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Aims & Scope

The Journal aims to publish research in all fields of clinical, diagnostic, experimental & preventive areas related to medical sciences to disseminate scholastic work among clinicians and scientists around the globe.

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Table of Contents

Letter to Editor

Clinico-Hematological Features in Pure Red Cell Aplasia Patients Diagnosed at Diagnostic & Research Laboratory, Hyderabad

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Pure red-cell aplasia (PRCA) or erythroblastopenia is a rare type of anemia or disorder that can be either idiopathic or associated with certain autoimmune diseases and affect red blood cell (RBC) precursors[1,2]. The disease is often present at birth, and it manifests in the first year of life in more than 90% of patients. It is a syndrome characterized by normochromic, normocytic anemia, reticulocytopenia (<1%), and an almost complete absence of erythroblasts (<0.5%) from the bone marrow[3].

PRCA is categorized into congenital and acquired classes[4]. Studies elucidating the characteristics of PRCA in Pakistani population are very limited[5]. The current study was aimed to identify the clinical and hematological features in local PRCA patients.

This cross-sectional study was carried out at Diagnostic & Research Laboratory LUMHS Hyderabad from October 2014 to December 2016. Five patients from Diagnostic & Research Laboratory LUMHS Hyderabad referred for bone marrow biopsy were selected. After taking detailed history and physical examination, clinical and hematological findings were recorded on a pre-designed proforma. Bone marrow aspiration was done on all patients and trephine biopsies were taken where indicated[6]. Blood samples were taken and complete blood count (CBC) was performed on XN 1000 five parts fully automated haematology analyzer (Sysmex®, Japan). Peripheral blood films were stained with Leishman Stain and brilliant cresyl blue. These films were screened generally and the reticulocyte count was performed manually.

Patients with normochromic normocytic anemia, low reticulocyte count and isolated erythroblastopenia in the bone marrow were selected[6]. Whereas those with other types of anemia and patients with abnormal myelopoiesis and/or thrombopoiesis were excluded.

In the almost two years study duration, only two male and three female children, 9 months to 7 years in age, were diagnosed to have PRCA. Main clinical findings recorded among these patients were fever, weakness, weight loss and pallor. Abdominal distension was seen in one while hepatomegaly was seen in second patient. Four patients received their first blood transfusion in the first four months after birth, while one patient, received the first transfusion at one year age. Reticulocyte count was 0.6% and 1% in 2 patients while among the other three patients it was undetectable (Figure 1). Myeloid-to-erythroid (M/E) ratio in the bone marrow was found to range from 15:1 to 25:1. Leucopoiesis and megakaryopoiesis were found to be normal in all the cases.

A local study by Muneeza Natiq et al showed mean age of 4.12 years while in our study it was 3.8 years[4]. A study by Ball et al from London[7] shows male to female ratio of 1.4:1 while in our study it was 3:2. In a study from India by Malhotra et al, pallor was found in all the patients; this is consistent with findings from the current study[6]. The mean hemoglobin concentration was 4.75 g/dl by El–Beshlawy et al from Egypt while in the present study it was 7.24 g/dl[8]. White blood cells count, platelets count and red cell indices were within normal limits in our study which was comparable to studies conducted by Muneeza Natiq et al and El–Beshlawy et al[4,8]. The M/E ratio showed a much wider range (18:1 to 100:1) in the patients studied by Malhotra et al[6].

The study was limited by the small sample size. We recommend more extensive studies conducted on larger number of patients from local population, in order to understand the clinico-hematological picture of the disease more accurately in local scenario. This study concluded that PRCA is a rare haematological disorder, commonly found in children. Fever, weakness and anemia are the common presenting features, whereas decreased RBC count, low hemoglobin concentration, low reticulocyte count and suppressed erythropoiesis on bone marrow examination are the main laboratory feature.

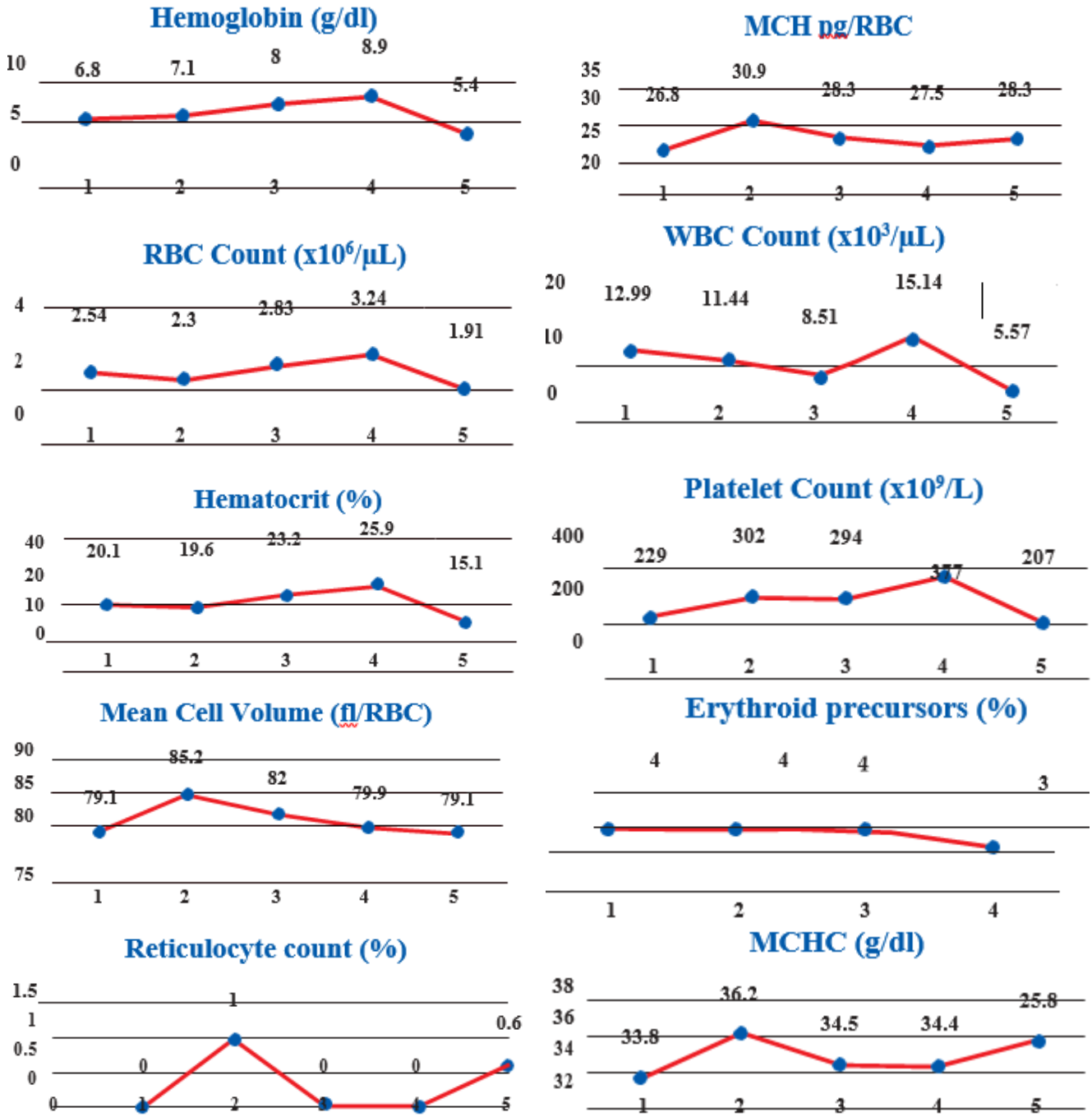

Figure 1. Key haematological parameters in the study patients. Arabic numerals on X-axis represent the five patients. Y-axis represent the test variable; the unit of measurement is provided in parenthesis alongside corresponding chart title. RBC, Red Blood Cell

*Erythrocyte precursors' percentage could not be elicited in patient number 5.

