Setting:** This study was conducted in department of Pediatrics Lahore General Hospital (LGH) / Postgraduate Medical Institute (PGMI) Lahore, Pakistan. **Design:** Retrospective descriptive study. **Period:** 1st August to 31st October 2011. **Method:** All the children (<18 years) with clinical features of Dengue Hemorrhagic Fever and Dengue shock Syndrome (DHF/DSS) admitted to the Pediatric ward Lahore General Hospital, Lahore during the period of 1st August to 31st October 2011 were enrolled in the study. The clinical manifestation were recorded on a standard questionnaire form. Clinically DHF/DSS cases were confirmed in the laboratory by different investigations. All the patient were diagnosed, managed and discharged according to WHO protocol. **Results:** A total of 254 patients were admitted in the ward labeled as dengue fever (DF) clinically. Out of these 142(55.9 %) were confirmed by serology. Of 254 DF cases 37(14.57%) were labeled as DHF and 02(0.79%) as DSS on their clinical manifestations and fulfilling the WHO criteria. 55% were male and 45%females. Common symptoms were fever seen in 100%, headache 71.79% and vomiting seen in 58.97% of the cases. The most common bleeding manifestations were epistaxis seen in 69.23% of the cases. Positive IgM was noted in 53.9% and IgG in 36.6% cases. A decrease in platelet count and increase in Heamatocrit (Hct) during stay in ward was noted. Out of 39 patients only one patient expired (2.56%).

Key words: Dengue fever, Dengue hemorrhagic fever, Dengue shock syndrome.

INTRODUCTION

Dengue infection is distributed worldwide and its out breaks are commonly seen in South East Asia[1]. First out break in sub continent was recorded in 1812[2]. Since then there have been many epidemics in this part of the world especially in Thailand, Sri Lanka, Indonesia, India, Bangladesh and Pakistan[3,4]. The first documented case of dengue fever (DF) in Pakistan was reported in 1985. The first outbreak was seen in 1994 – 1995 in Karachi and then again in 2006 in the same city[5].

In Pakistan dengue infection is taking the form of an epidemic[6]. It is transmitted by infected mosquito Aedes aegypti. Illness caused by dengue virus can range from a non specific febrile illness to more severe cases with bleeding and plasma leakage as seen in DHF/DSS. In endemic areas, symptomatic dengue fever is one of the leading causes of hospitalization and death among children. Each year an estimated 100 million cases of dengue fever occur and between 250, 000 and 50,0000 of dengue hemorrhagic fever are reported to WHO[7,8]. Differences in clinical manifestations of DF and DHF/DSS in different part of the world have been reported. In this study we have labeled all patients as DHF/DSS according to the WHO criteria[9]. According to WHO, case definition of DHF consisted of patients who had fever, hemorrhagic manifestations including at least a positive tourniquet test, thrombocytopenia (platelet count <100000 cu mm) and hemoconcentration (heamatocrit increase by > 20%)or objective evidence of increased capillary permeability. Definition of DSS consisted of all the above criteria with hypotension or narrow pulse pressure (20 mm Hg or less). All the patient admitted and diagnosed as DHF/DSS in our study had one or more of the these features.

This study was undertaken to evaluate clinical profile and outcome of children admitted with DHF/DSS, during the DHF epidemic in Lahore in 2011, which were diagnosed and managed according to the WHO protocol.

SUBJECT AND METHOD

All children < 18 years of age with clinical diagnosis of DHF/DSS admitted to Pediatric ward Lahore General Hospital during the period of 1st August to 31st October were enrolled in this study. This was retrospective descriptive study WHO criteria for diagnosis of DHF criteria and DSS was followed. According to WHO, case definition of DHF consisted of patients who had fever,

