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Editorial

Liver transplantation in children

B H N Yasmeen[1]

Till recently the option of liver transplantation (LT) was not available in developing world due to the prohibitive costs, lack of expertise and sophisticated infrastructure.[1,2] Even though adult liver transplantation already has started in our country. The first ever liver transplant surgery in Bangladesh was done at Birdem Hospital on 3 June, 2010, which is indeed a milestone. The first recipient (42). and donar (29) are now living a normal life. Second liver transplantation also successfully done in BIRDEM, on August 6, 2011. Both the donor (38), and recipient (35) are now in good health. These cases proves that liver transplantation is possible in Bangladesh by using indigenous skills and infrastructure. Though it is difficult to start paediatric LT in our country but not impossible and now it is the optimum necessity to start paediatrict LT here to save many child's life with liver failure.

Paediatric LT is now a routine treatment for end stage liver failure in developed countries with excellent 1 to 5 year survival.[3] It is not indicated if an acceptable alternative is available or if contraindications are present (eg, some cases of malignancy, terminal conditions, when expected outcome is poor.)

The first human liver transplant was performed in 1963 by a surgical team led by Dr. Thomas Starzl[4] of Denver, Colorado, United States. Dr. Starzl performed several additional transplants over the next few years before the first short-term success was achieved in 1967 with the first one-year survival post transplantation. Despite the development of viable surgical techniques, liver transplantation remained experimental through the 1970s, with one year patient survival in the vicinity of 25%. The introduction of ciclosporin by Sir Roy Calne markedly improved patient's outcomes, and during 1980s liver transplantation (with appropriate indications) was recognised as a standard clinical treatment for both adult and paediatric patients.[5] Since then, the evolution of immunosuppression and the development of new surgical approaches have led to the establishment of 100 transplant centers in the United States. Surgeons currently perform more than 500 pediatric transplantations per year.[6] The first report of successful Living Donor Liver Transplant (LDLT) was by Dr. Christoph Broelsch at the University of Chicago Medical Center in November 1989, when two-year-old Alyssa Smith received a portion of her mother's liver.[7] Now LT also has been successfully extended to neonates.[8]

About 50% of the paediatric patients who require a liver transplant have biliary atresia. Other disease states that progress to end-stage liver disease among paediatric patients which require liver transplantation include metabolic disorders, progressive intrahepatic cholestasis and acute poisoning etc.

Examples of metabolic derangements include Wilson disease, alpha 1-antitrypsin deficiency, tyrosinemia and hemochromatosis. Other metabolic disease states leading to hepatic dysfunction include[9] Crigler-Najjar syndrome, Metabolic respiratory chain deficiencies, Familial hyper- cholesterolemia etc.

Donor liver for LT comes from two sources

a) Deceased Donor : A liver from a deceased donor must be transplanted in to the recipient within 12-18 hours. A team of surgeons and anaesthesiologists performs an operation to remove the liver from the donor. The liver is then preserved and packed for transport. These procedures are performed by using standard surgical practices and sterile techniques. Upon completion of the operation, the incisions are closed, and the donor's body is prepared for funeral or cremation.

b) Living Donor : A living person can donate a part of his/her liver (right or left lobe) to one of his/her relative. Eligibility of a person for liver donation is judged after detailed examination and tests by the transplant team, where donor safety is considered first. The criteria for a liver donation include:

- being in good health

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- having a blood type that matches or is compatible with the recipient's
- having a charitable desire of donation without financial motivation
- being between 18 and 60 years old
- being of similar or bigger size of liver than the recipient

It may be possible to remove up to 70% of the liver from a healthy living donor without harm in most cases. The donor's liver will regenerate approaching 100% function within 4-6 weeks, and will almost reach full volumetric size with recapitulation of the normal structure soon thereafter. Generally, living donors do not have any restrictions or specific medications or special diet as a result of liver donation.

The transplanted portion will reach full function and the appropriate size in the recipient as well, although it will take longer time than the donor.[4]

Virtually all liver transplants are done in an orthotopic fashion, that is, the native liver is removed and the new liver is placed in the same anatomic location. The transplant operation can be conceptualized as consisting of the hepatectomy (diseased liver removal) phase, the anhepatic (no liver) phase, and the postimplantation phase. This operation is critical and can take several hours is about 12 to 14 hours.

Following liver transplant surgery, patients frequently remain on a ventilator for the first 24-48 hours. Patients are moved out of the pediatric ICU (PICU) in a few days, depending on their recovery. Reintroduction of oral intake can begin within the week following surgery. Typically, hospital stays range from 1-2 weeks.

Immunosuppressive drugs are started immediately after liver transplant to prevent rejection. It must be maintained for the rest of the life. Initial cost is high for first few months, but subsequently reduces to one or two medicine at the end of the year and single medicine in 2-4 years time, which needs to be taken life long. Liver functions and drug level also needs to be evaluated repeatedly.

Prior to discharge of the patient the transplant team provides follow-up care and medication instructions. The patient's and caregivers' questions are answered, and signs of rejection are discussed with the patient in an age-appropriate manner and with the family. The patient and family should be instructed to continue a rehabilitation program that includes exercise, proper nutrition and the continuation of immunosuppression and other medications.

Most children with LT can now be expeced to have long term survival. The dramatic increase in the survival rate throughout the 1990's in most International Centers has been sustained with most reporting one year actuarial survival rates of >90% in elective patients and >70% in acute liver failure. Long term survival figures for 10-15 years are >80%.[10,11]

The success of paediatric liver transplantation in developed countries has increased the awareness of need for such procedures in the developing country like Bangladesh. For LT sufficient professional and public education is needed to develop organ donation. Living related liver donation is the only realistic option in our country in the absence of cadaveric donors. It is also essential to have the proper resources to develop the surgical, medical and multidisciplinary support necessary for the success of LT. Also, there is a need for professional education with regard to early and appropriate referral to optimize child's survival.

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Original Article

Body Fat Distribution and Metabolic Syndrome in Bangladeshi Urban Adults

S N Zinia[1], **N Karim**[2]

Abstract

Background : Metabolic syndrome patients are having increased risk of developing into cardiovascular diseases & diabetes in their later life.

Objective : To determine the risk factors of metabolic syndrome and to identify the most potential risk factor that helps in early diagnosis of metabolic syndrome and prevention of Coronary Heart Disease (CHD), diabetes by early intervention.

Methods : A case control study was carried out during March-December 2011. The purposive sampling method with face to face interview using questionnaire, measurement tools were applied among 48 diagnosed metabolic syndrome patients in national Heart Foundation Hospital, Dhaka & 47 healthy controls in Shaheed Shaikh Abu Naser Hospital, Khulna in the study. Metabolic syndrome patients were confirmed according to NCEP ATP III criteria. Body fat distribution was measured and waist to height ratio (WHtR), Body mass index (BMI),wasit to hip ratio (WHR) was used as the markers of body fat distribution. Unadjusted odds ration was generated for all the variables with 95% confidence interval and only significant factors were considered as candidate for multivariate analysis. A binary logistic regression model was generated to assess risk factor of metabolic syndrome in comparison to non metabolic syndrome control adjusting for possible confounders. The statistical analysis was performed with SPSS 16 version.

Results : Among the participants significant increased risk of metabolic syndrome was evident in increased WHtR (OR 420.3, 6.3 -27664.0), increased WHR (OR 155.5. 3.8 -6338.9), increased BMI (OR 53.1, 2.5-1119.0), increased age > 50 years (OR 44.0, 1.5-1225.8), doing low level of physical activity (PAL) (OR 35.4, 1.5-788.7) and inadequate fruits and vegetables in diet (OR 576.8, 7.0- 47185.0. Among the anthropometric risk factors WHtR appeared as an independent and highest risk for metabolic syndrome with an odds ratio of 420.3 which was statistically significant. Area under the receiver operating characteristics (ROC) curve was 97.7% and was statistically significant.

Conclusion : Not only BMI also WHtR and WHR were strongly and positively associated with metabolic syndrome among Bangladeshi urban adults and they are the markers of metabolic syndrome diagnosis. The study recommended that WHtR, BMI, WHR as predictors should be routinely examined in metabolic syndrome diagnosis to prevent cardiovascular diseases and diabetes in the later life.

Key Words : BMI, WHR, WHtR, PAL, SFT.

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Introduction

Metabolic syndrome is a group of conditions that put a person at risk for heart diseases and diabetes. These conditions are- high blood pressure, high blood sugar levels, high levels of triglycerides (TG), low levels of high density lipoprotein (HDL), too much fat around the waist. When at least any three of the above five criteria are present then it is called metabolic syndrome and the risk of cardiovascular diseases and diabetes is increased by 1.5 to 2 folds. The metabolic syndrome has been proposed as an indicator of cardiovascular disease risk, type 2 diabetes.[1] Beyond CVD and type 2 diabetes, individuals with metabolic syndrome are susceptible to other conditions, notably polycystic ovary syndrome, fatty liver, gallstones, asthma, sleep disturbances, and some forms of cancer. In Bangladesh around 12.5% of all deaths are caused due to various types of cardiovascular diseases. The prevalence of ischemic heart diseases among the rural population is around 3.4%, prevalence of hypertension to be 17.9% which is increased in times.[2] In urban people prevalence of hypertension is more particularly in the slum population, have even higher prevalence (37.5% in men and 24.5% in women).[2,3] 1.1millions people died from diabetes in the year 2005.[2] Another report by ICDDRB suggests that in urban area the prevalence of diabetes is just double (10%) the rural area (5%).[4] According to the ICDDRB the risk of these diseases are increasing with urbanization. In general, the International Diabetes Federation estimates that one-quarter of the world's adult population has Metabolic Syndrome. Metabolic syndrome was found to be frequent (2.9%) in Bangladeshi rural women.[5] Increasing prevalence of obesity is also evident in our country and that is 8.9%.[3] Metabolic syndrome needed to be studied more among the urban adults of Bangladesh because of their mechanical life style and more proneness to become obese.

Methodology

A case control study was carried out during March-December 2011. A total of 46 cases and 47 controls to detect two folds or higher odds ratio, with the prevalence of obesity 0.089 among the general population at 80% power and at a case control ratio of one to two instead of a total of 34 cases and 68 controls due to the resource constraints. Cases were the consecutive hypertensive patients having at least any two metabolic syndrome criteria as defined by National colesterol education programme Adult treatment panel (NCEP ATP III) (like increased TG level, increased blood sugar level or frank diabetes, decreased HDL level, increased waist circumference) reported in hypertensive department of NHFH, Dhaka. Controls were the patients reported in the out patient department of Shaheed Sheikh Abu Naser Specialized Hospital, Khulna for any minor ailment, diagnosed as healthy controls free of metabolic syndrome or any other diseases later on by laboratory tests. Controls were selected purposively matched for age, sex and residence from Shaheed Sheikh Abu Naser Specialized Hospital, Khulna.

Data was collected with the semi-structured interview questionnaire, through face to face interview after taking informed consent from the participants. Interview was taken in patients coming regularly in the Hospital departments for hypertension and controls (healthy people) previously diagnosed correctly after biochemical testing of their blood for sugar and triglyceride. Information regarding risk factors and behaviors were inquired taking effort to minimize the recall bias. The protocol received ethical clearance from National heart foundation and Shaheed Sheikh Abu Naser Specialized Hospital. Blood pressure was measured through sphygmomanometer at sitting position thrice after taking 30 min. rest and average B.P was taken. Height was measured by measuring scale and weight by standard bathroom scale. BMI was calculated as kg/m2. Waist circumference was measured by measuring tape removing folds of clothing at the site one inch above the umbilicus. Hip circumference was measured at the maximum protrusion of hip. Waist to hip ratio (WHR) was calculated. Triceps skin fold thickness was measured by slide caliper.