Acknowledgment: All lab staff of Diagnostic & research Lab LUMHS Hyderabad.

Conflict of Interest

I hereby declare that we do not have any conflict of interest related to publication of this article.

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Original Article

Demographic, Dietary and Biochemical Risk Factors Associated with the Causation of Goiter in Plane Areas of Sindh Province

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Abstract
Present study was conducted to find out the demographic, dietary and biochemical risk factors associated with the causation of goiter in plane areas of Sindh province. This case-control study was carried out at Liaquat University of Medical and Health Sciences, Jamshoro from July 2009 to December 2009. A total of 200 subjects (100 goiter patients and 100 normal control subjects matched for age and gender) were recruited for present study. The demographic characteristics and dietary history of both goiter patients and control subjects were studied with the help of a standard questionnaire developed for that purpose. Serum samples from goiter patients and control subjects were analyzed for iodine, TSH, FT3 and FT4 levels, while urine samples were analysed for iodine content. Of the 100 goiter patients 87 were females and 13 were males. Majority (53%) of the study patients were young adults (20-39 years age). Odds Ratio analysis of the dietary data showed that consumption of cabbage and pickle in mustard oil containing mustard seeds had a significant positive association with goiter. Similarly, consumption of fish, eggs, milk products, chicken, beef and peas had a significant inverse association with goiter. Blood and urine iodine levels were significantly ($P<0.001$) lower in goiter patients than in control subjects whereas, the reverse was true for serum TSH and FT4 levels. All the goiter patients were found to be iodine deficient with 33 percent having mild and 77 percent moderate iodine deficiency. It was concluded that consumption of underground water, cabbage, and pickle in mustard oil containing the mustard seeds and low intake of animal protein diet is associated with mild to moderate iodine deficiency found in the inhabitants of plane areas of Sindh province.

Keywords: Goiter, TSH, FT , FT , Iodine

Introduction

Goiter is a condition in which the thyroid gland is abnormally enlarged. It is a common disorder affecting around 200-300 million population around the world. Inadequate supply of iodine causes insufficient production of tri-iodothyronine (T3) and thyroxine (T4) which leads to an increased influx of thyroid stimulating hormone (TSH) by the pituitary gland. This in turn stimulates thyroid gland hyperplasia and hypertrophy which leads to goiter formation.

Goiter is found in all age groups. However, people above 40 years of age are significantly, more likely to have goiter than younger people. Goiters are more common in females than in males. In females it is associated with pregnancy and menopause. Most of the mountainous areas in the world particularly the arc of Himalayas from Pakistan across India and Nepal into northern Thailand and Vietnam are one of the most highly endemic goiter regions of the world[1]. Goiter is said to be endemic when its prevalence is more than 5% in children aged 6-12 years within a population[1, 2].

The prevalence of goiter in mountainous areas of Pakistan is reported to be 80-90%, whereas in plane areas it is reported to be as high as 55%[3]. In Pakistan, Gilgit and Chitral are recognized as highly endemic goiter regions, since food and drinking water consumed in these areas is deficient in iodine[4]. In the plane areas of southern part of Sindh province, especially in Hyderabad and its adjacent districts, the incidence of goiter is reported to be increasing[5,6]. The reason for this rise in the incidence of goiter cases is difficult to elucidate, as it is generally assumed that surface drinking water and agriculture products consumed by the inhabitants of these areas have sufficient iodine content. Besides this, several common food products used by local population, especially salt, are fortified with iodine. The possible demographic risk factors associated with the prevalence of goiter in these areas could be tobacco smoking, age, gender, parity, ingestion of large amounts of goiterogens in foods and drugs[1,7,10].

The purpose of present study was to find out the demographic, dietary and biochemical risk factors associated with the causation of goiter in Hyderabad and its adjacent districts.

Material and Methods

During July 2009 to December 2009, one hundred diagnosed cases of goiter belonging to Hyderabad and its adjacent districts were randomly recruited from OPD of Nuclear Institute of Medicine and Radiotherapy (NIMRA) Jamshoro. Similarly, age and gender matched 100 non-goiter subjects from the same region, with similar socioeconomic status and with no family history of goiter were recruited as controls. Before obtaining written informed consent, the study participants were explained the nature and purpose of study and of possible harms and benefits from study. The ethical approval of the study was granted by the Ethical Committee of Liaquat University of Medical and Health Sciences, Jamshoro.

A questionnaire encompassing demographic and clinical parameters including age, gender, district of residence and dietary history was filled for each study participant. Serum and urine samples from patients and control subjects were analyzed for iodine content by spectrophotometric method using Hitachi-220 spectrophotometer. Serum samples were also analyzed for TSH, FT and FT levels by radioimmuno assays using Oak Field Health care Product Gamma Counter (UK) England.

Statistical Analysis

Dietary data of the goiter patients and control subjects were analyzed by Odds Ratio, while statistical comparisons for biochemical variables were done by using student's t-test. Results were considered statistically significant at $p \leq 0.05$ and highly significant at $p \leq 0.001$.

Results

Of the 100 goiter patients, 53% were of 20-39 years age; 87% were females; and 56% belonged to Hyderabad district. The association of various study parameters with goiter in current study have been presented in Table 1. Of the 10 smokers involved in present study 8 (80%) were goiter patients. Majority of the goiter patients (93%) and control subjects (84%) were non-iodized salt consumers. The Odds Ratio (OR) analysis of the data showed that the intake of underground water, cabbage and pickle in mustard oil containing the mustard seeds had a significant positive association with goiter. Similarly, consumption of fish, eggs, milk products, chicken, beef, and peas had a significant inverse association with goiter (Table 1). Table 2 gives the comparison of mean values for biochemical variables measured in serum and urine samples of goiter patients and control subjects. The mean iodine levels in serum and urine samples of goiter patients were found to be significantly lower ($P<0.001$) than the control subjects. Similarly, the mean serum TSH, FT3 and FT4 levels were significantly higher in goiter patients compared to control subjects. Thyroid profile of the goiter patients revealed euthyroidism in 60 cases, hyperthyroidism in 25 cases and hypothyroidism in 15 cases.