hemorrhagic manifestations including at least a positive tourniquet test, thrombocytopenia (platelet count <100000 cu mm) and hemoconcentration (heamatocrit increase by > 20%) or objective evidence of increased capillary permeability. Definition of DSS consisted of all the above criteria with hypotension or narrow pulse pressure (20 mm Hg or less). Patients having one or more features of this criteria were enrolled in this study. No particular value of platelet count was taken as criteria for admission. All the patients underwent a detail clinical evaluation and relevant investigations. Severity of DHF/DSS was graded according to WHO criteria. Hemoglobin, heamatocrit, platelet count and total leukocyte count were done in all cases. Serial heamatocrit and platelet count was done as and when required in certain cases. Liver function tests (LFT's), renal function tests (RFT's), serum electrolytes, chest X-ray and ultrasound abdomen was done in some patients. Blood for serology was collected during acute phase of illness in most of the patients at 5th day of illness and repeated at 10th day who remained with us till this time. Elisa (IgM and IgG) was performed by NovaLisa ®. An attempt was made to manage and monitor all patients according to the WHO protocol. Children were discharged when they were afebrile, maintained vital signs without intravenous fluid therapy and did not have any bleeding manifestations. Data of clinical profile, laboratory finding and outcome of these 39 patients were analyzed. All data were entered and analyzed through Statistical Package SPSS version 15. Continuous variables were expressed as mean ± standard deviation(S.D). Whereas discrete variables were presented as frequencies and percentages. Differences in the demographic, clinical data and also DF, DHF and DHSS etc were tested by Chi-square test for nominal variables. And one - way analysis of variance (ANOVA) followed by bonferroni method for continuous variables. Paired t-test was used to see significant difference between CBC investigations on follow-up days. A P-value of less than 0.05 was considered as statistically significant.

RESULTS

Of 254 patients admitted in pediatric dengue ward 37 (14.57%) were diagnosed as DHF and 02 (0.79%) as DSS (Table I).

Table-I. Out come of the patients with DHF

Cases	No. of patients	%age
DF	254	-
DSS	02	0.79%
DHF	37	14.57%
Grade I DHF	-	-
Grade II DHF	22/39	56.4%
Grade III DHF	12/39	30.7%
Grade IV DHF	05/39	12.8%
Hepatic encephalopathy	01	2.70%
Discharged	38/39	97.44%
Expired	1/39	2.56%
CXR (pleural effusion)	31/39	79.5%
USG Abd. (Ascities)	15/39	38.5%
IgM		
Yes	137/254	(53.9%)
No	9/254	(7.5%)
BL	5/254	(2.0%)
IgG		
Yes	93/254	(36.6%)
No	54/254	(21.3%)
BL	6/254	(2.4%)

Ages of the patient ranges from 2 month to 18 years. There were (55%) male and (45%) female among the study patients. Male to female ratio was 1.2:1 . The youngest child was aged 2 months and 3 cases presented with DHF during infancy. There was no case of DSS in infancy. Fever was the leading presentation seen in 100% patients. (88%) patients presented between 3rd and 5th day of fever and 12% after 7 days of fever. Fever was followed by headache, vomiting and abdominal pain seen in 71.79%, 58.97% and 38.14% of the cases respectively. Convulsions were seen in 02(5.13%) patients and altered sensorium in 01(2.56%) patient only.

Hepatomegaly was seen in 17(43.59%) patients and hepatic encephalopathy was noted only in one(2.7%) patient. Mortality was seen in one patient only who

expired within 24 hours of admission. Clinical features of the study patients is shown in (Table II).

Table-II. Clinical features of study patients

Features (n=39)	%age
Fever	100%
Headache	71.79%
Vomiting	58.97%
Abdominal pain	38.41%
Convulsion	5.13%
Altered sensorium	2.56%
Diarrhea	10.26%
Hepatomegaly	43.59%
Rash	33.33%
Jaundice	5.13%
Ascities	10.26%
Pleural effusion	7.69%
Hemorrhagic manifestations	
Positive tourniquet test	48.72%
Epistaxis	69.23%
Hematemesis	23.08%
Skin bleeds	41.03%
Malena / Rectal bleed	17.95%
Gum bleed	61.54%

Some patients had more than one bleeding manifestation. However epistaxis was seen in 27(69.23%) and gum bleeding in 24(61.54%) of the cases. Not all 39 patients had a platelet count less than 100,000/cu mm. A decrease in platelet during stay was observed. On the other hand mean Hct was increased from 32 to 44 (Table III).