After data collection variables were entered in SPSS 16. Data was checked for out of range errors, consistency etc and screened and cleaned for any missing value and discrepancies. Then variables were sorted as categorical and numeric. Then proportion of each of the risk factors was compared in between metabolic syndrome and non metabolic syndrome groups; association was sought for socio demographic variables, Behavioral factors, Family diseases factors, Anthropometric factors. Unadjusted odds ration was generated for all the variables with 95% confidence interval and only significant factors were considered as candidate for multivariate analysis. A binary logistic regression model was generated to assess risk factor of metabolic syndrome in comparison to non metabolic syndrome control adjusting for possible confounders.

Data was presented in the form of tables and ROC curve.

Results

A total 95 subjects were interviewed for the case-control study. Average age of the case was 46.44 years and control was 42.87 years and 54.7% were men. All the participants were from urban residence. Then proportion of each of the risk factors was compared in between metabolic syndrome and non metabolic syndrome groups; association was sought for socio demographic variables, Behavioral factors, Family diseases factors, Anthropometric factors. Unadjusted odds ration was generated for all the variables with 95% confidence interval. Among the variables monthly family income, Ever use of tobacoo, Table salt intake, Fruit. & vegetable intake, Physical activity level, Family history of chronic heart disease, Family history of hypertension (HTN), Waist to hip ratio, Body mass index, Waist to height ratio found statisticaly significant during univariant analysis and were considered as candidate for multivariate analysis & metabolic syndrome risk model was developed.

Table -I : Metabolic Syndrome Risk

Table - I	case [No,%]	Control [No,%]	OR (95% CI)	P Value
W Ht R (increased)	46(95.8)	25(53.2)	420.3(6.3,27664.0)	0.005*
WHR(increased)	44(91.7)	33(70.2)	155.5 (3.8, 6338.9)	0.008*
B M I (increased)	33(68.8)	22(46.8)	53.1 (2.5, 1119.0)	0.01*
Increased Age(>50yrs)	20(41.7)	13(27.7)	44.0 (1.5,1225.8)	0.02*
Low PAL	35(72.9)	25(53.2)	35.41 (1.5, 788.7)	0.02 *
Inadequate fruits & vegetables intake	42(87.5)	25(53.2)	576.8(7.0, 47185.0)	0.005*
Positive F/H of CHD	23(47.9)	10(21.3)	0.7(0.0, 0.6)	0.83
Positive F/H of HTN	24(50.0)	13(27.7)	6.8 (0.3, 118.8)	0.18
Family income (>20,000 tk)	13(27.0)	19(40.4)	0.2(0.0, 2.8)	0.25
Education level (S.S.C & illiterate)	33(68.8)	25(53.2)	2.0(0.1, 24.2)	0.58
Tobacco ever user	27(56.2)	9(19.1)	7.2 (0.6, 79.9)	0.10
SFT			0.8 (0.7, 1.0)	0. 10
Table Salt non user	26(54.2)	37(78.7)	0.0(0.0, 1.0)	0.05
Sex (female)	21(43.8)	22 (46.8)	0.1(0.0, 1.5)	0.10

Nagelkerke R Square 0.843

Metabolic syndrome risk model

Metabolic syndrome risk factors had been assessed through binary logistic regression model. The model explained 84% of the variability in the metabolic syndrome status.

Increased BMI, increased WHR, increased WHtR, inadequate fruit and vegetable intake, low physical activity level (PAL), increased age (>50 years) appeared as significant predictors of metabolic syndrome in comparison with referent healthy

control. Significant increased risk of metabolic syndrome was evident in inadequate fruit and vegetable intake (OR 576.8, 7.0 -47185.0), low level of physical activity (OR 35.4, 1.5 - 788.7), increased age >50 years (OR 44.0, 1.5 -1225.8). Anthropometric factors like WHtR was statistically significant risk with the highest OR (420.37, 6.3-27664.0). Other anthropometric factors like WHR (OR 155.5, 3.81-6338.9) and BMI (OR 53.1, 2.5 -1119.0) were also statistically significant increased risk for metabolic syndrome. However increased skin fold thickness (SFT) was not appeared as a statistically significant risk for metabolic syndrome. On the other hand F/H of HTN, F/H of CHD, tobacco use, table salt intake, education level, income and sex factors were not significant risks or predictors of metabolic syndrome in the current study. (Table-I)

Table-II : Correlation of WHR, BMI, SFT, WHtR with each other

	Constant	WHR_(1)	BMI_gr(1)	SFT	WHtR(1)
Step 1 Constant	1.000	-.682	-.627	.230	-.744
WHR_(1)		1.000	.682	-.408	.325
BMI_gr(1)	-.627	.682	1.000	-.474	.296
SFT	.230	-.408	-.474	1.000	-.073
WHtR(1)	-.744	.325	.296	-.073	1.000

Correlation matrix : It showed that WHR and BMI correlated with each other (0.6). So either WHR or BMI could be used for the same purpose. WHtR (0.3 with WHR and 0.2 with BMI) was an independent predictor and can be used independently for metabolic syndrome diagnosis. SFT (0.4) was also an independent predictor but it was not statistically significant. (Table II)

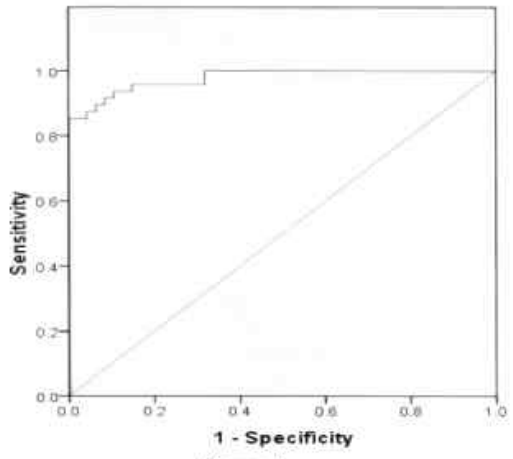


Figure-1

This ROC curve can generate risk for metabolic syndromeup to 97.7% (0.95-0.99).

Discussion

In the current study increased BMI and Increased WHR, increased WHtR, low level of physical activity, having inadequate fruits and vegetable in diet and increased age (>50 years) appeared as significant risk factors of metabolic syndrome in general. The ROC curve (Fig. I) can generate risks upto 97.7% and that was statistically significant.

Metabolic syndrome Risk

The correlation matrix (Table-II) in the current study showed that WHtR was an independent and better marker. BMI and WHR both acted as the same predictors of metabolic syndrome. SFT was also an independent predictor of metabolic syndrome but it was statistically non significant.

This finding of current study was somehow similar to the study by Ashwell and Hsieh who suggested global use of WHtR as a rapid screening tool for cardio metabolic risk factors with this simple public health message: 'Keep your waist circumference to less than half your height'.[6] Following six reasons given by Ashwell and Hsieh to defend the superiority of WHtR over other anthropometric indices were- WHtR is more sensitive than BMI as an early warning of health risks, WHtR is cheaper and easier to measure and calculate than BMI, a cut-off point of WHtR 0.5 indicates increased risk for man and woman, WHtR 0.50 is also for different ethnic groups, WHtR boundary values can be converted into a consumer-friendly chart, WHtR may allow the same boundary values for children and adults.[6] In the current study increased WHtR (0.50) in both sexes appeared as a risk factor with an OR of 420.37 which was the highest of all anthropometric factors in the model.

BMI can diagnose metabolic syndrome up to certain limit even in slightly overweight condition than Caucasians as shown by MC. Keigue .et al.[7] However in our study we found WHtR (a proxy to central fat measurement) had diagnosed metabolic syndrome most accurately with the OR of 420.3.

MC. Keigue,et al. stated that waist/hip circumference ratios were higher in South Asians than in Europeans of similar body mass index due to their pattern of body fat distribution -South Asians had more Waist circumference than hip circumference. They confirmed the existence of an insulin resistance syndrome, prevalent in South Asian populations with increased WHR.[8] Current study also unveiled this fact that increased WHR irrespective of sex appeared as a risk factor of metabolic syndrome with an OR of 155.5.

Conversely, St. Pierre, et al found normal-weight men with four or more features of the insulin resistance syndrome had a three-fold increase in the risk of ischemic heart disease. The researchers concluded that BMI alone poorly reflects the risk of ischemic heart disease associated with the features of insulin resistance syndrome.[9] Current study exactly unveiled the same fact that central adiposity was more irrespective of the heights of the cases and the hip circumference was also more in cases as well. Thus the study unveiled WHtR as well

as WHR were more reliable risks of metabolic syndrome along with BMI.

The current study showed having history of inadequate fruits and vegetables intake was a risk factor of metabolic syndrome with an OR of 576.8 and increased age also appeared as a risk for metabolic syndrome.

People in urban area are likely to live a very mechanical life. With the urbanization people are used to less physical activity. Leisure time physical activity is quite absent from their daily life because of lack of time. Lifestyle factors alone or modulated by inherited factors appear to play an important role because obesity and dyslipidaemia become worse with urbanization and migration as stated by Anoop Misra.et al.[10] This urbanization reflected in our study too. As this current study was among urban population, low physical activity level appeared as significant risk against metabolic syndrome with an OR of 35.4.This was similar to findings by studies on Bangladeshi immigrants to the U.K. by mckeigue, et al. showing the high prevalence of metabolic syndrome occurred due to the fact that a large proportion (65%) of women had low HDL cholesterol because of unfavorable environmental triggers such as stress, physical inactivity, and smoking.[8] Current study was also similar to the study findings by Zaman,et al. showing relatively low (<3%) prevalence of metabolic syndrome due to sufficient physical activity protecting the rural women of Bangladesh.[5]

Tobacco use, Table salt intake, Family income (>20000), education level S.S.C or illiteracy, positive family history of CHD, positive family history of HTN, sex (female) were not found as statistically significant risks of metabolic syndrome in the current study.

On the contrary to the findings in the article by La Moreno .et al, SFT of triceps was not found as a risk of metabolic syndrome.[11] This might be due to the fact that all four body site's (Biceps, Triceps, Sub scapular, Abdominal) SFT should be measured and then body fat content should be calculated for risk assessment. But due to the social context SFT could not be measured in all four body sites. Table salt non use did not appear as statistically protective factor of metabolic syndrome. There might be other explanation of such finding or could there be any missing link in the current study.

Limitations and scope of the study

1. This study was conducted among hospital controls in selected hospitals which may give rise to Barkit's Paradox.
2. Due to small sample size we had to take some prevalent cases which may give rise to Neyman's Fallacy.
3. No population specific cut off for Skin fold thickness measurement was available among Bangladeshi population.

Conclusion & Recommendation : This study concluded as– Not only BMI also WHtR and WHR were strongly and positively associated with metabolic syndrome among Bangladeshi urban adults and they are the markers of metabolic syndrome diagnosis. Not only BMI also WHtR, and WHR should be used as routine surveillance in metabolic syndrome diagnosis. Measures should be taken to maintain normal WHtR (0.5), WHR (0.85 in female and o.90 in male), BMI (18-25 in both sexes) by life style modification, increased physical activity level (PAL) and there by prevent metabolic syndrome and cardiovascular diseases risk.