Iodine intakes calculated from urinary iodine levels according to UNICEF criteria are shown in Table 3. Only 3 categories namely optimal intake, mild iodine deficiency, and moderate iodine deficiency were seen on the basis of results obtained. Accordingly all the control subjects were found to have an optimal iodine intake (iodine in urine = 100-199 µg/l). However, 76% of the goiter patients were found to have mild (iodine in urine= 50-99µ g/l) and 24% moderate (iodine in urine= 20-49 µg/l) iodine deficiency. Blood iodine levels less than 6µg/l were noted in 51% goiter patients only.

Discussion

The finding of the present study that goiter is about seven times more common in females than in males is in accordance with the findings from many other studies which reported 2-10 times higher prevalence of goiter in females as compared to males[2,7,11]. A greater proportion of females as against males had been reported to develop goiter when exposed to iodine deficiency[7].

In present study peak occurrence of goiter cases were seen in 20-39 years age group. Kundsen et al. (2002) had also noted greater prevalence of goiter in 30-40 years age group in areas of mild to moderate iodine deficiency. This association of goiter prevalence with age seems to be iodine intake dependent as in severe iodine deficiency areas the peak occurrence of goiter occurs around the middle age[7].

Of the ten smokers involved in the present study, eight were found to be goiter cases. Although, smoking was not positively associated with goiter in present study, the predisposition of smokers to goiter has been reported from iodine deficient areas[7,9,12]. Smoking undoubtedly is not the cause of goiter, but certainly could contribute in promoting iodine deficiency. This is suggested because thiocynate, which is abundant in cigarette smoke is known to produce goitrogenic effects through competitive inhibition of iodine uptake and organification[7,10,13,15].

Comparison of the dietary intakes between goiter patients and control subjects revealed that goiter patients as against the control subjects had significantly lower intake of fish and animal proteins in the diet. Contrary to this they had significantly higher consumption of underground water, cabbage and pickle in mustard oil with mustard seeds. Chemical compounds in underground drinking water samples might be interfering with the synthesis of thyroid hormones and hence contributing in the causation

Table 1. Association of various study parameters with goiter

Variables		Cases (n=100)	Controls (n=100)	Odds ratio (95% confidence interval)	P-value
Smoking habits	Smokers	08	02	4.261 (0.991-18.144)	0.052
	Non-smokers	92	98		
Salt consumed	Iodized	07	16	0.3952 (0.1550-1.0075)	0.0518
	Non-Iodized	93	84		
Source of drinking water	Surface	62	94	0.1041 (0.0416-0.2610)	<0.0001
	Underground	38	06		
Cabbage	Users	70	28	6.0 (3.2564-11.0552)	<0.0001
	Non-users	30	72		
Turnips	Users	37	25	1.762 (0.962-3.224)	0.067
	Non-users	63	75		
Peas	Users	61	84	0.298 (0.154-0.578)	0.0004
	Non0users	39	16		
Spinach	Users	92	94	0.734 (0.256-2.111)	0.579
	Non-users	08	06		
Pickle with mustard seeds	Users	32	06	7.373 (2.986-18.120)	<0.001
	Non-users	68	94		
Soya oil	Users	09	17	0.483 (0.208-1.123)	0.093
	Non-users	91	83		
Mustard oil	Users	18	06	3.439	0.009
	Non-users	82	94	(1.338-8.804)	
Other oils	Branded	12	65	0.073 (0.035-0.152)	<0.000
	Non-branded	88	35		
Fish	Users	10	38	0.2029 (0.010-0.425)	<0.0001
	Non-users	90	62		
Eggs	Users	08	81	0.020 (0.009-0.049)	<0.0001
	Non-users	92	19		
Milk Products	Users	12	82	0.030 (0.014-0.066)	<0.0001
	Non-users	88	18		

Table 2. Comparison of mean values for continuous biochemical variables measured in cases and controls

Variables	Study group	Mean	S.D	P-Value
Iodine in urine (µg.L)	Cases	60.26	11.99	<0.0001
	Controls	128.9	9.95	
Iodine in blood (µg/L)	Cases	6.02	1.35	<0.0001
	Controls	9.88	0.64	
TSH (mµ/L)	Cases	23.01	17.46	<0.0001
	Controls	1.49	0.83	
FT_3 (pmol/L)	Cases	7.73	3.63	<0.0001
	Controls	3.72	0.76	
FT_4 (pmol/L)	Cases	26.74	20.92	0.01
	Controls	18.58	2.76	

Table 3. Descriptive statistics for biochemical variables measured in cases and controls

		Cases (n=100)	Controls (n=100)
Iodine in urine (µg/L) (UNICEF Criteria)	Moderate deficiency (20-49 µg/L)	24	00
	Mild deficiency (50-99 µg/L)	76	00
	Optimal intake (100-199 µg/L)	00	100

of goiter. Ingestion of the large amounts of goitrogenic foods (cabbage, turnips, soybeans, peanuts, peaches, peas, strawberries, spinach, onions, sweet potatoes, seeds of mustard and rape) and low amounts of animal and fish proteins might be involved in the causation of iodine deficiency in goiter patients. This is because both fish and animal proteins as compared to vegetable proteins are good dietary sources of iodine.

The finding of present study that iodine levels in both blood and urine samples were significantly ($P<0.001$) lower in goiter patients than in control subjects suggests that iodine deficiency could be the major cause of goiter in Hyderabad and adjacent districts. This is further supported by the observation that all the goiter patients according to UNICEF criteria were iodine deficient; 24% had mild and 76% had moderate iodine deficiency.

Conflict of Interest

We hereby declare that we do not have any conflict of interest related to publication of this article.

Grant Support/ Financial Disclosures

None

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Research Article

Clinico-Pathological Spectrum of Pancytopenia: A Single Centre Study

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Abstract

Pancytopenia is a common hematological condition in clinical practice which is characterized by simultaneous presence of anemia, leukopenia and thrombocytopenia. To determine the frequency, common etiology & presentation of pancytopenia on the basis of bone marrow biopsy. This retrospective study was conducted at Diagnostic and Research Laboratory LUMHS Hyderabad during October 2014 to December 2016. Medical records, blood smear, bone marrow aspirate and biopsy findings of patients presenting with pancytopenia who full fill the inclusion criteria were analyzed. Relevant history, physical, systemic examination and hematological findings at presentation were recorded using a standard proforma after approval of institutional review board and signing of informed consent of patients or their guardian. Out of 351 cases 108 cases of pancytopenia, 61(56%) were males and females were 47(43%). The majority of the patients were falling in pediatric age group 73(67%). Megaloblastic anemia was the most common cause of pancytopenia in 45(41%), followed by aplastic anemia in 24(22%), hypersplenism in 9(9%) and leukemia in 8(7.4%) cases. Megaloblastic anemia was the most common cause of pancytopenia with male predominance followed by Aplastic anemia and Hypersplenism

Keywords: Pancytopenia, Megaloblastic Anemia, Aplastic Anemia, Bone marrow biopsy.

