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AIMS & SCOPE

HMDJ is the journal of HITEC Institute of Medical Sciences (HITEC-IMS), Taxila. It is an open access, peer-reviewed, bi-annual journal that aims to keep the medical & dental health professionals updated with the latest information relevant to their fields.

HMDJ welcomes scholarly work from medical, dental and allied subjects (basic & clinical), community health issues and medical education. It publishes original research, review articles, case reports, editorials, letters to editor, short communication, book reviews, recent advances, new techniques, debates, adverse drug reports, current practices, and conference reports. All publications of HMDJ are peer reviewed by subject specialists from Pakistan and abroad.

OBJECTIVES

1. To publish original, peer reviewed clinical and basic sciences articles.
2. To promote research culture in our institute and beyond, by inculcating the habit of medical writing in doctors.
3. To assist physicians to stay informed about the developments in their own & related fields.
4. To support knowledge & experience sharing among the health professionals for the benefit of patients.
5. To attain the top-notch ethical medical journalism by delivering credible and reader- friendly publications.

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CONTENTS

EDITORIAL

STRUCTURED HOUSE JOB TRAINING AT HITEC-IMS AND HIT HOSPITAL, TAXILA

Hamid Shafiq[1], Syed Wasim Akhtar[2]

[1] Dean and Principal HITEC-IMS, [2] Professor of Neurology and Director Training Cell, HITEC IMS

HITEC-Institute of Medical Sciences (HITEC-IMS) and HIT Hospital (HITH) have achieved a significant milestone with the graduation of their first batch of MBBS students and the start of the house job program. A house job Training Cell (TC) was formulated in order to launch a structured training program for the first batch of house officers. It has especially focused on medical and surgical emergencies as well as the routine procedures of a physician.

We are following the Pakistan Medical Commission (PMC) guidelines for house job training. According to PMC, a house job includes 6 months of training in "Medicine and allied" out of which 3 months in general Medicine are mandatory. Similarly, 6 months of training in "Surgery and allied" out of which 3 months in general Surgery are compulsory. PMC has also outlined the competencies and the general procedures of a physician for a house job. The structured training program of house job at HITEC-IMS covers the competencies and the procedures outlined by the PMC[1] under the umbrella of the World Federation for Medical Education (WFME) [2].

According to the objectives of the training, at the completion of the house job, "the house officers will be able to serve as community-competent general practitioners in Pakistan, prove themselves competent in the medical and surgical specialties and subspecialties, deal with medical and surgical emergencies, perform the general procedures of a physician, show a professional attitude and exhibit ethical practices in any institution they opt for" [3, 4].

CAPSULE SUMMARY

The implementation of a one-year structured house job included:

- Launching of a Training cell and an operational cell.
- Development of an emergency book and a log book.
- MOUs with other institutions in Rawalpindi district.
- A Prior orientation week of crash training in firefighting, BLS, and intensive care.
- Mandatory training for all at various medical and surgical departments.
- Feedback from trainers and trainees.

Planning of a structured house job training [5] at HITEC-IMS commenced one year prior to the start of the house job under the vision and direction of the Dean & Principal HITEC-IMS. It included the following brainstorming and actions: (a) A pictorial emergency handbook, "Learning Emergencies Management Book", was developed and customized to the needs of the junior doctors. (b) A dedicated TC was formulated for the implementation of structured house job training. (c) A Discipline Officer was appointed to facilitate the TC. (d) An Operation Cell was thought out for the monitoring part. (e) The Department of Medical Education (DME), Vice Principal (VP), and Director Admin of HITEC-IMS were taken on board in order to facilitate the TC. (f) Feedback was taken from the clinical faculty as well as students for the teaching requirements. (g) An orientation week was scheduled to give a crash training to the house officers prior to the actual house job.

The TC was headed by Director TC, with a representation of Clinical Surgery (Assistant Director TC Surgery) and Clinical Medicine (Assistant Director TC Medicine). The Professors of Neurology, Orthopedics, and Assistant Professor of Medicine accepted the responsibilities of Director TC, Assistant Director TC Surgery, and Assistant Director TC Medicine respectively. The Head of Department (HOD) Gynae & Obs was appointed as the Discipline Officer. The HOD and the Assistant Professor DME did the brainstorming with the TC to outline the functions of TC in relation to the laid down objectives of the structured house job training. The VP and Director Admin provided their invaluable guidance as well as the required resources for the smooth functioning of the TC. Three clerical staff with computer and printer facilities in a furnished room were provided to the TC.