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Original Article

Nutritional Status among Primary School Children in an Upozila of Bangladesh

M Adhikary[1]

Abstract

Objective : The objective of this research is "to assess the nutritional status of primary school children of rural areas", in terms of the incidence of stunting and wasting among the children.

Methods : Descriptive, cross-sectional study was administered in two primary schools located in sreepur during May-June 2010. The schools were selected using purposive sampling technique. From these selected schools, a total number of 345 students studying from class IV to V were enrolled in the study. First anthropometric measurements such as Age (in years), Height (in Cms), and Weight (in Kgs) of each child were taken to assess their nutritional status.

Results : The mean height of children was (136.9; SD ± 8.57cm) not comparable with National Centre for Health and Statistics (NCHS), USA. Among 345 students, 81.74% of the students were found to be undernourished. Underweight, stunting, and wasting were present in 40.2%, 57.98%, and 23.77% of schoolchildren, respectively. Underweight was associated with lower household wealth ($p < .05$). The mean weight (27.18 Kg; SD ± 6.78kg) was lower than NCHS standards. Among underweight children girls (47.62%) were found to be higher than boys (32.77%). The students were more stunted (57.98%) than wasted (23.77%). Only 10.15 % of the students were found to be both wasted and stunted.

Conclusion : The study revealed that high percentage of primary school students was malnourished. The study result also revealed the urgent need for initiation of school health program with specific emphasis on, improvement of nutritional status personal hygiene and prevention of diseases with the collaboration of governmental and non-governmental institutions.

Key Words : school health, nutritional status, malnutrition.

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Introduction

The definition of primary school age corresponds approximately to the period from kindergarten to secondary which begins after the period of high mortality risk in the preschool years. Primary school age children constitute a substantial fraction of the world's population, numbering about 24% of the population of the less developed world and about 15% of that of the industrialized world. Not only are school age children a much larger proportion of the total population, but their numbers are also growing at a substantial rate (1.4% per year)[1]. In consequence, by the year 2015, approximately 90% of the world's primary school age children will live in less developed countries[2]

Nutritional status is the aspect of development that influences behavior directly or indirectly. Operationally it is determined by taking body measurements with reference to their proportion to one another. A World Free from Hunger Report states that half of the world's underweight children live in South Asia. The estimated prevalence and number of stunted children is also alarming here. The approximate prevalence of stunting for all developing countries is 29% of all children, or 165 million children. More alarming is the likelihood that these are underestimates. According to UNICEF report (1995- 2003) Underweight children are the most prevalent problem found with 54% followed by stunted growth in 52% of the children and 17% are being wasted of Bangladeshi children.

Nutritional studies on primary school children in Malaysia show that under nutrition continue to be major health problems, both in rural and urban areas. For example, anthropometric assessment of children aged 6-12 years old from five rural communities found the prevalence of underweight among boys and girls to be 29.1% and 26.1%

respectively[3]. In these communities, an average of 34.4% boys and 24.9% girls were stunted. However, the prevalence of wasting among these children (boys=8.2%; girls=6.2%) was much lower compared to the other two nutritional status indicators. A survey by the School Health Service Unit of the Health department of the City Hall of Kuala Lumpur found that among the 7 and 12 years old children, 12.5% and 16.2% were underweight[4]. In a sample of low income children between 5–10 years old showing the highest prevalence of underweight and stunting[5]. In view of the still high prevalence of under nutrition among younger school children in different less developed countries, this study was conducted to assess the nutritional status (weight-for-age, height-for-age and weight-for-height) of rural primary school children aged 8-14 years old in Sreepur upozilla. The study also focused on gender and age differentials in the children's growth status, mainly height-for-age (an indicator for chronic malnutrition) and weight-for-height (an indicator for acute malnutrition).

Materials and Methods

Methods

This descriptive cross-sectional study was conducted from May to June 2010 at two schools, Sreepur Model Govt. Primary School and Keoa Poschim Khondo Daroga Chala Register Primary School of Sreepur upazilla under Gazipur district were selected by purposing sampling. Study population was students of classes four and five attending school at the time of suevey. A verbal consent was obtained from the headmasters of the schools. A total of 345 students (177 boys and 168 girls) were included in this study. A semi structured questionnaire was used to collect data through face to face interview. Data were edited, processed, and analyzed with the use of the SPSS: Version 11.0.

Measurements

Age: This was determined from the register of the school. The school insists on a birth certificate at the time of admission and thereafter the age is increased by one every year.

Height: Height in centimeters was marked on a wall in the school with the help of a measuring tape. All children were measured against the wall. The children were asked to remove the foot wear, and stand with heels together and head positioned so that the line of vision was perpendicular to the body. A glass scale was brought down to the topmost point on the head. Height was recorded to the nearest 1 cm.

Weight: A bath room scale was used. It was calibrated against known weights regularly. Zero error was checked for and removed if present every day. Clothes were not removed as adequate privacy was not available. However, as the study period was in May and June when the weather was warm, only light clothes were worn by the students. Weight was recorded to the nearest 500 grams. The anthropometric indicators recommended for child are stunting (height for age < 90%) and thinness (weight for height <80%). These were calculated separately for boys and girls for each year of age, as the WHO reference norms vary by age and sex.

Results

Out of 345 students, 177 (51%) were boys and 168 (49%) were girls. According to Waterlow's classification, there were 56 (16.23%) normal, 282(81.74 %;) undernourished and 7 (2.03%) obese/overweight children. The age group-wise undernourished, overweight & obese are seen in table-1. Among undernourished children, girls dominate the boys while the reverse in the case of normal children. The prevalence of under nutrition was highest among 10-11.9 age groups (62%). (Table I)

Table I. Nutritional Status According to Age

Age group in years	Normal (%)	Undernourished (%)	Obese & overweight	Total (%)
8-9.9	9 (16.07)	79 (28)	-	88 (25.51)
10-11.9	25 (44.64)	175(62)	2 (28.57)	202(58.55)
12 – 14	22 (39.29)	28 (10)	5 (71.43)	55 (15.94)
Total	56 (100)	282 (100)	7(100)	345 (100)

Based on the Waterlow classification of malnutrition among children, overall combined prevalence of being underweight; stunting and thinness were found to be 40.2 %, 57.98 % and 23.77 %, respectively. Rates of underweight (boys = 32.77%; girls = 47.62%), stunting (boys = 45.2%; girls = 71.43%), and thinness (boys = 21.47%; girls = 26.2%) were higher among girls than boys.

Table-II Prevalence of underweight, stunting & thinness by sex wise

Sex	Underweight	Stunting	Thinness
Boys	58(32.77%)	80 (45.2%)	38 (21.47%)
Girls	80(47.62%)	120 (71.43%)	44(26.2%)
Over all	138 (40.2%)	200 (57.98%)	82(23.77%)

Table III. Wasting Vs Stunting per Waterlow classification

Weight for Height (Wasting)	Height for Age (Stunting)		
	≥90%	<90%	Total
≥80%	n = 98 (28.40%)	Stunted n = 165 (47.83%)	263 (76.23%)
<80%	Wasted n = 47 (13.62%)	Waste d and Stunted n = 35 (10.15%)	82 (23.77%)
Total	145 (42.02%)	200 (57.98%)	345(100%)

Table-IV gives the association of maternal factors and malnutrition among children. More than 70% of mother's of malnourished children were illiterate compared to 55.36% of normal children. Literacy, occupationof mother and monthly family income were found to have highly significant association ($p<0.005$) with malnutrition among their children.

Table- IV Association of Maternal Factors and Malnutrition among Children.

Maternal Factors	Malnourished N=289 (%)	Normal N=56 (%)	Total N=345	Signifi-cance Test
Literacy				
Illiterate	203 (70.24)	31 (55.36)	234 (67.83%)	p<0.001
Literate	86 (29.76)	25 (44.64)	111(32.17%)	
Occupation				
House Wife	101 (34.95)	37 (66.07)	138(40%)	p<0.0001
Laborer	130 (44.98)	11(19.64)	141(40.87%)	
Service	58 (20.07)	8 (14.29)	66(19.13%)	
Monthly Family Income (TK)				
<3000	160 (55.36)	3(5.36)	163(47.25%)	
3000-4999	90 (31.14)	13 (23.21)	103(29.85%)	p<0.0001
5000-9999	32(11.07)	17 (30.36)	49(14.20%)	
≥10000	7(2.42)	23 (41.07)	30(8.70%)	

Discussion

Bangladesh registers one of the highest child malnutrition rates in SEAR.About 25% (37.5 million) of total population (150 million) of Bangladesh comprises of children a 5 to 15 years and more than 80% of children in this age group goes to school. Out of 345 students 177 (51%) were males and 168 (49%) females giving male to female ratio 1:0.95.According to Waterlow classification 81.74% of students were found to be under nourished.

The proportion of undernourished is more among females (97.63%) than males (66.67%). Studies conducted in Ecuador in 1998 and in Tanzania in 2009 shows boys were more commonly affected than girls. The female children from very poor families do not attend school and this could be the reason for low prevalence of malnourishment among girls compared to male children in Tanzania.

According to Waterlow classification the percentage of wasting in our study was 23.77%, which is more than double compared with the wasting percentage 10.5% of the study done in Nepal[6,7]. For stunting and both wasting and stunting also, the results were different from that of the above two studies in Ecuador and Tanzania. In our study the overall percentage of undernourished children was 81.74%, stunting 57.98% and both wasting and stunting 10.15%. These prevalence were more compared to the results obtained in the above two studies (37%, 21% and 5.4% respectively). The higher prevalence of stunting and both wasting and stunting as observed in the present study is due to the lower socioeconomic status of the people in the study area.

There are many factors that directly or indirectly cause malnutrition among children. Women's educational and social status, national per capita income, food availability, and access to safe water are important underlying determinants of child malnutrition[8]. Some studies suggested that high prevalence of low birth weight, poor hygiene, inadequate child care and feeding practices, and the low status of women in society are key factors that explain high rates of child malnutrition[9]. The present study shows highly significant association of maternal literacy, occupation, income on child malnutrition. Economic status of the household is associated with the general health and development status of the family.

Literate mothers adopt many improved behaviors related to maternal and child health care, feeding and eating practices which ultimately affect the nutritional status of children. The present study shows that 70.24% of mothers of malnourished children are illiterate. This finding is also similar to the findings from studies from Nepal[10] and NFHS (National Family Health Survey) from India[11].

A high prevalence of stunting has been reported from India. The report on regional WHO Consultation on nutritional status of children reported 45% prevalence of stunting among girls and 20% among boys with an average of 32% in both sexes[11]. In our study the prevalence was 71.43% among girls and 45.2% among boys with an oveall prevalence of 57.98%. A similarity in the prevalence of stunting in boys and girls from developing countries has also been found by other workers[12]. Thinness as defined by Weight for Height <80% was present in 21.47% of boys and 26.2% of girls in this study. In a study in government and public schools of Delhi, the prevalence of stunting was 9.9% in upper socioeconomic class girls and 35.3% in lower middle class girls[13].

The poor nutritional status of girls has important implications in future life in terms of physical work capacity and adverse reproductive outcomes[14]. School based mid day meal programme and iron supplementation should receive priority in rural areas.