Introduction

This Latin originated term "Pancytopenia" can be better introduced as a hematological entity, which holds capacity to peril human life by giving series of fatal diseases. Rather, pancytopenia is not a disease entity but a decrease in all the three cellular elements of peripheral blood leading to anemia, leucopenia and thrombocytopenia and collectively called pancytopenia. It is one of the commonest hematological entity seen in the laboratory medicine[1]. While various disorders may range from failure of production of hemopioetic progenitors in bone marrow, malignant cells infiltration, antibody mediated bone marrow suppression, ineffective hematopoiesis, dysplasia or peripheral sequestration of blood cells in overactive reticuloendothelial system, giving rise to pancytopenia ranging from megaloblastic anemia to fatal and potentially life threatening disorders like acute leukemia and aplastic anemia[2]. Therefore, there is dire need to know about the cause of pancytopenia in order to get proper and precise management and prognosis.

However, the affirmed causes of pancytopenia are aplastic anemia, hypersplenism, myelodysplastic syndrome, nutritional deficiencies leading to megaloblastic anemia, sub-leukemic (acute) leukemia, multiple myeloma, paroxysmal nocturnal hemoglobinuria and infections such as HIV, milliary tuberculosis, brucellosis and leishmaniasis[3]. The presenting symptoms are pallor, dyspnea, bleeding and bruising and increased propensity to infections[4]. As far as investigation is concerned, bone marrow examination plays great utility for diagnostic modality[5]. In addition, ancillary studies like cytochemical stains, immunohistochemistry and molecular studies like fluorescent in situ hybridization (FISH) can also be done[6].

The frequency of pancytopenia may vary as per geographical location, social and economic background. The aim of this study was to identify the determinants of pancytopenia and to elicit the corresponding bone marrow (BM) examination characteristics in this regard.

Methodology

The study was carried out at the "Diagnostic and Research Laboratory LUMHS Hyderabad". The study was completed in two years from October 2014 to December 2016. Patients of either gender and all ages were included in this study. The inclusion criteria for pancytopenia detected on peripheral blood was hemoglobin level <10 g/dl, total leucocyte count <4x 10^9/l and platelet count <150 x 10^9/l. Patients with iatrogenic causes of pancytopenia i.e. chemotherapy and radiotherapy were excluded from this study. A detailed clinical history taken and meticulous physical examination of each patient was done by doctor and recorded on a proforma. For further investigation

purpose, 3ml of blood was collected from each patient from the antecubital vein in EDTA tube, under aseptic measures in order to perform complete blood count and peripheral blood film examination. Complete blood counts including hemoglobin, total leucocyte count and platelet count, performed on automated hematology analyzer Symex KS- 2100. Peripheral film was made on a clean glass slide, stained by leishman stain and examined under microscope. After acquiring informed consent, bone marrow aspiration and biopsy were performed from posterior superior iliac spine under local anesthesia by 2% Xylocaine. Smears from bone marrow aspirate were made on clean glass slides and stained with Leishman stain. Iron stores were assessed on bone marrow by doing Perl stain. Bone marrow biopsy was performed, under the consideration of standard protocols, which then processed and stained on an automated tissue processor and stainer. Moreover bone marrow aspirate slides and hemotoxilin and eosin stained bone trephine slides were scrutinized under microscope by a hematologist.

Results

A total of 108 cases were registered in the study. These included 60 male and 48 female patients. The gender-age based distribution of study patients is provided in Table 1. Majority of the patients (n=78) were <18 years of age.

Table 1. Frequency and percentage distribution according to age and gender

Age		Male n (%)	Female n (%)	Total n (%)
Children (upto 18 yrs)		44 (56)	34 (44)	78 (72.2)
Adults	Young (18 – 40 yrs)	12 (52)	11 (48)	23 (21.29)
	Middle-aged (41 – 60 yrs)	3 (60)	2 (40)	5 (4.68)
	Elder (>60 yrs)	1 (50)	1 (50)	2 (1.85)
Total		60	48	108
n., number of patients; yrs, years				

Majority of the pancytopenia patients, i.e. 42% (n=45) had megaloblastic anemia. This was followed in respective order by aplastic anemia (n=23; 22%), hypersplenism (n=10; 9%), leukemia (n=7; 6.2%), mixed hematinic deficiency (n=3;2.7%), MDS (n=2; 1.85%), lymphoma (n=2; 1.85%), in ltration (n=1; 0.93%), myelofibrosis (n=1; 0.93%), infection(n=1; 0.93%), and normal (n=13; 12.03%) (Figure 1). In the study patients, fever was the most common symptom (81%) followed by weakness and weight loss in 71% of the cases. Others clinical features are shown in Figure 2 It was found that there is an increase in craving; for betel nuts, ghutka, cigarette, alcohol in low socioeconomic group of patients about 7.2%.

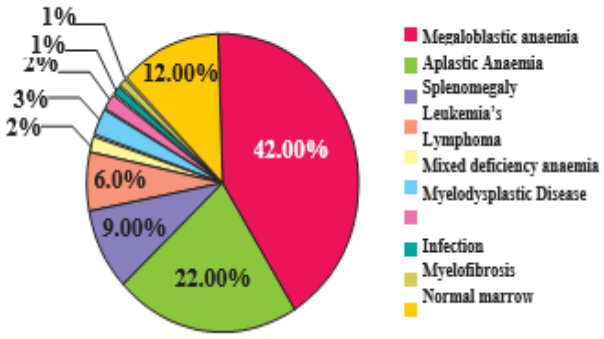

Figure 1. Disease wise Distribution

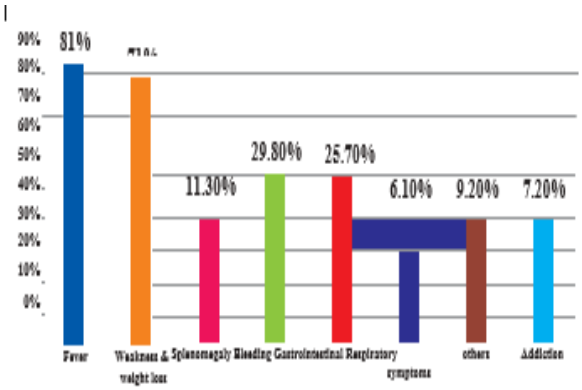

Figure 2. Clinical Features

Discussion

Pancytopenia is a common indication for BM aspirate and biopsy examination. In a study performed by Bashawri LA, 11.9% of all the BM aspirate and biopsy examinations were indicated in settings of pancytopenia[5]. Every second patient in our laboratory who underwent BM examination, had pancytopenia. In our study, males were found in greater number than females, as were also analyzed in the research of Umbreen Arshad, Shazia Memon and Rajesh Chetiwal[7,8,9]. Our research demonstrated the occurrence of pancytopenia more common in the 1 to 18 years of age this agrees with findings in another study conducted by Hayat AS[3]. However, the frequencies of different ages of that most affected age group is comprehensively demonstrated in table. Moreover, as far as the commonest symptoms are

concerned, fever, weakness, bleeding gums and weight loss were the common findings and were present in almost 71% of the patients this agrees with findings from studies carried out by Umbreen Arshad and Dr. Atif Sitwat

Hayat[3,7]. On further analysis, the patients diagnosed with megaloblastic anaemia and aplastic anaemia were mostly 97%, suffering from the symptoms of fever, weakness, vomiting, and weight loss and bleeding from gums and mouths. A total of 20% patients were suffering from some kind of addiction (betel-nuts, Ghutka, Cigarette). This seems in concordance with the research conducted by Murugkan[10].