Serology for dengue was performed in all 39 cases but IgM was positive in 53.9% and IgG is 36.6% of the cases. (Table I). X-Ray chest was done in 38 patients of which

Table-III. CBC investigation of different level of days

	Mean ± S.D	Conclusion (x)	P-value
HB			
Day 3	10.6±10.8	0.522	*<0.001
Day 5	10.97±2.15		
HB			
Day 6	12.1±11.32	0.646	*0.004
Day 7	3.8±1.3		
TLC			
Day 3	4.9±2.4	0.316	*<0.001
Day 5	3.8±1.3		
TLC			
Day 6	4.1±1.3	0.608	0.007
Day 7	3.7±1.2		
HTC			
Day 3	32.8±7.7	0.189	0.112
Day 5	31.6±7.8		
HTC			
Day 6	33.6±6.5	0.135	0.730
Day 7	44±26.2		
PLT			
Day 3	109.5±169.6	0.577	*<0.001
Day 5	86.4±67.2		
PLT			
Day 6	104.1±86.5	0.321	*0.001
Day 7	76.1±41.7		

**show statistically significant*

31(81.51%) revealed evidence of plural effusion. Ultrasound abdomen was done in 36 patients of which 15 (41.61%) reveals evidence of ascities. Clinical evidence of plural effusion or ascities was found in 4 and 3cases respectively.

Mean duration of stay in cases of DSS was 7.2 days and in DHF 5.7 days. Peripheral smear for malarial parasite and blood culture done in cases with splenomegaly did not reveal any abnormality. Cerebrospinal fluid examination was not done in any of the cases.

DISCUSSION

This is the third proven epidemic of dengue fever in Pakistan. This study was undertaken to define the natural

history of this diseases in terms of clinical presentation and outcome in children especially DHF. The epidemic started in August. The timing can be explained by increased mosquito breeding due to ambient temperature and humidity present in the preceding months[9]. During the present epidemic, a higher proportion of young children <10 years of age were affected suggesting either a increase in endemicity or virulence of dengue virus. Also a management protocol of DHF/DSS in which fluid therapy is not based on heamatocrit values needs to be formulated. Majority of children were from pre-urban slums that favor mosquito breeding owing to conditions such as inadequate solid and water waste management, practices of water collection for domestic usage and over crowded living conditions[9].

Dengue infection shows bimodal peaks during age groups of less than one year and between 5 to 10 years . 41.03% of our cases were 5 to 10 years of age. Report from other South and East Asian countries have shown dengue infection occurring in different age groups during previous epidemics. Studies from Punjab and Tamil Nadu, India, have reported lesser number of infected children below 15 years of age[11,12], whereas in Indonesia, Delhi, India and Karachi, Pakistan, has reported 66.4 %, 67% and majority of patients below 10 years of age respectively[6,13,14]. In the present study we had 2 (5.12%) cases who presented DHF during infancy. It is generally believed that 90% of DHF/DSS cases have circulating antibodies against dengue either by previous infection or passive transfer from the mother. Since in the present epidemic we had cases belonging to younger age groups it shows endemic nature of dengue virus so that children acquire antibodies at an early age. Some authors have suggested that viral virulence is a risk factor of DHF/DSS independent of pre- infection antibody status[15]. Therefore, cases of dengue in earlier age groups could also be due to increased virulence of virus during the present epidemic.

Male preponderance was observed in our study, as it has been observed in other studies from Pakistan and India[6,12,16]. 55.1% of our cases were male. This could be due to the social reason that males spend more time out doors than females, thereby have increased risk of mosquito bite. Whereas Ahmed et al and Gubler has reported 54 and 53% male preponderance in their studies respectively[6,17].

The commonest hemorrhagic manifestation in the present study was Hematemesis (29%), followed by epistaxis (27%). Positive tourniquet test was observed in 32% patients. Positivity of tourniquet test is variable in previous studies ranging from 13-66%[18].

Most of the DHF patients in our study were with fever and gastrointestinal symptoms along with hemorrhagic manifestations. Fever was the leading symptom seen in 100% followed by headache, vomiting and abdominal pain seen in 71.79%, 58.97% and 38.41% of the cases. Previous studies also report the same results. As Thanh Phuong et al has reported abdominal pain, vomiting and headache in 64%, 64%, 10% of the cases[19] and Kabilan has reported fever in 100% of their cases[11]. Rash was seen in 33.3% of our patients. Whereas Hammond et al has reported rash in 55.2% of the cases.