Improved child health and survival are considered as universal humanitarian goals. In this respect, understanding the nutritional status of children has far-reaching implications for the better development of future generations. Malnutrition continues to be a problem of considerable magnitude in most developing countries of the world. Several studies[11,12] have shown that dietary and environmental constraints are the determinants of nutritional status of countries. In the present study stunting reflects a failure to reach the linear growth potential due to suboptimal health and/or nutritional conditions, underweight reveals a low body mass relative to chronological age, which is influenced by both child's height and weight.

In this study, approximately 40.2% (n = 138), 57.98% (n = 200) and 23.77% (n = 82) of the children were found to be underweight, stunted and wasted respectively (Table 2). Which has its implications on the child's consequent development (e.g. cognitive skills).

As stunting reflects past nutrition, the finding indicates that these children may have had experiences with poor diets and infections during their early childhood and perhaps were continuously living with similar conditions as a consequence of poverty. Nutritionists have argued that children in less developed countries can attain their optimum weight and height if the environment is conducive to their health and nutritional status.

Conclusion

This study provided evidence that these children were under acute and chronic nutritional stress .Hence, the screening for common health problems and the assessment of nutritional status should be an essential part of school health services. Early detection and appropriate treatment of malnourished children must be done prior to school entry, to avoid complications like stunting and wasting.

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Original Article

Characteristics of Injectable Contraceptive Users among Rural Women of a Selected Area in Bangladesh

N Begum[1], M Rahman[2], S Afroz[3], M M Raham[4], M A Jabbar[5]

Abstract

Background : Injectable contraceptive, Depot Medroxy Progesteron Acetate (DMPA) is safe, effective, convenient and long acting hormonal contraceptive. It is estimated that about 30 million women in more than 90 countries are using this method. It is the third most popular contraceptive method.

Objective : To find out the characteristics of injectable contraceptive users in a rural area of Bangladesh

Methodology : This descriptive cross-sectional study was carried out between December 2011 to May 2012. A total 93 clients were selected purposely from village Islampur in Dhamrai upazila. Data were collected by face to face interview, using a pre-tested questionnaire.

Result : The study revealed that most (50.54%) of the respondents were young aged women (25-34yrs), Muslim respondents were (98.92%) and educated (27.96%) up to secondary level. About 88.17% of the participants were house wives and 60.22% had family members < 4. The socio-economic status revealed that 50.53% of the women had family income between 5,000-10,000 taka. The participants (97.85%) enjoyed good health. Reproductive health status showed that 62.37% of women's age of menarche started within 11-13yr and 65.59% had regular menstrual cycle. Most of the women (58.06%) got married between 17-21yrs and 50.54% women conceived 1-2 times. Age of youngest child was below 5 years about 58.06%. Only 36.56% respondents took injection DMPA after birth of first child. 46.24% of the participants got information from primary level health worker (FWV/HA). Nearly half of the women (48.39%) took injection 1-5 times. Post injection health problem within 6 months revealed that 73.12% had health problems. Among them 75% women had Amenorrhea.

Conclusion : Proper counseling before initiation of injection, immediate and adequate management of side effects should be taken into consideration.

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Introduction

A rapid population growth is a burden on the resources of many developing countries. Unregulated fertility, which contributes to such situations, compromises the economic development and political stability of these countries. Therefore, many countries consider limiting population growth as an important component of their overall developmental goal to improve living standards and the quality of life of the people. This strategy is now enhanced by the availability of effective modern contraceptive methods since the 1960s.[1] Contraceptives were invented to prevent the normal physiological process of conception by various means[2]. Christina S. Chu defines contraception as "Intentional prevention of conception through the use of various devices, sexual practices, chemicals, drugs, or surgical procedures. This means that something (or some behavior) becomes a contraceptive if its purpose is to prevent a woman from becoming pregnant".[3]

There are a number of contraceptive methods available to the couple. These methods can be divided based on several criteria such as natural/ artificial, traditional/modern, temporary/permanent, male/female, oral/ injectables and intra uterine contraceptic devices (IUCD)[4]. Artificial contraceptive methods include barrier methods, intrauterine devices, hormonal methods and post conceptional methods. These are reversible contraceptive methods. Among reversible contraceptives failure rate is lowest in hormonal contraceptives. Most women of the world prefer hormonal contraceptive. Injectable contraceptives are currently the only widely used long acting hormonal contraceptives. Injectable contraceptives are DMPA (Depot Medroxy Progesteron Acetate) and NET-EN (Norethisteron Enanthate). DMPA is more preferred injectable contraceptive. DMPA is administered in a dose of 150mg every three months or 600mg every six months. As of 1996, about 12 million women in developing countries have been using DMPA injectable contraceptives.[5] Uncontrolled growth of population is the most urgent problem in the country and population stabilization program has the top priority.

Bangladesh is at eighth position among top ten highly populated countries. Population problem is one of its major problems.

Bangladesh has a population of 160 million and an annual population growth rate of 1.39 per cent. To control population burden Govt. of Bangladesh launched family planning in 1960 and strengthen in 1970. Now it is intensified and service reached up to the grass root level. Primary level health worker through their domiciliary service reach door of every house and counsel, educate rural women. Approximately 70 percent of the population of Bangladesh lives in rural areas. Female and male population ratio is 104.8:100. 30 per cent of the population is women of reproductive age. There are nearly 25.1 million are eligible couples.[6] According to current estimates about 56 per cent of the eligible couples are being protected by the contraceptive method.[7]

Despite more long-term experience with DMPA, little is known about the characteristics, attitudes and needs of potential acceptors and actual users of this contraceptive. Studies on injectable contraception in Bangladesh are scarce. Such a study would be most beneficial given the potential value of the information to women's health, family planning and society in general.

Materials and Methods

This was a cross- sectional type of descriptive study which was conducted at Islampur village in Dhamrai Upazilla under Dhaka district from December 2011 to May 2012. By a non-probability purposive sampling 93 married women age between 18-59yrs were selected. Data were collected ensuring the privacy and confidentiality by face to face interview of the respondents using a pre- tested structured questionnaire. Descriptive statistics were analyzed by using SPSS statistical software version 16.

Result

The study was conducted on 93 married women in a rural area who are using injectable contraceptive.

In the study, the socio- demographic status of the respondents revealed that 50.54% were of age group 25-34 years, 92(98.92%) were Muslims. Educational qualification showed that maximum number of the participants were qualified up to secondary level (27.96%). 25.80%.were educated up to primary level, others (22.58% and 5.38%) were able to sign and illiterate. Among the respondents 88.17% were house wife and 5.38% were service holder. 50.53% had monthly income between 50000-10000Tk and 21.50% got below 5000Tk. 60.22% respondents had family members less than 4. Rest of the respondents had big family of 5-20 members. Regarding living standard 54.84% lived in semipakka house. (Table I)

Table 1 Socio-demographic profile of the respondents

Attribute	Frequency	Percentage
Age group (years)		
14 -24	15	16.12%
25 -34	47	50.54%
35 -44	29	31.18%
45 -54	01	1.08%
>55	01	1.08%
Religion		
Islam	92	98.92%
Hindu & Others	01	1.08%
Educational status		
Illiterate	05	5.38%
Able to sign only	21	22.58%
Primary level	24	25.80%
Secondary level	26	27.96%
SSC or Equivalent	11	11.83%
HSC or Equivalent & above	06	6.45%
Occupation		
Housewife	82	88.17%
Service Holder	05	5.38%
Business	03	3.23%
Day Laborer & Others	03	3.23%
Monthly income(taka)		
Below 5,000	20	21.50%
5,000 -10,000	47	50.53%
10,001 -15,000	15	16.13%
15,001 -20,000	09	9.68%
20,001 & above	02	2.15%
Family members		
Less than four(<4)	56	60.22%
Four or more than four (>4)	37	39.78%

In this study 97.85% respondent had no health problem. 35.48% were married between 12-16, 58.06% were married between 17-21, 4.30% were married between 22-26yrs. Regarding reproductive health of respondent's recent study revealed that highest number (62.37%) menarche started at the age of 11- 13 yrs and 65.59% had regular menstrual cycle. Age at marriage of respondents was 17-21yr (58.08%) and early marriage at 12-16yrs was (35.48%). It is evident from result that 50.54% conceived 1-2 times, 41.94% conceived 3-4 times, 5.38% conceived 5-6 times, 2.15% conceived above 6 times. The study result showed that 23.65% had 1 living child, 43.01% had 2 living children and 23.65% 3 living children, >4 children had 7.54% and 2.15% had no living child. On questioning age of last child was below 5 years 58.06% and 32.25% were 6-10 years 9.67% were above 11 years. (Table II)

Table II : Health problem & Reproductive health related information of the respondent

Health problem	Frequency	Percentage
Yes	2	2.15%
No	91	97.85%
Reproductive health	**Related Information**	
Age (yr) of menarche		
8 - 10	2	2.15%
11 - 13	58	62.37%
14 - 16	32	35.48%
Age (yr) at marriage		
7 - 11	1	1.08%
12 - 16	33	35.48%
17 - 21	54	58.06%
22 - 26	4	4.30%
27 - 31	1	1.08%
Menstrual Cycle		
Regular	61	65.59%
Irregular	32	34.41%
Age of youngest child		
Below 5 years	54	58.06%
6 - 10 years	30	32.25%
11 - 15 years	7	7.5 2%
Above 15 years	2	2.15%
Number of conception		
1 - 2 times	47	50.54%
3 - 4 times	39	41.94%
5 - 6 times	5	5.38%
Above 6 times	2	2.15%
Number of living children		
1 Child	22	23.65%
2 Children	40	43.01%
3 Children	22	23.65%
>4 Children	7	7.54%
No living child	2	2.15%

It is evident from result that 6.45% took injection before child birth, 36.56% took injection after birth of first child, and 56.99% were in other situation. The study revealed that 46.24% respondents got information from FWV/HA, 20.42% from Relatives, 18.28% from Husband, 5.38% from Doctor, 7.53% from others The current study showed 48.39% women took injection 1-5 times, 23.65% took injection 6-10 times, 27.96% took injection more than 11 times. Regarding side effect after taking DMPA 75% respondents period was stopped, 17.65% had spotting during menstrual cycle, 5.88% had profuse bleeding, 42.65% complained of excessive weight gain, 41.18% had severe headache, 32.35% had abdominal discomfort 06.13% developed breathlessness & chest pain on minimum labour. (Table III & IV)

Table III : Source of information regarding injectable contraceptive

Source of information	Frequency	Percentage
MBBS Doctor	5	5.38%
FWA/HA	43	46.24%
Relatives	19	20.42%
Husband	17	18.28%
Others	9	9.68%

Table IV : Information's regarding Injectable Contraceptive user

Time of initiation of 1st injection		
Time	**Frequency**	**Percentage**
Before child birth	6	6.45%
After birth of first child	34	36.56%
Others	53	56.99%
Frequency of injectable contraceptives		
1-5	45	48.39%
6-10	22	23.65%
>11	26	27.96%
Problems after injectable contraceptives		
Yes	68	73.12%
No	25	26.88%
Side effects after injection (Multiple responses)		
Stopped period	51	75%
Spotting in menstrual cycle	12	73.12%
Profuse bleeding	4	5.88%
Excessive weight gain	29	42.65%
Severe headache	28	41.18%
Abdominal discomfort	22	32.35%
Breathlessness & chest pain on minimum labour	8	06.13%
Others	4	5.88%

Discussion

This cross sectional study was designed to determine the characteristics of injectable contraceptive user in a selected rural community. Regarding socio-demographics characteristic most of the respondents (50.54%) were young aged women between 25-34yrs of age. A study in Planned Parenthood of the Rocky Mountains in US showed that the majority of the women using injectable contraceptive were younger age of 23-30 years old.[8]

In rural Bangladesh women are ignorant about birth spacing and they usually become interested in family planning after delivery of second child. As the area was Muslim majority, highest user was Muslim (98.92%). The opposite picture was found in a study in India because of Hindu majority population.[9]

Educational qualification of the respondents showed that maximum number of the respondents of recent study were qualified up to Secondary level (27.96%). 25.80%.were educated up to primary level, others (22.58% and 5.38%) were able to sign and illiterate. Injectable contraceptive is suitable for illiterate and less educated women as it is convenient for them to use. WHO reproductive health and research revealed that in the developing countries injectable contraceptive is used mostly by the rural and less educated women.[10] Our study also revealed that respondents were less educated and illiterate.