If analyzing from the prism of causes, then the cardinal factor was Megaloblastic Anaemia (42%) was found in 45 cases and majority of victims were children. Bhatnagar et al.[11] also revised the very same. While the second most common cause was aplastic anaemia (22%) found in 23 patients; hypersplenism, leukemia and normal findings followed in respective order . Similar findings have been reported by Aziz et al from Pakistan and Tilak et al, khunger et al and Gayathri et al from India, Mohammad Arphan Azaad [12-15].

Conclusion

Pancytopenia being a frequent finding in the laboratory, is commonly caused by megaloblastic anaemia and aplastic anaemia. Children and youngsters are the most common age groups in this study. The usual presenting symptoms include fever, weakness, weight loss, bleeding gums and vomiting.

Recommendations

Owing to the higher frequency of malignant disease causing pancytopenia, it is recommended that BM examination should promptly be performed. This will shorten the time to diagnose in such cases. The current study revealed that a majority of those with pancytopenia are suffering from nutritional deficiencies like vitamin B12, folic acid and mixed hematinic deficiency. It is recommended that the groups at risk for these complications be identified and the problem be addressed at community level. The higher incidence of addiction in the study patients is another alarming sign which needs appropriate work up. The current study was delimited by the small sample size; it is hence recommended that such studies be performed on larger groups of patients to elucidate the findings on larger scale.

Conflict of Interest

We hereby declare that we do not have any conflict of interest related to publication of this article.

Grant Support Financial Disclosures
None

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Research Article

Prevalence of Hepatitis B, C and HIV Viruses in Blood Donors at Patel Hospital

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Abstract
Globally around 70 million people are suffering from chronic hepatitis B virus (HBV), chronic hepatitis C virus (HCV) and Human Immuno Deficiency Virus (HIV) infections. Owing to inadequate health care facilities and lack of awareness at large, Pakistan is also adversely affected by these diseases. The objective of this study was to determine the frequency of transfusion transmitted viral infections among voluntary blood donors at Patel Hospital Karachi. Participants were selected through stringent selection criteria ensuring safety of both the donor and recipient. Specimens from donated blood were screened for hepatitis B surface antigen (HBsAg), antibody against hepatitis C virus (anti HCV) and antibody against Human Immuno Deficiency Virus type 1 (HIV-1) and type 2 (HIV-2) using chemiluminosence based assays. A total of 4034 donors were identified, based on the selection criteria, 424 donors were deferred and 3610 were enrolled into the study. Anemia was the most common cause for deferral. Among the study participants 69 (1.91%) donors were HBsAg, 81(2.24%) were Anti HCV and 2 were Anti HIV-1/HIV-2 infected. It was concluded that the most common cause for donor deferral was anemia and that a significant number of voluntary blood donors are infected with (HBV), (HCV) and (HIV). Blood products should, therefore, be properly screened for these infections.

Keywords: Hepatitis B, Hepatitis C, HIV, Screening, Blood Donors

Introduction
Hepatitis B virus (HBV), hepatitis C virus (HCV) and Human Immuno Deficiency Virus (HIV) infections are among the leading global public health problems[1]. Prevalence of these infections is especially higher in the developing countries where it pertains to the lack of resources and appropriate measures[2]. Worldwide, a total of around 248 million people suffer from chronic HBV infection[3]. HCV infection is relatively less common and affects approximately 80 million people[4]. HIV affects a total of around 36.9 million people[5]. HBV and HCV infections are most feared for their hepatic complications which may lead to severe morbidity and mortality. Together, the two diseases account for more than 50% of the cases of cirrhosis liver and hepatocellular carcinoma[1]. However, globally 80% of deaths due to complications of HBV and HCV have been reported to be caused in the less privileged countries lacking in adequate prevention and cure of these diseases[6].

On the other hand transfusion of blood and its components have become a vital component of modern therapeutics and have a long list of indications[7]. Transfusion transmitted infections (TTIs) are, however, the major concern with this therapeutic modality and has led to meticulous screening measures.

Pakistan is an under-resourced country with inadequate provisions of health care services to majority of its population. A higher prevalence of the aforementioned diseases is hence anticipated. The current study aims at determining the prevalence of HBV, HCV and HIV infections among blood donors in a major tertiary health care hospital located at Karachi, the largest city of Pakistan.

Methodology
This was a cross-sectional, descriptive study, conducted during the year 2015, at Patel Hospital Karachi. All the individuals who volunteered for blood donation in the stipulated study year were processed. Standard procedures of donor selection set at the native blood bank were observed during donor selection process. These included donor's clinical and behavioral history followed by stringent physical examination and testing with complete blood count (CBC). Only adult (18-55 years age) healthy volunteer blood donors were enrolled into the study. Individuals with

known or suspected mental, infectious, uncontrolled metabolic, immunological or systemic disorders and those taking any kind of medications were excluded. An informed consent was acquired in writing from all the enrolled donors.

Blood Screening

All the blood donations were screened for presence of hepatitis B surface antigen (HBsAg), Anti-HCV antibody (Anti HCV), anti HIV-1 and HIV-2 antibodies. The tests were carried out onVITROS® ECiQ immunodiagnostics system. The system employs enhanced chemiluminescence technology in its functioning. Manufacturer's guidelines were adopted in determining reactivity of the cases

Statistical Analyses

The data was recorded and analysed employing Statistical Package for Social Sciences (SPSS®) version 22. Simple arithmetic means and standard deviations were deduced. Categorical data were compared with each other using Chi Square test. The P-value of significance was set at 0.05.

Results

A total of 4034 donors (voluntary and replacement) were processed at the native blood bank of Patel Hospital Karachi during 1st January 2015 to 31st December 2015. After initial donor recruitment scrutiny, 424 donors were deferred. These included 394 (92.9%) cases of anemia, 10 (2.3%) cases of hypotension and 20 (4.7%) cases of active medication. Rest of the 3610 donors were enrolled into the study (Table 1). Of the 3614 donors, a total of 152 (4.2%) donors turned out to be reactive in the screening assays. Sixty nine (1.91%) donors were HBsAg reactive and 81(2.24%) donors were Anti HCV reactive. Only two donors were found to be positive for Anti HIV-1/HIV-2 (Table 1).