The Operation Cell, on the part of the HIT hospital, was established by the Commanding Officer of the hospital. The Second in Command of the hospital was made in charge of the Operation Cell. The function of the Operation Cell was to monitor the duty rosters, safety, discipline, logistics, and the working of house officers.

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The "Learning Emergencies Management Book" was conceived and edited by the Dean & Principal HITEC-IMS and the Director TC. It had valuable contributions from all the clinical faculty.

A "Logbook of House Job Training" was developed by the Director and Assistant Directors of TC. It was critically reviewed by the Associate Dean Clinical and HODs of Medicine, Surgery, and Gynae & Obs. The main function of this logbook was to document the learning outcomes of the house officers in medical and surgical emergencies as well as in clinical procedures [6,7]. The logbook has been divided into parts according to the clinical departments.

The Memorandums of Understanding (MOU)s, with other institutions of Rawalpindi district, were also signed to facilitate the structured training of the house officers: i) The Rawalpindi Medical University (RMU), for 1-month training in medical & surgical emergencies at the Holy Family Hospital (HFH); ii) The Wah Medical College (WMC), for 1-month of training in medical & surgical emergencies, cardiology, Eye, and ENT, at Pakistan Ordinance Factory Hospital Wah Cantt (POFH) iii) The Rawalpindi Institute of Cardiology (RIC), for 15 days of training in cardiac emergencies and procedures; and iv) The Tehsil Head Quarter Hospital Taxila (THQH), for 15 days of training in Medicine.

The TC, with the approval of the Dean & Principal, Associate Dean Clinical, and HODs of Medicine, Surgery, and Gynae & Obs has planned and implemented the following structured training program:

A. General Surgery: 2 Months HITH (2 weeks Ward, 2 weeks Operation theatre, 2 weeks OPD, 2 weeks Emergency Room, ER); and 1 Month HFH-RMU ER.

B. Allied Surgery: 1 Month HITH (Male house officers to Orthopedics and female house officers to Gynecology); 1 Month HITH (15 days ENT and 15 days Eye); and 1 Month HITH (15 days Radiology and 15 days Anesthesia) or HFH-RMU ER.

C. General Medicine: 15 days THQH Medicine; 15 days HITH Intensive Care Unit (ICU); 15 days HITH male-ward; 15 days HITH female-ward; 15 days HITH Neurology; and 15 days HITH Cardiology or RIC.

D. Allied Medicine: 1 Month POFH (15 days ER and 15 days Coronary Care Unit, CCU); 1 Month HITH Pediatrics; and 1 Month HITH (15 days Dermatology and 15 days Psychiatry).

Out of 87 students who passed in the final year of MBBS, 65 opted for the house job. From outside HITEC-IMS, two house officers joined the program. So, there are 67 house officers.

The orientation week for crash training of house officers started one week prior to the actual house job training. Principal HITEC-IMS highlighted the objectives of the house job, the method of the structured training, the professional attitude of the doctors, and the ethical practices expected from the house officers. On the day-one of the crash trainings, all house officers had firefighting drill. Then they were divided into 4 batches. In the next four days, each batch had the training in BLS, intensive care, pathology lab, and patient handling. The house job training was started after the orientation week on 16th May 2022.

First half of the one-year structured house job training has been completed. The HODs of the clinical sciences had outlined the learning objectives of the house job training in their respective departments, which have been met. During the the first half of the training, Dean & Principal HITEC-IMS took feedback from the house officers on multiple occasions, giving them the opportunity to share any reservations or difficulties faced by them. Separate feedback was gathered from the house officers who attended the HFH-RMU, POFH, and THQH. The house officers were satisfied and thankful for the training imparted to them by the above institutions. It is encouraging that the supervisors at the aforementioned institutions have also found our house officers enthusiastic and primed for learning.

The clinical faculty at HITEC-IMS vows to support house job training in the future as well and has faith in their house officers to emerge as qualified doctors from this facility.

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ORIGINAL ARTICLE

DETERMINATION OF EXPRESSION OF *SCARB*1 GENE, FASTING BLOOD GLUCOSE AND BODY MASS INDEX IN TYPE 2 DIABETICS PRESENTING WITH AND WITHOUT DYSLIPIDEMIA

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ABSTRACT

Objective: To investigate the expression of *SCARB*1 gene, blood glucose (fasting) and Body Mass Index (BMI) in type- 2 diabetics with and without dyslipidemia.