Occupational status of our study showed that most of the respondents (88.17%) were house wife. Among the

respondents 50.53% had the family income 5,000-10,000 taka. And then about 21.50% was the lowest as below 5,000 taka monthly. In a study in India revealed similar result that most of the users were house wife and from lower economic class.[11]

Regarding reproductive health of respondent's recent study revealed that highest number of respondents (62.37%) menarche started at the age of 11- 13 yrs and 65.59% had regular menstrual cycle. Khan MM et al from ICDDR,B showed similar result in their study in Rural Bangladesh.[12]

In our study age at marriage of respondents was 17-21yr (58.08%) and early marriage at 12-16yrs was (35.48%). Among total respondents about 43.01% women using injectable contraceptive had 2 Children and 23.65% had either one or three. It is here to be mentioned that fertility declined dramatically in Bangladesh. Women reporting 5 or more children declined from 35.9% in 1991 to 17.9% in 2000-04.[13] Respondents were asked about age of the last child 58.06% mentioned below 5 years and 32.25% mentioned between 6-10 years. It indicates that DMPA is an effective contraceptive for birth spacing.

The current study revealed that sources of information about injectable contraceptive were from primary health worker, relatives and husband were 46.24% 20.42% and 18.28% respectively. Community health workers of SEAR countries and Sub Saharan countries distribute Family planning materials and also push contraceptive injections during their door to door domiciliary visits.[14]

Our study showed only 10.75% respondents were aware about birth spacing took contraceptive injection 16-20 times and half of the respondents (48.39%) were less aware on contraception as they took contraceptive injection 1-5 times. Study in rural Uganda showed similar picture that a few women were conscious about their contraception and maximum percentage were less aware.[15]

Regarding post injection complication 72.12% had complication with in 6 months after DMPA injection. Complications related to menstrual irregularities were 75% had amenorrhea, 17.65% had spotting and 5.88% had heavy bleeding. Next highest number was 42.65% complained of excessive weight gain. Headache was complained by 41.18% and abdominal discomfort was complained by 32.35%. This finding corresponds to the common problem of DMPA mentioned by WHO[14] and FDA of USA.

Conclusion & Recommendations

Injectable contraceptive (DMPA) is safe, effective, reversible contraceptive method and return of fertility is longer comparing with other reversible contraceptive method and most effective in birth spacing. Women of lower socioeconomic class are more motivated to use injectable contraceptive (DMPA). Rural women are conscious about family planning and health workers at primary level health care are playing an important role in disseminating knowledge on family planning methods. Policy maker should consider these points and strengthen family planning service at grass root level.

Acknowledgement

The authors pleased to acknowledge the 4th year MBBS students of Northern International Medical College, UH&FPO, Medical Officers & Supporting staffs working at Dhamrai Upazila Health Complex under Dhaka district for their heartiest co-operation in the collection of relevant data pertaining to this study.

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Original Article

Clinico-pathological profile of Hodgkin's lymphoma in children

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Introduction : Hodgkin's lymphoma is a type of lymphoma characterized clinically by the spread of disease from one group of lymph nodes to another and by the development of systemic symptoms with advancement of disease. Pathologically, it is characterized by the presence of Reed-Sternberg cells. With early detection survival rate of the disease is around 90%.

Objective: The principal purpose of this study was to assess the clinico-pathological features of the Hodgkin's lymphoma in children (n= 30).

Method: A retrospective study was carried out with 30 Paediatric patients of Hodgkin's lymphoma in the department of Paediatric Haematoncology, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka from October 2008 to March 2009 . Clinical features of Hodgkin's lymphoma were assessed among these patients. Histopathological features of individual cases were also assessed.

Result: Wide spectrum of clinical presentation like swelling of lymph nodes (most common cervical lymph nodes 100% cases), fever (80%), weight loss (70%), Vomiting (20%), Oedema (6.7%) and Jaundice (3.3%) were found. Majority patients were in advanced stage and B symptoms at the time of presentation. ESR was high in 70% cases. Mean Hb concentration was 8.14 ± 1.89 gm/dl with a range from 5.50-12gm/dl. Serum LDH was high in 60% cases. Out of all the Hodgkin's lymphoma patients 20% were lymphocyte predominant and 80% were mixed cellularity type.

Conclusion : Most common clinical presentations in patients of our study were lymphadenopathy, fever and weight loss. Other presenting features were vomiting, oedema and jaundice. Majority patients have advanced stage disease. 80% were mixed cellularity type and 20% were lymphocyte predominant variety.Clinical presentations are similar to other previous studies.

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Introduction

Hodgkin's lymphoma has a bimodal incidence curve; it occurs most frequently in two age groups, the first being young adulthood (age 15–35) and the second being in those over 55 years[1].

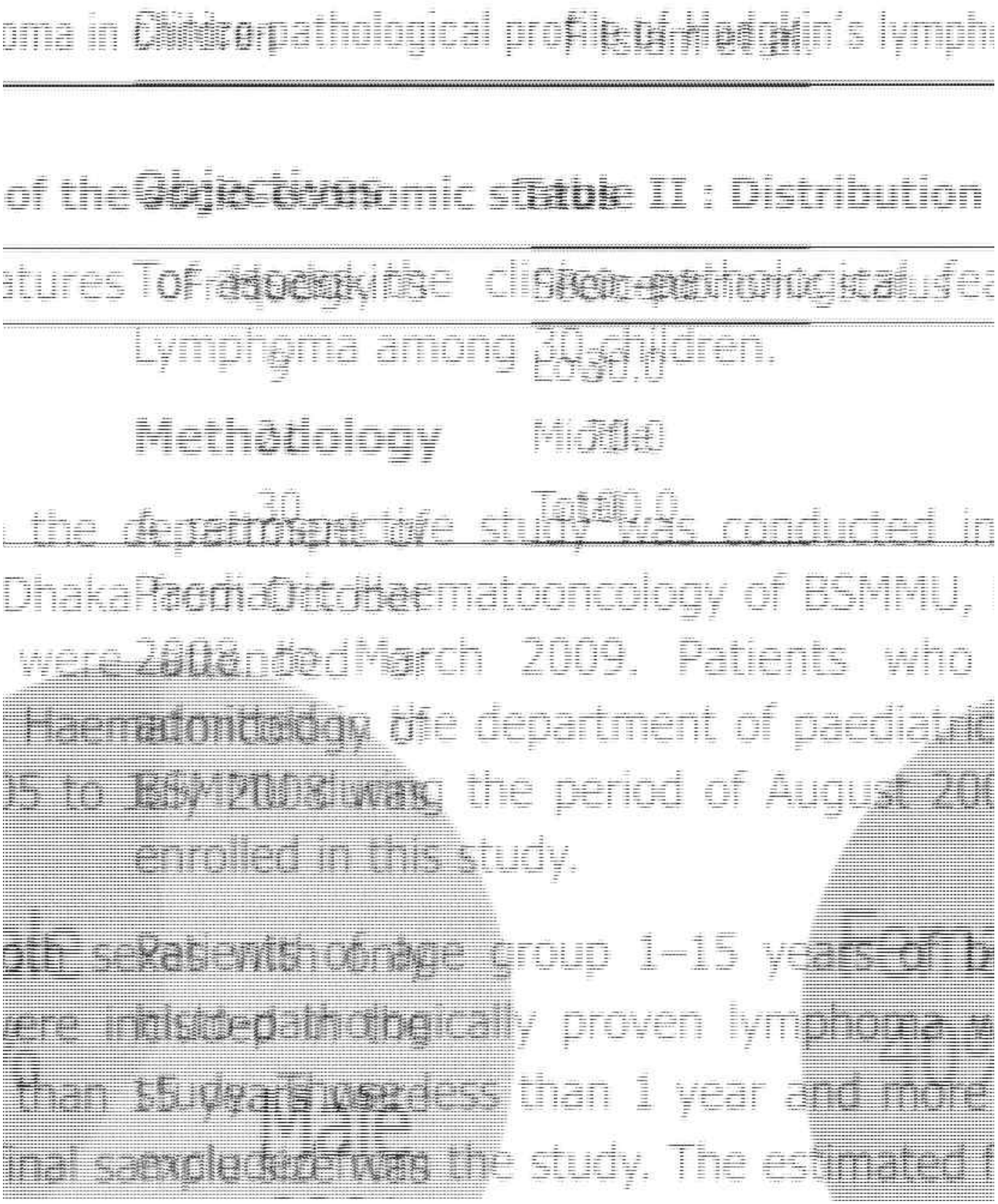
Overall, it is more common in males, except for the nodular sclerosis variant, which is more common in females. The annual incidence of Hodgkin's lymphoma is about one in 25,000 people and the disease accounts for slightly less than 1% of all cancers worldwide. The incidence of Hodgkin's lymphoma is increased in patients with HIV infection[2].

Patients with Hodgkin's lymphoma may present with the following symptoms: painless enlargement of one or more lymph nodes, rubbery in consistency and frequently involved cervical and supraclvicular regions (80-90%). The spleen is pathologically involved in 30% to 45% of patients with Hodgkin's disease at diagnosis, although, conversely, approximately 35% to 50% of patients with Hodgkin's disease and clinical splenomegaly do not have pathologic involvement documented at staging laparotomy[3,4]. Approximately one third of the patients may have disease-related symptoms, including B symptoms and pruritus.

In classic Hodgkin disease (Hodgkin's lymphoma), the neoplastic cell is the Reed-Sternberg (RS) cell.

Classical Hodgkin lymphoma (excluding nodular lymphocyte predominant Hodgkin's) can be sub-classified into 4 pathologic subtypes (Nodular sclerosing CHL, Mixed-cellularity subtype, Lymphocyte rich and Lymphocyte depleted) based upon Reed-Sternberg cell morphology and the composition of the reactive cell infiltrate seen in the lymph node biopsy specimen.

Literature review revealed very little information focusing on clinico- pathological feature of Hodgkins Lymphoma in children. This paucity of information and absence of a national cancer registry system in Bangladesh led us to conduct this study.



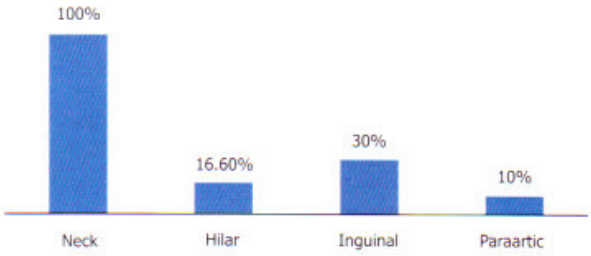


Fig. 3 : Distribution of lymphnode site involvement

Table III : Stage at Presentation

	Frequency	Percentage
Stage I	5	16.6
• IA	2	6.6
• IB	3	10.0
Stage II	8	26.6
• IA	1	3.3
• IB	7	23.3
Stage III	12	40.0
• IA	1	3.3
• IB	11	36.6
Stage IV	5	16.6
• IA	1	3.3
• IB	4	13.3

This study showed that splenomegaly (26.6%) was more commonly found than hepatomegaly (16.6%) (Table- IV).