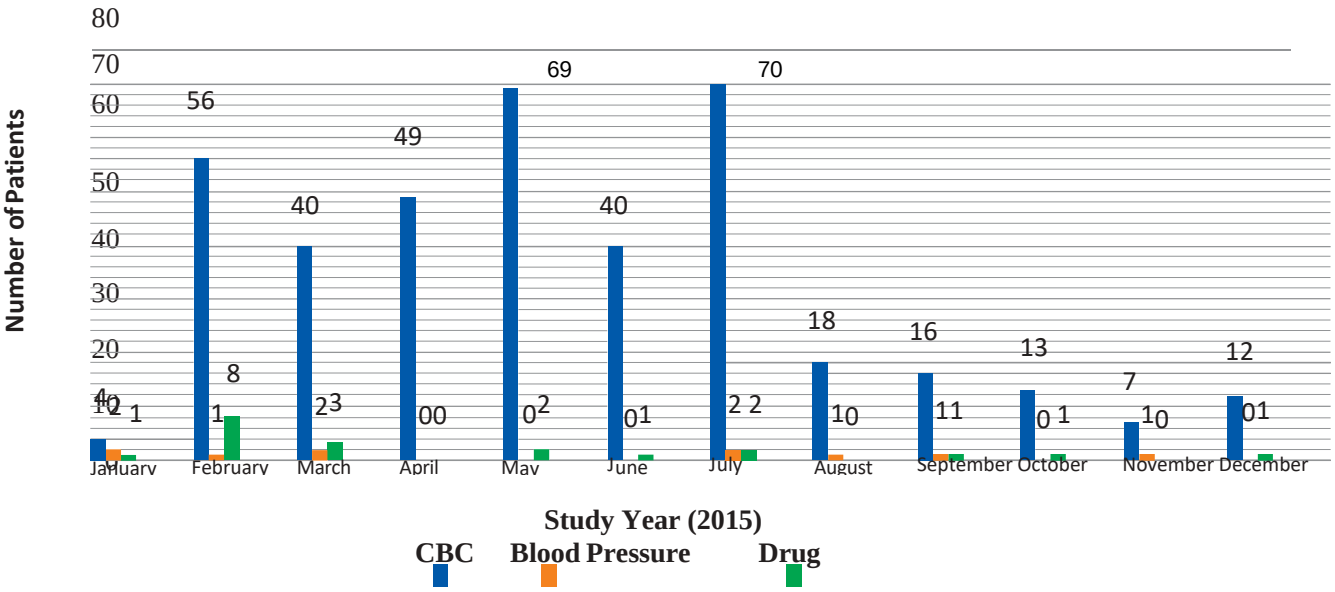

Figure 1. Frequencies of various donor deferral causes in study patients

Discussion

Meticulous screening of blood and its products ensures not only recipient's safety but also imparts an insight into the prevalence of transfusion transmitted infections in general population[8]. This study was carried out to assess the frequency of designated infectious disease markers in donor population of Patel Hospital Karachi. Being a hospital based blood bank, majority of the cases were replacement donations. The overall sero-reactivity for HBsAg, Anti HCV and Anti HIV-1/HIV-2 was determined to be 1.9%, 2.2% and 0.05%, respectively. In a survey conducted by the Pakistan Medical Research Council (PMRC) in 2009, it was found that a total of 2.5% of the Pakistani population was infected by HBV whereas HCV prevails in around 4.9% of the population[9]. Taking into account the evolving health care facilities in the country, findings from the current study are in agreement with those stated by PMC. These findings are also comparable with those from studies conducted earlier[8]. Anemia was the most common cause for deferral in the current study. Studies conducted earlier had comparable findings in terms of the most common cause of deferral[10,11]. The proportion of cases deferred due to anemia,

however, varied considerably. Findings in the current study are way too high when compared with previous studies[12]. Iron deficiency has been elucidated to be the most common cause of anemia among donors[13].

Table 1. Monthly frequency of viral seropositive cases among donors

Months	Total Donors	HBs Ag n(%)	HCV n(%)	HIV n(%)
January	322	6 (1.86)	2 (0.62)	0
February	325	3 (0.92)	3 (0.923)	0
March	286	4 (1.39)	2 (0.69)	0
April	329	6 (1.82)	13 (3.95)	1 (0.30)
May	337	11 (3.26)	9 (2.67)	0
June	370	8 (2.16)	9 (2.43)	0
July	271	3 (1.10)	3 (1.10)	0
August	339	6 (1.76)	8 (2.35)	0
September	203	5 (2.46)	10 (4.92)	0
October	248	5 (2.0)	8 (3.22)	0
November	326	5 (1.53)	5 (1.53)	0
December	254	7 (2.75)	9 (3.54)	1 (0.39)
TOTAL	3610	69 (1.91)	81 (2.24)	2 (0.05)

Conclusion

The results showed that donor were more affected with Hepatics C than that of Hepatitis B, while none of them suffering from HIV. Majority of the donors had awareness regarding the disease and most of them agreed to contribute blood in coming times, if need arises.

Conflict of Interest

We hereby declare that we do not have any conflict of interest related to publication of this article.

Grant Support Financial Disclosures

None

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Research Article

Diagnostic Utility of Conventional Radiography in Traumatic Skull Injury

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Abstract

This study was aimed to evaluate specific anatomical structures in patients who have sustained a traumatic brain injury and also to compare CT to x-ray in diagnosing brain injury. It was a cross sectional study, conducted at Mayo Hospital, from February to May 2017. A total of 65 patients were included in this study. CT was used as gold standard measure for evaluation of close head injuries. The most common trauma, which was found in this study, was motor vehicle 23(43.1%) and back of head was the most affected area 24(36.9%). Close head injury was found in 33(58.5%) patients. The sensitivity of skull radiography was 78.85%, whereas specificity was 76.92%. Other related risk factors were seen in trauma patients like double vision 28(43.1%), dizziness 59(90.3%), loss of balance 36(55.4%), loss of memory 4(6.2%), headache 58(89.2%), vomiting 21(32.3), and blurred vision 22(33.8%). The identification of fracture on the cranium suggests a significant brain and /or meningeal damage visible on a standardized x-ray film of skull bone. It is recommended that if CT scan is available, the victim of head injury must not have his rontgenogram done since it will give excessive radiations along with unnecessary interruption in reaching the actual diagnosis. However the choice of ideal tool used for the diagnosis for cranial wound is made on the basis of damage on the skull, if the damage is gigantic brain CT is the choice of investigation otherwise x-ray films can also be considered for some minimal problem.

Keywords: Computed Tomography (CT), X-Ray, Traumatic Brain Injury (TBI).

Introduction

Traumatic brain destruction is one of the most important reasons of mortality and morbidity in the developing and developed world alike causing almost half of the victims a permanent disability. Radiology plays a pivotal role in determining the magnitude of actual degree of damage caused by the accident and is quite handy in dealing with acute damages. However it is very important to identify the crucial pathogenesis associated with the trauma and the deprived consequences that occur after the head injury in the long run[1].

Injuries to brain, meninges, dura meter and skull bone remain are huge chunk of hospitalization after road traffic accidents and other unfortunate circumstances. These are the most cumbersome injuries responsible for deaths and disabilities[1,2]. Now with the advent of high tech apparatus in the field of diagnostic imaging and radiology, CT scans i.e. computed tomography is considered as a baseline investigation especially in cases of accidents and head trauma. It is a highly reliable tool with precise results provided within a limited period of time that can identify from minute fractures to brain bleeds[2].