Design: Cross sectional (comparative)

Place and Duration of Study: Army Medical College, Rawalpindi's Center for Research in Experimental and Applied Medicine (CREAM), in association with the Military Hospital, Rawalpindi, from August 2017 to March 2018.

Patients and Methods: Type 2 Diabetics (n=60), and healthy individuals (n=30) were enrolled randomly between the age of 25 to 75 years. Diabetic patients were further divided into diabetic dyslipidemia (Group I) and diabetic only (Group II). Group III served as control (n=). Ribonucleic acid (RNA) was isolated from the samples of peripheral blood and cDNA was synthesized. Determination of the SCARB1 gene expression was done on Real Time PCR and was presented in cycle threshold. The relative quantification of the gene relied upon 2-ΔΔCT method. Target gene expression, fasting blood glucose and body mass index (BMI) were determined. Comparison of the aforementioned parameters among control, diabetic dyslipidemia and diabetic non-dyslipidemic subjects was done using SPSS 17.

Results: The mean ± SD value of cycle threshold (CT) of *SCARB*1 gene diabetic dyslipidemia (Group I) was 20.499±2.15, it was 21.504±1.10 in Group II (diabetic only) while 20.72 ± 1.44 in Group III (control). In Groups I, II and III mean ± SD CT values of *GAPDH* gene were 22.36 ± 2.27, 22.181 ± 2.23 & 22.548 ± 3.45 respectively. In comparison with the control group, the diabetic dyslipidemia group's expression of the *SCARB*1 gene was altered by 1.0 and 0.4-fold, respectively. Fasting blood glucose levels were most deranged in diabetic dyslipidemia patients ($p < 0.001$) while BMI was significantly different among the three groups ($p < 0.05$).

Conclusion: The *SCARB*1 gene expression was not changed in the diabetic dyslipidemia patients while there was a slight decrease in the expression in the diabetic group. The fasting blood glucose and body mass index were independently altered in diabetic dyslipidemia and diabetic patients.

Key words: *Diabetes, High-density Lipoprotein, Triglyceride*

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INTRODUCTION

Diabetes Mellitus(DM) is ranked fourth among non-communicable diseases (NCD) with 1.6 million deaths yearly[1] and was in eighth position among the diseases that caused deaths in 2019 globally , according to the World Health Organization (WHO)[2]. About 425 million people worldwide have diabetes, according to the International Diabetic Federation (IDF), with 629 million anticipated to have the disease by 2045[3]. It is the leading cause of cardiovascular disease (CVD) therefore WHO recommends managing the levels of glucose and lipids as well as recommends cessation of smoking in diabetics in order to lessen the CVD risk[2]. Type 2 Diabetes Mellitus (T2DM) is distinguished by disturbances of plasma lipoproteins, referred to as diabetic dyslipidemia which is a major contributor to coronary artery disease and atherosclerosis[4]. Pakistan is ranked seventh in terms of the prevalence of DM, with dyslipidemia being the most common complication of T2DM[5]. Diabetic dyslipidemia is distinguished by decreased High-density lipoprotein cholesterol (HDL-C) and increased Triglycerides (TG) levels in the blood. Lipid abnormalities are metabolically linked, and a variety of factors influence normal lipid metabolism[6]. HDL-C is crucial in the reverse cholesterol transport (RCT). High triglyceride with decreased HDL-C observed in type 2 diabetes are linked to an elevated risk of cardiovascular events[7], a high lipid inflow also contributes to β-cell dysfunction[8]. HDL-C participates in the selective uptake of cholesterol esters in order to maintain cholesterol homoeostasis in the human body. Variations in HDL-C levels are influenced by both environmental and genetic factors.

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Scavenger Receptor Class B Type 1, SCARB1, receptor is one of the transmembrane proteins with a good affinity for HDL that regulates selective HDL cholesterol efflux. *SCARB*1 gene encodes SCARB1protein, which is located on the 12th chromosome, spanning 75kb & consisting of 13 exons. SCARB1 protein is important in cholesterol homeostasis and reduces thrombotic risk by maintaining HDL-C levels[9]. Genetic variations in the *SCARB*1 gene may reduce the ability of lecithin-cholesterol acyltransferase (LCAT) to bind to HDL, causing cholesterol accumulation by affecting the RCT. The SCARB1 receptor found in macrophages as well as on the endothelial cells protects against atherosclerosis[10]. Insulin resistance has been linked to *SCARB*1 expression and lower HDL levels in mice, according to studies. *SCARB*1 overexpression in mouse hepatic cells has been seen to be linked with lower plasma HDL levels[11]. In one case-control study, *SCARB*1 gene analysis of type 2 diabetics disclosed a link between polymorphism rs9919713 to some lipid parameters[12]. The current study sought to investigate the basis of dyslipidemia of type 2 diabetic patients on the molecular level, by studying *SCARB*1 gene. Need of the hour is to explore molecular anomalies correlated with clinical manifestations of diabetic dyslipidemia. This study's objective was to determine *SCARB*1 gene expression, BMI and the glycemic index in type 2 diabetics with, and without dyslipidemia. This was the first study on Pakistani people to look at diabetic dyslipidemia at the molecular level.