Table IV : Distributionof extranodal involvement

Extranodal area	No. of Patients	Percent
Hepatomegaly	5	16.6.0
Splenomegaly	8	26.6.0

Haematological and Biochemical parameter of the study patient showed that ESR were high in 70% cases and serum LDH was abnormal in 60% cases. (Table V)

Table V: Distribution of Patients by ESR & LDH

	ESR		LDH	
	No. of Patients	Percent	No. of Patients	Percent
Normal	9	30.0	12	40.0
High	21	70.0	18	60.0
Total	30	100.0	30	100.0
Mean ± SD (Range)	58.80 ± 40.80	7±115	434.50 ± 158.25	255±820

Mean haemoglobin (Hb) of the study patient was 8.14±1.89, WBC count was 7633.33 ± 1357, mean serum urea was 28.50 ± 4.76, mean serum creatinine was 0.58±0.15 and mean SGPT was 27.67 ± 7.77. (Table VI)

Table VI: Distribution by lab/biochemical parameter

Variables	Mean ± SD	Range
Hb (gm/dL)	8.14 ± 1.89	5.50-12.00
WBC	7633.33 ± 1357.82	5000-10000
SGPT	27.67 ± 7.77	15-36
Urea	28.50 ± 4.76	20-35
S. Creatinine	0.58 ± 0.15	0.25-0.85

According to histological features 20% of the study patients were lymphocyte predominant and 80% were mixed cellularity type. None was found as Lymphocyte depleted or Nodular sclerosing type (Table VII).

Table VII: Distribution by histological features

Histological variant	Frequency	Percent
Lymphocyte predominant	6	20.0
Lymphocyte depleted	0	0.0
Mixed cellularity	24	80.0
Nodular sclerosing	0	0.0

Discussion

Analysis of data of this study shows mean age of the study subjects were 7.05 ± 2.62 years, ranging from 3.5 to 12.0 years. 30 % of the respondents were in the age group of 5 years and majority (60%) was in the age group of 5-10 years. Only 10% cases were of age group >10 years.

The data from the study by IARC, on cancer incidence in five continents, for the year 1988 to 1992. Study populations over 4.5 million, suggests that Hodgkin's lymphoma, has a bimodal peak at ages 15–34 years and over 60 years in most European, American, Hispanic and Australian populations with incidence rates less than 1.46 per 100,000 in the age group 0 to 14 years and around 6 per 100,000 per year in the over-60-year-olds[5].

Siddiqui N et al. studied that the clinico-epidemiological profile of Hodgkin's lymphoma (HL) in Pakistan. Six hundred and fifty eight histopathologically confirmed cases of HL were identified. Patients ranged in age from 1 year - 84 years. The mean age at presentation was 23.8 years. Three hundred and twenty cases (48.6%) belonged to age group < 18 years and 338 cases (51.4%) were > 18 years of age[6].

In current study 60% of the children were male and 40% were female. Cartwright and Watkins (2004)[7], in their review presented the age-standardized (World) incidence rates/100 000/year for Hodgkin's disease is higher (maximum 1.46) in males than female (maximum 0.78) [5, 7].

It has been suggested that risk of Hodgkin's lymphoma may be linked to social class background in childhood. Positive associations between Hodgkin's lymphoma and correlates of higher social class have been reported in studies of children

and young adults[8]. In our study 70% of patients were belonged to middle class family and 30% of the patients were of lower socio-economic class.

Most common presentation of our patients were swelling of lymph nodes.100% of patients presented with swelling of cervical lymphadenopathy, other site included supraclavicular mediastinal, inguinal and para-aortic. B symptoms present in majority of cases, 80% had fever and 70% with weight loss. Other presenting features were undue vomiting (20%), oedema (6.7%), and Jaundice (3.3%).

In Siddiqui et al.[6] series the majority of patients (81.2%) presented with cervical lymphadenopathy.

Ramani A et al.[9] reported that out of 103 patients with lymphomas, Fever and superficial lymphadenopathy were the commonest presenting features and 'B' symptoms were present in over 60% of both groups[7].

According to Howard Terebalo, patients with Hodgkin's lymphoma may present with the following symptoms: painless enlargement of one or more lymph nodes which felt rubbery in consistency and frequently involved cervical and supraclvicular regions (80-90%), splenomegaly (30%)[3]. In our series, splenomegaly26.6% cases and hepatomegaly was found in 6.6% cases.

Hepatomegaly (5%), Hepato-splenomegaly, Pain after alcohol consumption[4], nonspecific back pain has been reported in some cases of Hodgkin's lymphoma. About one-third of patients with Hodgkin's disease may also present with systemic symptoms, including low-grade fever; night sweats; unexplained weight loss of at least 10% of the patient's total body mass in six months or less, itchy skin (pruritus)[4].

Clinical staging was done at the time of diagnosis. majority of the patients, 56.7% were stage III & IV diseases and 43.3% stage I & II diseases among them 80% presented with B symptoms. Ramani A et el[11] reported that out of 103 patients with lymphomas 31 (30.1%) had Hodgking's lymphoma. Among them 64.5% of HL presented in stages III & IV of the diseases. Siddiqui N et el[6] Early stage I & II disease was present in 43.9% patients at presentation, while 56.1% patients presented with advanced stage III & IV.

On histopathological study, 20% of our cases were diagnosed as lymphocyte predominant 80% were mixed cellularity type and none was of lymphocyte depleted or nodular sclerosis type. According to Ho et al[10], the nodular sclerosing subtype was commonest in females (5 out of 8 cases) and for males, the commonest was mixed cellularity (10 out of 18 cases)[10]. In Siddiqui et al.[6] series, histopathologically, mixed cellularity (MC) constituted 63.8% of cases, followed by nodular sclerosis (NS) 19.9%, lymphocyte predominant (LP) 7.3% and lymphocyte depleted (LD) 1.2%.

In 70.0% cases ESR was high and Mean Hb concentration was 8.14.14 ± 1.89 gm/dl Serum LDH was high in 60.0% cases, Mean (±SD) blood urea level was 28.50 ± 4.76, S. creatinine 0.58± 0.15, SGPT was 27.67 ± 7.77 and mean WBC count was 7633.33 ± 1357.82. All of these were within their normal limit.

Conclusion

In this study we found that most common clinical presentations in patients of our study were lymphadenopathy, fever and weight loss. Other presenting features were vomiting, oedema and jaundice. Majority patients have advanced stage disease. 80% were mixed cellularity type and 20% were lymphocyte predominant variety.Clinical presentations are similar to other previous studies.

Limitation of this study is that smaller sample size (30) was used to evaluate and analyze the clinico-pathological pattern. Immuno-phenotyping could not be done and association with EBV, HIV or other viruses was not observed.

Further epidemiological study in large scale is recommended to evaluate the clinicopathological pattern in Bangladesh. More systemic assessment as well as CT scan or MRI confirmation is needed to explore the involvement of other internal organs.

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Case Report

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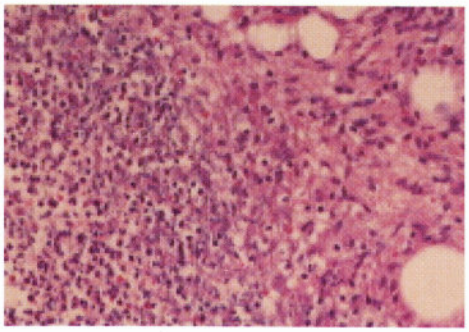
baman[1], M R U Siddique[2], M A Islam[3], M Z Mahb

Abstract

the vegetative form has no common Only
ciation with underlying systemic disease. tion with underlying systemic disease. Pyodermo
tory ulcerative disease of unknown etiology inflammat
form may turn into another forms and Each
me ulcerative[4]. The diagnosis does not beco
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e the diagnosis and to exclude other make
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nd prednisolone for this problem. dapsone a
rative processes causing dermal ulcer
rophilia[4] and healthy granulation tissue Re-epithe
neut

As pyoderma gangrenosum can be associated with HIV infection, an HIV test was performed and found to be negative. Other diagnostic tests such as chest X-ray, abdominal ultrasound and a double contrast barium enema, performed in order to exclude any underling diseases, revealed no abnormalities.

The lesional skin biopsy demonstrated a dense diffuse neutrophilic infiltrate with a mixture of lymphocytes, plasma cells, histiocytes and occasional foreign body giant cells that extended to the subcutis.



Histopathology (lesional skin biopsy) the dermis shows dense infiltrate of acute and chronic inflammatory cells, fibrosis and features of vasculitis

Then we started treatment with sysemic steroid and Dapsone. Gradually the patient improved and completely cured within 3 months.



A well defined ulcer covered with thick crust and prominent rolled border on lower leg



Same ulcer with red granulation tissue



Same ulcer with atrophic and dyspigmented plaque indicate healed ulcer after 6 weeks therapy with prednisolone and dapsone

Discussion

Since its first description in1930 the aetiology of pyoderma gangrenosum has remained obscure[1] Pyoderma gangrenosum is a rare, chronic, destructive, ulcerating skin disorder of unknown etiology. Complete and sustained resolution of the lesion is known to occur when the associated systemic disease is treated and cured. Many hypotheses have been proposed, but attention has focused principally on immune abnormalities and alterations in cell-mediated immune response[6]. It is thought that pyoderma gangrenosum may be the result of a hyperergic (or hypersensitive) reaction of the immune system due to an altered, exaggerated and uncontrolled inflammatory response to specific and non-specific stimuli, leading to a neutrophilic vasculitis, characterized by perivascular deposition of immunoreactants, mainly immunoglobulin M (IgM), C3 and fibrin, with direct immunofluorescence. Neutrophils appear to play a key role in the pathogenesis of pyoderma gangrenosum. This is evidenced by the fact that the disease responds to therapies that have antineutrophilic activity. In some patients defective cell-mediated immunity has been identified, including: defective leukocyte adhesion glycoproteins; defective neutrophilic chemotaxis and intracellular killing of microbial pathogens; selective anergy (immune unresponsiveness) to bacterial or fungal antigens; and E hypergammaglobulinaemia. In 40 to 50 percent of cases, pyoderma gangrenosum occurs in patients with no known associated systemic disease, and its occurrence is assumed to be sporadic.[7,8]

When pyoderma gangrenosum is associated with systemic disease, the therapeutic approach should also address the underlying disorder[4,9]. Treatment of lesions usually involves systemic treatment, together with local therapies[5,9]. Systemic treatments include steroids such as prednisolone 40-120mg/day until healing[10,11,6] Although prednisolone is a first-line treatment, it is not consistent in treating the

condition successfully and sometimes the high doses of prednisoloe is required which is associated with significant side effects. Therefoe, other drugs such as- Cyclosporine, Dapsone may use to minimize the side effects of steroid. Cyclosporine (6mg/kg) is a common therapy used either alone or in combination with steroids[12,13]. Systemic antibiotics have also been used, including rifampin, tetracycline, vancomycin and mezocillin[6,7]. Thalidomide has also been shown to be effective, especially in genital pyoderma gangrenosum[14].

We manage this patient successfully with Dapsone and Prednisolone therapy for three months.