Hepatomegaly was observed in 43.59% of our cases, reported between 71-79% by others[20,21]. No case was proved to have Malaria or enteric fever in the present study. Convulsions and altered sensorium were seen in 5.13% and 2.56% cases though a higher incidence of 12.5% to 20% has been observed in previous studies from Delhi[12]. No other abnormal clinical manifestation was seen during the present epidemic. Patient with grade I severity were usually not admitted and hence most of patients belonged to Grades II and III as seen in previous studies[22]. 6.3% cases of Grade II and 7.09% of Grade III cases were seen in our study whereas there was only 1.97% cases of Grade IV.

Unusual manifestations of DHF were observed in one case who developed encephalopathy and severe hepatitis with acute liver failure. In 1983 Sumarmo observed 33 cases of encephalopathy among 358 patients with DHF[23]. In 1989 Harun reported 21 cases of encephalopathy among 754 patients with DHF. DHF cases with encephalopathy and/or acute liver failure have been reported from many countries[24]. Ascities and

plural effusion is seen in 10.26%, 7.69% of our cases. Whereas Ahmed et al has reported no such finding in his study 6. In contrast to this Bich Chau et al has reported plural suffusion in 71.4% of the cases[25].

Most common hemorrhagic manifestation of our study was epistaxis seen in 39.23% of the cases followed by gum and skin bleed seen in 61.54% and 41.03% of the cases respectively. In contrast to our results Carlos has reported epistaxis in 5.3% and gum bleed in 19.7% of their cases[26].

Positivity of tourniquet test was reported in 48.72% of our cases. This maybe due to various techniques and timing of the test. Tourniquet test may be negative during the stage of shock and is positive for a few days during the course of illness. Pott has reported 42% and Rigau has reported 24% positivity of this test in their study[27,28].

Thrombocytopenia with a platelet count <100 000/mm^3 which is one of the clinical diagnostic criteria proposed by the WHO was only observed in 4% of the children on admission. Platelet count decreased from 109.5 to 76.1 with moderate correlation 0.577 and found statistically significant ($P < 0.001$). Because thrombocytopenia with a platelet count <100 000/mm^3 is rarely present on admission of children with DHF, using a criteria of platelet count <150 000 mm3 may increase the DHF case detection rate. The WHO protocol for managements of DHF/DSS requires 1-2 hourly determination of heamatocrit value and adjustment of fluids therapy accordingly[8]. In the present study, Hct level increased from 32 to 44 with negligible correlation (r) 0.189 and since pre illness heamatocrit was not known it was difficult to document hemoconcentration. Fluid therapy was monitored according to clinical criteria and vital signs. Thanh Phuong has reported a platelet count of <1,00000 in 81% of their cases and Hct increase from 36 to 52[19].

In this study only 41.1% of the children with a clinical diagnosis of DHF were confirmed by HI Dengue serology. This rate of confirmation is similar with the national figure in Indonesia which is round 40% (SarosoT, CDC Arboviruses, Ministry of Health, Personal communication)[13]. In a study performed in Manila, the Philippines among 1055 cases clinically diagnosed with DHF only 49% were confirmed by HI test[26]. The explanation of this may be the low sensitivity of the HI test but another possibility is that some of the hemorrhagic fevers is Bandung were caused by other viruses. A limitation of the HI test is that paired sera are required. This is impossible to obtain in rapidly fatal cases. Sera of the children in this study were not kept deep frozen, therefore we were unable to test them with more sensitive dengue serological tests or with serological tests for other viral diseases. IgM antibody titers of > 1:160 against dengue were seen in (53.9%) and IgG in 36.6% of cases in whom serology was sent during acute phase of illness. Whereas 2% and 2.4% cases were border line for IgM and IgG respectively. Usually samples of IgM antibody detection should be collected after 5 days and not later than 6 weeks of onset of fever. Nearly 100% positivity of samples tested after 5 days of fever confirms the presence of epidemic due to dengue type 2.

DSS was observed in 0.8% of the cases. Compared with previous studies in Indonesia the prevalence of DSS has decreased. In Jakarta between 1975 and 1978 Sumarmo observed DSS in 64.3% of the children hospitalized with DHF[23]. Ten years later at the same pediatric department in Jakarta Harun observed shock only in 27.7% of the children[24].