The objective of this study is to determine the utility of both conventional skull X-ray for detection of skull fractures and taking CT head as gold standard.

Material and Methods

It is a cross sectional study, conducted at the radiology department of Mayo Hospital from Feb 2017 till May 2017. 65 patients of either gender who presented to emergency department with closed head injury were included in this study. Those patients who had open head injuries or require immediate surgical manipulations were not included in this study. Extensive physical examination of the injury site was taken before going to the radiology department.

X-ray AP and the lateral view was done with Philips x-ray machine. CT head was done with Toshiba Machine CT. Scanner(TSX 002A), Data was collected for the presence of a fracture and its exact anatomic location. CT was used as a gold standard measure for evaluation of closed head injuries[2].

Results

In this study. 46(70.8%) were males and 19(29.2%) were females (Table 1). The mean age of the patient was 30.74 years with a range from 17 to 56 years. Variable causes of head trauma were noted, most common cause was motor vehicle accident and falling from height and other causes summarised in (Table 2). The most common site of trauma was back of head, however all other locations that were involved are described in (Table 3). Patient complains were double vision 23(43. 1%), dizziness 59(90.3%), loss of balance 36(55.4%), loss of memory 4(6.2%), headache 58(89.2%), vomiting 21(32.3), and blurred vision 22(33.8%).

Out of 65 cases, 52 patients had a skull fracture on CT. Skull X-ray showed fracture in 41 cases, pseudo fractures were visible in 3 cases. 11 cases showed fracture on CT scan only. The sensitivity of skull radiography was found to be 73.35% and specificity was 76.92 %.

Table 1: Gender Distribution

Gender	Frequency	%age
Male	46	70.8
Female	19	29.2

Table 2: Causes of traumatic head injury

Causes of injury	Frequency	%age
Motor Vehicle	28	43.1
Blow to head	6	9.2
Drug Abuse	1	1.5
Stroke	5	7.7
Industrial Accident	1	1.5
Poison /Toxic substance	2	3.1
Hemorrhage	1	1.5
Fall	21	32.3

Table 3: Location of the injury

Site of injury	Frequency	%age
Forehead	14	21.5
Right-side	11	16.9
Left-side	5	7.7
Back of head	24	36.9
Top of head	7	10.8
Face	4	6.2

Discussion

The routine skull radiographic examination cannot detect minute hair line fracture of the cranium. The direction, size and spatial orientation of a fracture determines its visibility on a plain x-ray film. Fractures at skull bone of temporal region as well as sphenoid bone fractures are usually missed on radiography. Now X-ray is considered obsolete for the diagnosis of skull fractures[3,4]. CT scan is the investigation of choice for skull injury with sensitivity up to 93% with features like bone window and 3D reconstruction. For this reason it is more precise than conventional radiographs especially in identifying skull fractures causing depression in the cranial cavity[5].

In our study radiography missed 11 fractures. 56% of those fractures were at temporal bone, 20% at sphenoid bone and 24% in other bones. 3 fractures were misinterpreted as a fracture on radiography. Radiography was clearly showing fractures in 41 cases 82% in temporal bone, 12% in occipital bone and 6% in frontal bone. Many studies showed that radiographs are less accurate in detecting skull fracture, in a study conducted by Goel et al showed that autopsies have more fractures as much as 63.6% as compared to the x-rays performed while alive[6]. Another study also conducted by Hiruppathy et al also stated the supremacy of CT over plain radiographs[7]. According to Pfeifer & Pape, wrong interpretation of bony breaches is the most significant factor in false negative X-ray films in 15-34.9% of the cases. Naïve practioners (26.5%), measurement problems(33.3—60.5%) and different analytical difficulties are also important attributes in causing missed diagnosis of fractures on X-ray films. Traces of veins and arteries can cause hindrance in identifying fractures[8,9]. Skull base fractures are one of the most serious traumatic head injury which is almost missed to be diagnosed in radiography. Elrahim et al showed in their work that 1.3% linear along with 5.1% depressed fractures were unrecognized on X-rays. Also X-rays were unable to capture the breaches present at the base of cranium which were evident on CT scan among 12 patients. In most cases of severe traumatic head injury, there is usually intracranial hemorrhage associated with it[10,11]. CT head with bone algorithm have high accuracy in diagnosing, staging and preoperative planning of head injury. Yousfani et al study on 100 cases concluded that CT scan had superior performance in grading of damage to cranium as compared to roentgenograms. These X-ray films were unable to identify 21 brain damaging fractures[12,13]. CT scan is the investigation of choice when it comes to correctly detect the problem, grading it and instituting accurate management options timely. It is a very useful, time and cost-effective modality[14].

Conclusion

The identification of fracture on the cranium suggests a significant brain and /or meningeal damage visible on a standardized X-ray film of skull bone. It is recommended that if CT scan is available, the victim of head injury must not have his roentgenogram done since it will give excessive radiations along with unnecessary interruption in

reaching the actual diagnosis. However the choice of ideal tool used for the diagnosis for cranial wound is made on the basis of damage on the skull, if the damage is gigantic brain CT is the choice of investigation otherwise X-ray films will be enough for some minimal problem.

Limitations

The sample size of this study is quite small and is of the drawback of this study.

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Research article

Survey of Hepatitis B and C Among Employees of University of Sindh, Pakistan; Focus on Risk Factors and Lack of Treatment Due to Low Socio-Economic Status

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Abstract

Hepatitis B Virus (HBV) and Hepatitis C virus (HCV) infections are spreading fast in the province of Sindh, Pakistan. HBV and HCV are highly contagious viruses and their spread is increasing in low income societies. This study was carried out among employees of University of Sindh, Jamshoro, Pakistan. Qualitative tests for HBV and HCV infections were performed on 350 consenting non officer cadre employees (BPS-2 to BPS-7) in the staff canteen and laboratories of physics, chemistry, biochemistry, biotechnology, microbiology, environmental chemistry, information technology, physiology, geology and staff canteen. There was no restriction of age or gender in the recruitment of study participants. The age of study participants ranged between 20 to 59 years. Survey based questionnaire and qualitative analysis revealed HBV and HCV frequency in 25% (n=88) employees, including 92% (n=81) males and 8 %(n=7) females. Only 18.4% (n=16) of employees were previously vaccinated. Most of the employees were unaware of preventive vaccination of hepatitis B, whereas a few could not afford vaccination. HBV and HCV are common in the study population. Highest frequency of infection was found among the peons and laboratory attendants. Financial constraints restricted most of the employees from screening and treatment of hepatitis.

Keywords: Hepatitis B Virus, HCV infection, Sindh University

Introduction

Hepatitis is defined as an inflammation of the hepatocytes1. Drugs, chemicals, viruses and auto immune disorders are the common causes of hepatitis[2]. Hepatitis B virus (HBV) and Hepatitis C virus (HCV) infections are the common causes of hepatitis globally[3]. The incidence of HBV and HCV associated hepatitis is increasing in South East Asia, particularly in Pakistan[4].