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Case Report

Nephrotic syndrome induced Hypothyroidism – A case Report

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D Hossain[6], M M U Quader[7], R Begum[8]

Abstract

A girl of 12 years old admitted in the department of Pediatric Nephrology, National Institute of Kidney Diseases and Urology (NIKDU), Sher-E-Bangla Nagar, Dhaka who was diagnosed as a case of nephrotic syndrome induced hypothyroidism. She had no family history of renal disease or any consanguinity. She was treated with oral steroid with careful monitoring of her hypothyroidism. Though hypothyroidism may associated with Nephrotic syndrome. it should be carefully evaluated.

Key words : Nephrotic Syndrome, Hypothyroidism.

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Introduction

Nephrotic syndrome is a common renal disease all over the world among children. The clinical and biochemical features of nephrotic syndrome result from heavy proteinuria (more than 40 mg/m²/hour), hypoalbuminemia, lowered plasma oncotic pressure and edema.[1] Protienemia is below 50 gm/L in 80% of patients and below 40 gm/L in 40% of patients.[2] Hyperlipidaemia is a consequences of increased hepatic synthesis of cholesterol, triglycerides and lipoproteins, decreased catabolism of lipoproteins, a decreased LDL receptor activity and an increased urinary loss of HDL[3]. During nephrotic syndrome thyroxine may be reduced due to decreased thyroid binding globulin. Therefore, TSH level in blood became high. Several cases of glomerular diseases have been associated with thyroid diseases both in adults and in children. Although pseudohypothyroidism is well-known in nephrotic pathophysiology.[4]

Case Report

A 12 year old girl, first issue of non-consanguineous parents admitted in the department of pediatric nephrology, National Institute of Kidney Diseases and Urology (NIKDU) on 12th May '2011, presented with gradual swelling of whole body which was first appeared at face with scanty micturation for the last 3 months and a swelling on the front of her neck for one and half months. For these reasons her parents consulted with several medicine specialists and took medicine according to the prescription of the physicians but her condition was not improved. After that she was seen by an endocrinologist and diagnosed as a case of Hypothyroidism. She was treated with tab. Levothyroxine (50μg) but her condition remain unchanged. Then she was seen by a Paediatric Nephrologist and diagnosed her as a case of Nephrotic Syndrome and referred to NIKDU for better management.

She has no history of skin diseases, sore throat, headache, joint pain, oral ulcer or constipation. Her milestone of development was normal. She was vaccinated as per EPI schedule. She came from a middle class family and her IQ was normal. During her treatment under different physicians she took many antibiotics and tab. thyroxine (50μg) for about 6 weeks.

During admission, she was ill looking, her height was 143 cm and weight was 41 kg. She was edematous. Her thyroid gland was enlarged, surface smooth, move with deglutition. Other systems reveal no abnormality. Bed side urinary albumin was three plus (+++).

On investigation (during admission) her CBC was Hb%-13.48 gm/dl, total count of WBC–7950/cmm, Platelets-342000/cmm.
Urine R/M/E shows Albumin- +++, Pus cell- 3-5/hpf, RBC–nil Serum Creatinine-0.6 mg/dl. Serum Cholesterol–500 mg/dl, Serum Albumin-1.40 gm/dl,
S. Electrolytes- Sodium (Na)- 139 mmol/L, Potassium (K)-4.4 mmol/L, Chloride (Cl)-114 mmol/L. ANA (Anti Nuclear Antibody)- Negative. HBsAg-Negative Anti HCV-Negative, Urine C/S-No Growth.
USG of Thyroid shows Normal study. Thyroid Stimulating Hormone (TSH)-12.7 iu/ml (Normal value 0.70–5.70 iu/ml).

After one week of admission we started treatment with steroid in adequate dose and duration for nephrotic syndrome and discontinued tab. levothyroxine.

One week later her Urine R/M/E-Alb-+, Pus cell- 2-4/hpf, RBC–nil.
Serum T4 was–3.10gm/dl (Normal value 5.5-15 gm/dl), TSH–8.81 iu/ml (0.70–5.7 iu/ml).
USG of KUB reveals- Parenchymal echogenecity is slightly raised with poorly defined cortico-medullary differiantion. The remark was Bilateral early parenchymal disease of Kidneys.
Renal biopsy shows all glomeruli are normal in respect to mesengeal cellularity and basement membrane thickness. Renal tubules, interstitium and blood vessels are normal. Mild Granular deposition of IgA and IgM in the mesengium.

Then we discharge the patient only with steroid as treatment protocol for first attack of nephrotic syndrome.

On follow up visit after four weeks of her discharge, her urine for R/M/E-Alb–nil, pus cell–1-2/hpf, RBC-nil.
Serum T3–1.38 ngm/ml (0.86–02.70 ngm/ml), Serum T4–7.82 µgm/dl (5.50–15.00 µgm/dl), TSH–3.14 iu/ml (0.47-5.01 iu/ml).

Discussion

Thyroid hormones (TH) are essential for an adequate growth and development of the kidney. Conversely, the kidney is not only an organ for metabolism and elimination of thyroid hormone(TH)[5,6] but also a target organ of iodothyronines actions. Thyroid dysfunction causes remarkable changes in glomerular and tubular functions and electrolyte and water homeostasis. Hypothyroidism may coexist with nephrotic syndrome and accompanied by a decrease in glomerular filtration, hyponatremia, and an alteration of the ability for water excretion. Thyroid dysfunction acquires special characteristics in those patients with advanced kidney disease[7]. The kidney also plays a role on the regulation of metabolism and elimination of TH.[8,9]

Thyroid disease may be linked to different forms of glomerulonephritis[10]. Hypothyroidism can coincide with different forms of glomerular disease. The more frequent form in case of adult is membranous glomerulopathy associated with nephrotic syndrome (NS).[11] Thyroid dysfunction has been reported to be associated with IgA glomerulonephritis[17] mesangiocapillary or membrano-proliferative glomerulonephritis[13] and minimal change glomerulonephritis.[11,14] In children there is not enough study have been found.

NS is associated with changes in serum TH levels[15,16,17]. Urinary losses of binding proteins, such as thyroxine binding globulin (TBG), transthyretin or pre-albumin, albumin, and TH binded to them, result in a reduction in serum total thyroxine (T4) and, sometimes, in total T_3 levels.

There is no such study regarding renal histopathological changes in nephrotic syndrome associated hypothyroidism in children in our country. Here this girl had features of hypothyroidism and generalized swelling. Therefore, her features of nephrotic syndrome overlooked by the physicians. But these hormonal changes are related both to the degree of proteinuria and to serum albumin levels.[18]

Conclusion

In this case this child presented with generalized swelling and a swelling on the front of her neck. Although her generalized swelling appeared first but her neck swelling drew the attention of most of the physicians.

After admission in NIKDU we took her history properly and did all the investigations as required. We treated the child with steroid (Tab. Prednisolon 2 mg/kg body weight) and discontinued tab. levothyroxine. After one week of treatment her proteinuria was subsided and thyroid swelling also reduced. Her thyroid hormone status became normal after four weeks of her discharge. Therefore we conclude that her hypothyroidism was due to nephrotic syndrome.

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Review Article

Management of Paediatric Hypertension : An Update

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Introduction

Hypertension is an increasingly common problem in adolescents; the awareness of it among both the medical community and general public has increased in recent years1, leading to greater numbers of hypertensive children coming to medical attention. Increases in the prevalence of hypertension are related to the increased prevalence of childhood obesity[2]. The causes of hypertension in children are diverse. Systemic arterial hypertension in children has traditionally been thought to be secondary in origin. Increased incidence of risk factors like obesity, sedentary life-styles, and faulty dietary habits has led to increased prevalence of the primary arterial hypertension (PAH), particularly in adolescents. Presence of childhood hypertension may cause risk of coronary artery attack in children. Early development of atherosclerosis may be associated with childhood hypertension[3]. The Pediatricians should be keep in mind that they have to know the different types of hypertension, seen in childhood, as well as to have an organized approach for the diagnostic evaluation and treatment of such patients.

Evaluation of the Child with Suspected Hypertension

The evaluation of pediatric children starts correct measurement of BP4 preferable by conventional mercury column or aneroid sphygmomanometer. Although less accurate, an automated, oscillometric device can be used in infants and toddlers who will not cooperate with manual BP determinastion. The bladder of the cuff should encircle 80-100% of the circumference of the upper arm, and its width should be at 40% of the upper arm circumference5. Since too narrow of a cuff will create false reading, children with longer upper arms than others of the same age require a wider cuff. Not to be overlooked is a large adult or thigh cuff for use in obese children. The child should be seated quietly for at least 5 minutes prior to BP determination. The arm should be supported at heart level. Infants' blood pressures should be obtained in the supine position. The disappearance of the 5th heart sound is now preferred for the diastolic reading[6].

Clinical presentation varies depending upon age, the target organ involved, and etiology. Neonates may present with apnea, cyanosis, irritability, and poor feeding[7]. In addition, clinical features may reflect specific etiologies. Older children with long-term hypertension or acute exacerbation of chronic hypertension or sudden severe elevation of blood pressure may present with symptoms related to end organ abnormalities involving the heart, eye, kidney, and brain[9].

If a child has been a persistently elevated BP, the first step is to obtain a thorough history and should focus on whether symptoms of another underlying disorder are present, including symptoms of underlying renal disease (enuresis, gross hematuria, edema, fatigue), heart disease (chest pain, exertional dyspnea, palpitations) etc. The past history should include recent as well as chronic illnesses and neonatal history of umbilical line placement (in infants). A family history of hypertension, diabetes, renal disease and other cardiovascular disease (hyperlipidemia, stroke) should be obtained. Physical examination should focus on discovering specific findings that may provide clues to the etiology and/or degree of hypertension. Common examples of such findings are listed in Table I.

Table-I: Physical Exam findings in Childhood Hypertension[9]

	Finding	Possible Etiology
Vital Signs	Tachycardia	Hyperthyroidism, Pheochromocytoma, Neuroblastoma, Essential Hypertension
	Decreased LE pulses; drop in BP from UE's to LE's	Aortic Coarctation
Height/weight	Growth retardation	Chronic renal failure
	Obesity	Primary hypertension
	Truncal obesity	Cushing's syndrome
Head & Neck	Moon facies	Cushing's syndrome
	Elfin facies	Williams syndrome
	Webbe d neck	Turner's syndrome
	Thyromegaly	Hyperthyroidism
Skin	Pallor, flushing, diaphoresis	Pheochromocytoma
	Acne, hirsutism, striae	Cushing's syndrome, anabolic steroid Abuse
	Cafe -au-lait spots	Neurofibromatosis
	Adenoma sebaceum	Tuberous sclerosis
	Malar rash	Systemic Lupus Erythematosus
Chest	Widely spaced nipples	Turner's syndrome
	Heart murmur	Coarctation
	Friction rub	Systemic Lupus Erythematosus (pericarditis)
	Apical heave	Left ventricular hypertrophy/chronic Hypertension
Abdomen	Mass	Wilms' tumor, Neuroblastoma, Pheochromocytoma
	Epigastric/flank bruit	Renal artery stenosis
	Palpable kidneys	Polycystic kidney disease, hydronephrosis, Multicystic -dysplastic kidney
Genitalia	Ambiguous/virilization	Adrenal hyperplasia
Extremities	Joint swelling	Systemic Lupus Erythematosus
	Muscle weakness	Hyperaldosteronism, Liddle's syndrome

Many hypertensive children have normal physical examinations, even in the presence of significant underlying renal or other organ system disease. Therefore, laboratory testing is usually necessary in order to complete the child's evaluation. Before starting on laboratory testing, however, the child's age, history, physical exam findings, and degree of blood pressure elevation should be used to decide what are the best studies for the particular child.