CONCLUSIONS

We can conclude from this study that although dengue epidemic was very severe in this season in Lahore but outcome shows 14.6% DHF and only 0.8% DSS cases. Only 1 patient expired which was grade IV DHF. So mortality in the present study was 2.56% comparative to 12-13% in the previous study 29. This could be due to delay to recognition of epidemic in previous years or delay in seeking medical attention. Due to increased awareness, endemic nature of disease, better transport facilities and case management according to the WHO guide-lines, mortality in the present epidemics was low. Since majority of patients presented with hemorrhagic manifestations they were recognized and treated at any early stage.

REFERENCES

1. Halstead SB. **Pathogenesis of dengue: Challenge to molecular biology.** Science 1988; 239: 476-481.

2. Konar NK, Mandal AK, Saha AK. **Hemorrhagic fever in Calcutta.** J Assoc Phys India 1966; 14: 331-340. Qui FX, Gubler DJ, Liu JC, Chen QQ. Dengue in China: A clinical review. Bull WHO 1993; 71: 349-359.

3. Qui FX, Gubler DJ, Liu JC, Chen QQ. **Dengue in China: A clinical review.** Bull WHO 1993; 71: 349-359.

4. George R. **Dengue hemoorhagic fever in Malaysia: A review.** Southeast Asian J Pub Hlth 1987; 18: 278-283.

5. Qurshi JA, Notta NJ, Slahaudin N, Zaman V, Khan JA. **An epidemic of Dengue fever in Karachi associated clinical manifestations.** J Pak Med Assoc 1997. 47: 178-81.

6. Ahmed S, Arif F, Yahya Y, Rehman A, Abbas K. **Dengue fever outbreak in Karachi 2006- A study of profile and outcome of children under 15 years of age.** JPMA 58:4:2008.

7. World Health Organization. **Dengue Hemorrhagic Fever:** Diagnosis, Treatment and Control Geneva, World Health Organization, 1995.

8. **Guidelines for treatment of dengue fever/dengue hemorrhagic feverin small hospitals.** New Delhi, India: World health Organization, Regional Office for South-East Asia, 1999:5.

9. **WHO Dengue hemorrhagic fever diagnosis, treatment prevension and control.** 2nd ed. Geneva: WHO 1997.

10. **World Health Organization prevention and control of dengue and dengue hemorrhagic fever Comprehensive guidelines.** WHO Regional publication SEARO. No 29.1999.

11. Kabilan L, Balsaubramanian S, Keshava SM, Thenmozhi V, Sekar G, et all. **Dengue Disease Spectrum among Infants in the 2001 Dengue Epidemic in Chennai, Tamil Nadu, India.** Journal of Clinical Microbiology, Aug. 2003, p, 3919-3921.

12. Aggarwal A, Chandra J, Aneja S, Patwari AK, Dutta AK. **An Epidemic of Dengue Hemorrhagic Fever and Dengue Shock Syndrome in children in Delhi.** Indian Pediatric 1998; 35:727-732.

13. Chairulfatah A, Setiabudi D, Ridad A, Colibunders R. **Clinical manifestations of Dengue Hemorrhagic Fever in children in Bandung, Indonesia.** Ann. Soc. Belge Med trop. 1995, 75, 291-295.

14. Kabra SK, Verma IC, Arora NK, Jain Y, Kalra V. **Dengue Hemorrhagic Fever in children in Delhi.** Bulletin of the World Health Organization, 70 (1): 105-108(1992).

15. Cobra C, Rigau-Perez JG, Kuno G, et all. **Symptoms of gangue fever in relation to host immunologic response and virus serotype,** Puerto Rico, 1990-1991. Am J Epidemiol 1995;142:1204-11.

16. Srivastave, V.K. et al. **An epidemic of dengue hemorrhagic fever and dengue shock syndrome in Delhi.** A clinical study. Annals of trpical pediatrics, 10:329-324(1990).