Hepatitis B is an infectious illness caused by HBV which infects the hepatocytes and causes inflammation. Adults are more likely to develop symptoms as compared to children. Initial symptoms are often minimal and include flu-like symptoms[5-7]. Other symptoms may include fever, jaundice, nausea and vomiting etc. Incubation period of HBV infection ranges from 45-160 days. While Hepatitis C is an infectious disease primarily affecting the liver, caused by HCV. The infection is often asymptomatic but chronic infection can lead to cirrhosis, which is generally apparent after prolonged period of time[8-10]. HCV has a relatively shorter incubation period of two weeks to six months.
Acute hepatitis generally occurs in the initial six month period after infection. Some cases, however, will follow a chronic phase (defined as a state of HBsAg positive infection for more than six months). Common symptoms, in chronic infection, include flu like symptoms, loss of appetite, nausea, vomiting, fever and weakness, tiredness, abdominal pain. Less common symptoms include dark colour urine, light-coloured stool, fever, jaundice[11-13]. Acute hepatitis isusually self-limiting. However, in some cases it may evolve into chronic active hepatitis[14]. In Sindh, a rising incidence of hepatitis B and C has been observed[15]. Especially in rural areas, the increasing incidence of HBV and HCV hepatitis has been attributed in part to poor socio economic status, habits and lack of awareness of preventive measures. HBV vaccination in other parts of world remains helpful in reducing the incidence of hepatitis B[16]. In Sindh specifically and Pakistan generally the rate of vaccination is limited and also the for HBV only to those at risk. Paramedical staff is more prone to develop hepatitis[17,18]. However no technical staff is at equal risk of infection[19]. Hence the current study determines the frequency of these infections among non-technical staff of a native university. This study was designed to survey HBV and HCV frequency among

employees of Sindh University from grade BPS-2 to BPS-7. The research was undertaken with sole purpose to survey HBV & HCV hepatitis and carrier rate in among lower staff and their family members.

Materials and Methods

This was a descriptive cross sectional. This study was based on questionnaire survey and qualitative analysis for HBV and HCV. The research project was approved by the ethical committee of Institute of Biochemistry, University of Sindh. The study included non-technical employees in different departments of "University of Sindh" All the participants were analyzed through questionnaire survey so as to acquire information about their routine work to determine epidemiological risk factors involved in transmission of HBV and HCV. The questionnaire included demographic and clinical details including age, sex, number of children, marital status, surgeries and interactions with other employees and students of the university. It also encompassed signs and symptoms of hepatitis as well as vaccination and treatment records. Qualitative tests for HBV and HCV were performed on all 350 employees (BPS-2 to BPS-7), using immunoassay chromatography test (ICT) based kits, who were handling/sharing different instruments or items of personal use in laboratories of Physics, Chemistry, Biochemistry, Biotechnology, Microbiology, Environmental Chemistry, Information Technology, Physiology and Geology departments and the canteen staff.

Results

The study was undertaken on the employees from grade BPS-2 to BPS-7 of Sindh University Jamshoro, Sindh, Pakistan. Total employees from BPS-2 to BPS-7 were 400; however, only 350 consented to be enrolled in the study. Frequency of participants from various departments is provided in Table 1. Ages of the participants ranged from 20 to 59 years. The results revealed occurrence of HBV and HCV in 25% (n=88) employees including 92% (n=81) males and 8% (n=7) females. The survey revealed that families of 31 (8.7%) employees were under treatment for HBV or HCV. Only 4.57% (n=16) of employees could receive vaccination whereas remaining could not, either due to non-affordability or lack of awareness.

A significant numbers of sero-negative individuals 42% (n=37) were also found with common symptoms of hepatitis. Qualitative ICT device test could not detect the infection with HCV of HBV 22% (n=19) employees were clinically jaundiced.

Table1. Frequency of participation from different departments

S.#	Nature of work	Percentage (%)
1	Carpenter	2.2
2	Office attendance	3.4
3	Driver	2.8
4	Security Guard	11.8
5	Peon	30.8
6	Clerk	7.8
7	Sweeper/s	7
8	Lab Attendant/Assistance	29
9	Liberian	0.8
10	Electrician	2.2
11	Plumbers	2.2

Table 2. Suspected causes of Hepatitis B and C infection

Type of Hepatitis	Caused by by Jaundice	Caused Blood transfusion	Caused by visiting Dentist	Caused by Surgeries	Spread by Spouse of Employees	Spread by Children of Employees
HBV	**23%**	**40%**	**34%**	**60%**	**22%**	**20&**
HCV	**52%**	**65%**	**25%**	**26%**	**82%**	**70%**

Discussion

Hepatitis B and C are viral infections of liver[20].Hepatitis is a contagious disease and can transfer easily[21-23] through blood. A number of studies have focused paramedical staff of Universities[8], beauticians and barbers[24]. However, studies focusing non-technical University staff are lacking. Due to economic constrants low income staff usually do not undergo screening and treatment for hepatitis. Notwithstanding the fact that government has announced programs for free screening and treatment, yet lack of easy access to these facilities has immensely contributed to an increase in the incidence of these infections among the employees. Special screening and treatment programs for Hepatitis B and C have thus been devised in such populations[25,26].

Questionnaire and qualitative analysis revealed that 25% of employees were infected whereas 42% of employees were found to have all common symptoms of hepatitis. This may have been due the relatively lower sensitivity of the test employed in current study. 18.4% of the employees had been previously vaccinated. It was suspected that 9% employees contracted the infection through their families. 15% of employees endeavored to avoid the virus through protective measures like protective marital relationship, ensuring use of sterilized instruments during surgeries, use of gloves while handling sputum, blood and stool samples. The infection was found in 10% of those who were previously vaccinated. This might have been due to inadequate vaccination or because they had contracted the infection before vaccination.

Results also revealed that infected employees were married indicating that their spouse and children had also been at risk[27]. HBV and HCV can be easily transmitted bynon-sterilised surgical instruments[28-31]. People who frequently visit dentists are found to be at a higher risk of viral diseases especially hepatitis. The local surgeons usually do not use proper sterilized instruments/surgical tools which is a common cause of viral Hepatitis in our area. Common signs and symptoms of Hepatitis B and C are change in colour of stool and urine, loss of appetite and frequent diarrhoea. Treatment of HBV and HCV is very expensive, according to our survey 18% were under treatment and 82% could not received treatment due to poverty[32-34].

Conclusion

Hepatitis is spreading at a rapid pace in Pakistan mostly due to lack of awareness. Governmental and different nongovernmental organizations are trying to prevent the disease by educating people through different programs and financially sponsoring infected people to undergo treatment. Due to the high magnitude of spread, existing educational and financial programs are insufficient to control the rampant spread of the disease. The employees from grade 2 to 7 (BPS-2 to BPS-7) earned approximately Rs.14, 000 to 17,000 per month and could hardly support their family needs. Hence it has not been possible for them to undergo screening tests. Highest ratio of infected employees was among peons and lab attendants. Expensive treatment and non-affordability restricted majority of the employees from screening and treatment of hepatitis.

Conflict of Interest

We hereby declare that we do not have any conflict of interest related to publication of this article.

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None

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