Dividing the laboratory evaluation into screening, specific and specialized phases as outlined in Table II is helpful.

Table-II : Laboratory evaluation of the child with hypertension[5, 10, 11]

Phase	Studies
Screening tests	Urinalysis and culture Electrolytes, BUN, creatinine, glucose, calcium, phosphorus, uric acid Lipid panel (cholesterol, triglycerides, etc.) CBC with differential, platelet count
Specific tests	24 hour urine collection for protein excretion & creatinine clearance Urine and serum catecholamines Hormone levels (thyroid, adrenal, etc.) Echocardiogram Renal ultrasound
Specialized studies	Renin profiling (plasma renin & 24 hour urinary sodium excretion) Renal ult rasound with Doppler study of renal arteries Captopril challenge test Renal angiography with renal vein renins Magnetic resonance angiography Captopril renal scan Ambulatory blood pressure monitoring Renal biopsy

All hypertensive children should undergo the screening laboratory tests listed and will usually detect whether significant renal disease or another chronic illness is present. Of the more specific tests, only those indicated by the history, physical examination and screening tests should be obtained. For example, the echocardiogram, which should be obtained in any hypertensive child because left ventricular hypertrophy can be present even in children with mild hypertension[12,13]

On the other hand, renal ultrasounds probably only need to be obtained in preadolescent children with hypertension, and in hypertensive adolescents with abnormal urinalyses or unusually severe hypertension. It may be helpful to consult a specialist with experience in pediatric hypertension at this stage of the evaluation, especially if one or more of the screening studies was abnormal. The specialized studies listed in Table II are typically done at referral centers, or by pediatric subspecialists with extensive experience managing hypertensive children. Several of these are used to investigate the possibility of renal artery stenosis. It is important to note that since renal artery stenosis in children is typically caused by fibromuscular dysplasia[14], angiography is still the gold standard for diagnosis because of its superior ability to detect branch vessel disease, especially in infants and young children[10]. Magnetic resonance angiography, which is finding increased use for evaluation of hypertension in adults may have a role in the adolescent or older child who can cooperate with the procedure. However, if the magnetic resonance angiogram reveals the presence of renal artery stenosis, the child may still need to undergo an angiogram prior to revascularization surgery.

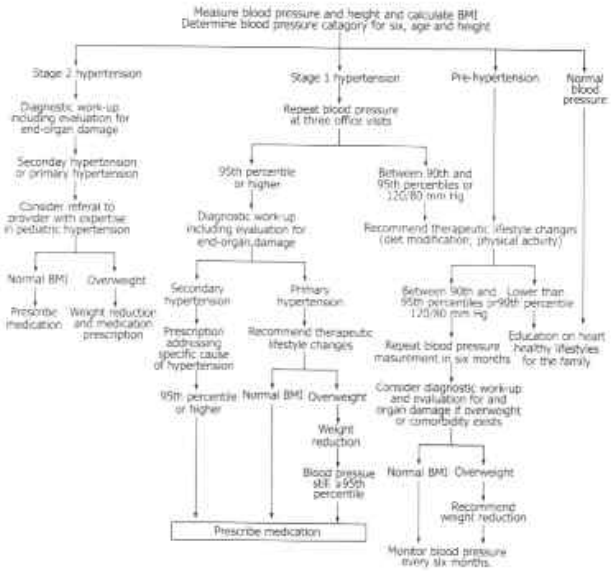
Another diagnostic study that deserves specific mention is ambulatory blood pressure monitoring (ABPM). In this

procedure, the subject wears a blood pressure cuff that takes BP at regular intervals for an entire day. Lightweight devices and a variety of cuff sizes are widely available, making it possible to obtain ABPM studies in young children as well as teenagers[15].

Finally, no diagnostic evaluation of a hypertensive child would be complete without including one or more studies to assess for the presence of end-organ damage[16]. Although hypertension itself is virtually unknown as a cause of chronic renal failure in childhood, both left ventricular hypertrophy and retinal changes are relatively common, even in children with essential hypertension[12].

As will be discussed later, if such abnormalities are present, the child will likely require antihypertensive drug treatment.

Treatment of Childhood hypertension



Algorithm for the management of childhood hypertension

Adapted with permission from National High Blood Pressure Education Program Working Group on High Blood Pressure in Children and Adolescents. The fourth report on the diagnosis, evaluation, and treatment of high blood pressure in children and adolescents. Pediatrics 2004; 114 (2 suppl 4th report):571.

A. Pharmacotherapy

Reasons to initiate antihypertensive medication in children and adolescents include symptomatic hypertension, end-organ damage (e.g., LVH, retinopathy, proteinuria), secondary hypertension, stage 1 hypertension that does not respond to lifestyle changes, and stage 2 hypertension. Drug therapy is always an adjunct to nonpharmacologic measures.

Table III : Antihypertensive Medications with FDA Approval for Use in Children[17]

Class	Drug	Initial dosage	Maximum dosage
Angiotensin-converting enzyme inhibitor*†‡	Benazepril (Lotensin)§	0.2 mg per kg per day up to 10 mg per day	0.6 mg per kg per day up to 40 mg per day
	Enalapril (Vasotec)§	0.08 mg per kg per day up to 5 mg per day	0.6 mg per kg per day up to 40 mg per day
	Fosinopril (Monopril)	Children heavier than 50 kg: 5 to 10mg per day	Children heavier than 50 kg: 40 mg per day
	Lisinopril (Zestril)§	0.07 mg per kg per day up to 5 mg per day	0.6 mg per kg per day up to 40 mg per day
Angiotensin-receptor blocker*†‡	Irbesartan (Avapro)	Six to 12 years of age: 75 to 150 mg per day	Same as initial
		13 years of age: 150 to 300 mg per day	Same as initial
	Losartan (Cozaar)§	0.7 mg per kg per day up to 50 mg per day	1.4 mg per kg per day up to 100 mg per day
Beta blocker	Propranolol (Inderal)||	1 to 2 mg per kg per day	4 mg per kg per day up to 640 mg per day
Calcium channel blocker¶	Amlodipine (Norvasc)§	6 to 17 years of age: 2.5 to 5.0 mg per day	10 mg per day
Diuretic**	Hydrochloro thiazide (Hydrodiuril)	1 mg per kg per day up to 50 mg per day	3 mg per kg per day up to 50 mg per day

FDA = U.S. Food and Drug Administration.
*—Contraindicated during pregnancy; females of childbearing age should be counseled to use contraception.
†—Check serum potassium and creatinine periodically to monitor for hyperkalemia or azotemia.
‡—FDA approval is limited to children six years of age or older with creatinine clearance of at least 30 ml per min per 1.73 m2.
§—Can be prepared as a suspension.
||—Contraindicated in asthma and heart failure. Heart rate is dose-limiting. May impair athletic performance. Should not be used in insulindependent patients with diabetes. A sustained-release, once-daily formulation is available.
¶—May cause tachycardia.
**—All patients treated with diuretic medications should have electrolytes monitored shortly after initiation of therapy and periodically thereafter.
Useful as add-on therapy in patients being treated with drugs from other drug classes.
Adapted with permission from National High Blood Pressure Education Program Working Group on High Blood Pressure in Children and Adolescents.The fourth report on the diagnosis, evaluation, and treatment of high blood pressure in children and adolescents. Pediatrics 2004;114(2 suppl 4th report):568-9.

Table IV : Selected Combinations of Drug Products

Combination	Some Available Preparations
ACEi plus CCB	
Benazepril/Amlodipine	10 mg/2.5 mg; 10 mg/ 5 mg; 20 mg/5 mg
ACEi plus Diuretic	
Benazepril/Hydrochlorothiazide	5 mg/6.25 mg; 10 mg/12.5 mg; 20 mg/12.5 mg
Captopril/Hydrochlorothiazide	25 mg/15 mg; 25 mg/25 mg
Enalapril/Hydrochlorothiazide	5 mg/12.5 mg; 10 mg/25 mg
Lisinopril/Hydrochlorothiazide	10 mg/12.5 mg; 20 mg/12.5 mg
ARB plus Diuretic	
Losartan/Hydrochlorothiazide	50 mg/12.5 mg; 100 mg/12.5 mg
Irbesartan/Hydrochlorothiazide	150 mg/12.5 mg; 300 mg/12.5 mg

ACEi_angiotensin-converting enzyme inhibitor, CCB_calcium channel blocker, ARB_angiotensin receptor blocker

*Check pediatric labeling and safety information on all agents. These drug combinations do not have specific pediatric testing or indications but are recommended on the basis of clinical experience in adolescents and young adults.[1]

Special Treatment Issues[18]

Essential Hypertension: The decision to treat a patient who has essential hypertension often is controversial. Initially conservative management including dietary modifications and exercise programs are appropriate as long as there is no evidence of end-organ damage. If medication need, it is important to maximize compliance and minimize adverse metabolic side effects. The most commonly used drugs are long-acting calcium channel blockers and ACEIs.

Hypertensive Athletes: For the pediatric athlete, ACEIs and calcium channel blockers are often excellent pharmacologic options because they do not suppress cardiovascular function. Diuretics are banned by many sports organizations and should be avoided because of the additional adverse effects of enhanced volume contraction.

Neonatal Hypertension: In the neonatae group, the most common causes of hypertension include congenital renal diseases, renal ischemic events, and a combination of cardiopulmonary disease and multiple drug regimens. There are very few data regarding long-term use and safety of antihypertensive drugs ACEIs work well in renin mediated hypertension due to renal ischemia or congenital obstructions. The clinician should be aware for abnormal renal development in the very preterm infant in whom nephrogenesis is incomplete. Each infant's special problems should be considered individually prior to choosing of drugs.

Hypertensive Emergencies: The goal of treatment of hypertensive urgencies is to reduce the blood pressure over a 24-hour period. Oral or sublingual nifedipine is effective but short-lived, and additional, longer-acting medications should be added or increased. The addition of intravenous medications should be considered if oral options do not produce the desired results quickly. In hypertensive emergency that involves acute, life threatening cardiovascular or cerebrovascular complications, intravenous medications and intra-arterial monitoring are mandatory. Oral or sublingual nifedipine are helpful in the initial stages of treatment, but continuous intravenous infusions with sodium nitroprusside, nicardipine, or labetalol should be initiated as rapidly as possible.

B. Non-pharmacological treatment:

For pediatric patients with pre-hypertension and stage 1 hypertension cases, therapeutic lifestyle changes are usually recommended that includes weight control, exercise (especially cycling and swimming), low-fat and low-sodium diet (such as atkin diet) etc.

Conclusion

The issue of hypertension in childhood is an emerging topic. Well-designed epidemiologic studies have shown that the prevalence of hypertension is increasing among children. Further, hypertension in children is not a benign condition, and it is associated with end-organ damage. Common causes of childhood hypertension include renal and cardiac disease. It may even result in adult hypertension.

The role of the pediatrician, the pediatric nephrologists, and the others caring for children is important in terms of identification of children at risk for hypertension, initiation of preventive measurements, and management of patients with established high blood pressure. Newer imaging modalities, specific management protocol, modern antihypertensive drugs etc have enriched the management of pediatric hypertension.

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