17. Gubler DJ, 1998. **Dengue and dengue hemorrhagic fever.** Clin Microbiol Rev 11: 480-496.

18. Kalayanrooj S, VaughnDE, Nimmannitya S, Greeen S,Suntayakorn S, Kunentarasai N,Viramitrachai W, Ratenchu-eke S, Kiatpolpoj S, Innis BL, Rothman AL, Nisalak A, Ennis FA, 1997. **Early clinical and laboratory indicators of acute dengue illness.** J infect Dis 176: 313-321.

19. Thanh Phuong CX, Thinhan N, Kneen R, Thu Thuy PT, Van Thien C. **Clinical diagnosis and assessment of severity of confirmed Dengue Infections in Vietnamese children: Is the World Health Organization classification system helpful?** Am. J. Trop. Med. Hyg., 70(2), 2004, pp. 172-179.

20. Hammond SN, Balmaseda A, Perez L, Tellez Y, Saborio SI, Mercado, et all. **Differences in Dengue severity in infants, Children and adults in a 3- year hospital based study in Nicaragua.** Am. J. Trop. Med. Hyg., 73(6), 2005, pp. 1063-1070.

21. Endy TP, Chunsuttiwat S, Nisalaka A, Libarty DH, Green S, Rothman AL, et all. **Epidemiology of Inapparent and Symptometic Acute Dengue Virus Infection: A prospective study of primary school children in Kamphaeng** Phet, Thailand. Am J Epidemiol 2002; 156:40-51.

22. Gubler DJ, Clark GG. **Dengue/dengue hemorrhagic fever: the emergence of a global health problem.** Emerg Infact dis 1995;1:55-7.

23. Sumarmo PS: **Dengue hemorrhagic fever in children.** In University of Indonesia Press (1st ed), Jakarta, 1983, 95-119.

24. Sri Rejeki Harun: **Dengue hemorrhagic fever : experiences in the department of pediatrics** Dr. Cipto Mangunkusuma Hospital, Cermin DuniaKodektera, special ed.,1992, 81, 57-61.

25. Bich Chau TN, Anders KL, Lien Lb, Hung NT, Minh Hieu LT, et al. **Clinical and Virological features of Dengue in Vietnamese infants.** PLoS Negi Trop Dis 2010;4(4): e 657. doi 10, 1371/journal pntd 0000657.

26. Carlos CC, Oishi K, Cinco D, Mapua CA, Inoue S, et all. **Comparison of Clinical features and Hematologic abnormalities between Dengue Fever and Dengue Hemorrhagic Fever among children in the Philippines.** Am. J. Trop. Med. Hyg., 73(2), 2005 pp. 435-440.

27. Potts JA, Gibbons RV, Rothman AL, Srikiatkhachorn A, Thomas SJ, et al. **Prediction of Dengue Severity among Pediatric Thai Patients using early Clinical Laboratory indicators.** PLoS Negl Trop Dis 2010;4(8): e.769.

28. Rigau-Perez JG, Clark GC, Gubler DJ, Reiter P, Sanders EJ, Vorndam AV. **Dengue and Dengue Hemorrhagic Fever.** Lancet 1998;352:971-7.

29. Cam BV, Fonsmark L, Hue NB, Phuong NT, Poulsen A, Heegard ED. **Prospective case – control study of encephalopathy in children with Dengue Hemorrhagic Fever.** Am. J. Trop. Med. Hyg., 65(6), 2001, pp. 848-851.

Article received on: 02/03/2012 Accepted for Publication: 09/08/2012 Received after proof reading: 08/10/2012

Correspondence Address:
Dr. Amir Rashid
Assistant Professor,
Department of Pediatrics,
Lahore General Hospital / PGMI ,Lahore.
228-C , Askari-10 ,Lahore Cantt.,Lahore
dramirr_brain007@yahoo.com

Article Citation:
Rashid A, Khan HI, Rasool N. Dengue hemorrhagic fever / dengue shock syndrome. Professional Med J Oct 2012;19(5):661-667.

PREVIOUS RELATED STUDIES

Irfan Arshad, Fayyaz Ahmed Malik, Aamir Hussian, Shahida A.R. Shah. DENGUE FEVER; CLINICO-PATHOLOGIC CORRELATIONS AND THEIR ASSOCIATION WITH POOR OUTCOME (Original) Prof Med Jour 18(1) 57-63 Jan, Feb, Mar 2011.