CAPSULE SUMMARY

- Expression of the Scavenger Receptor class B type 1 (*SCARB*1) gene was unchanged in diabetic dyslipidemia patients while it decreased slightly in the diabetic group
- In diabetic dyslipidemia and diabetic patients, fasting blood glucose and body mass index were altered independently

MATERIAL AND METHODS

Patients: The study was done from August 2017 to March 2018 in collaboration with Pak-Emirates Military Hospital, following a formal approval by the Army Medical College's Ethical Review Committee (No. ERC/MS-17 dated 11 August 2017). The research was done according with the Helsinki Declaration's principles (revised version 2013) [13], employing a non-probability purposive sampling technique. The study included ninety subjects. After explaining the purpose of the study, an informed consent, in black and white was taken from all participants. They were well aware of the publications of the result after maintaining confidentiality. The study participants were divided in three groups. Those with Diabetic dyslipidemia were labeled as a Group I, diabetics without dyslipidemia as Group II and healthy subjects as Group III. Medical and family histories of type 2 diabetes of all patients were noted on questionnaire-based proforma in addition to age and sex, BMI, drug history, socioeconomic standing, lifestyle, as well as dietary habits. Lab investigations included fasting blood glucose (FBG), HbA1c, and lipid profiles. The identification codes were assigned to each sample to keep secret patient's identity and were used during the study period. The inclusion criteria were: newly diagnosed type 2 diabetics with and without dyslipidemia, both genders, between the ages of 25 and 75, and age-matched healthy subjects. Individuals with only dyslipidemia were excluded from the study, as were those with any co-morbidity, such as renal dysfunction, hypertension, chronic liver disease, cardiovascular disease, cancer, gestational diabetes, type 1 DM, and type 2 diabetics on hypoglycemic or lipid-lowering medicines.

RNA extraction and Real Time Polymerase Chain Reaction

A 2ml sample of peripheral blood was collected in an ethylenediaminetetraacetic acid (EDTA) vacutainer, and RNA was isolated employing the GeneJet RNA Purification Kit (Thermo Fisher Scientific). RNA was separated on agarose gel (1%), it was visualized using Bio-Rad's (USA) Gel Documentation System. Purified RNA was kept at -80°C. The *SCARB*1 gene's mRNA sequence was got from the National Center for Biotechnology Information . Using downloaded gene sequences, "Primer 3" , an online bioinformatics tool was used to design the required primers, forward being 5'CTGTGGGTGAGATCATGTGG3', while the reverse, 5'GCCAGAAGTCAACCTTGCTC3'. The RevertAid First Strand cDNA Synthesis Kit (Thermo Fisher Scientific) was utilized to synthesize cDNA, employing gene specific primers. Using cDNA generated from a control sample, the polymerase chain reaction (PCR) for the *SCARB*1 gene was optimised on a traditional thermal cycler (CGI-96 Corbet). The PCR reaction mixture contained nuclease-free water, 1x PCR buffer, 0.2M dNTPs, 1.7mM MgCl2, 1pmol/l reverse & forward primers, and Taq polymerase (0.3 units). Optimized PCR program was as follows; (1) Denaturation, at a temperature of 94°C for 30 sec, (2) Annealing, at a temperature of 57.2°C for 35 sec, and (3) Extension, at a temperature of 72°C for 8 min, with 35 cycles. On 1% agarose gel, the amplicon was electrophoresed and then seen using the Gel Documentation System ("Bio-Rad, USA").

The *SCARB*1 and the reference *GAPDH* genes expression analyses were done on Smart cycler II (Cepheid, USA) by employing SyberGreen Universal Kit (Thermo Fisher Scientific). Real-time PCR was performed in duplicate in order to maintain the data normalization with reference to the housekeeping *GAPDH* gene. In the PCR reaction 1l of cDNA, 12.5l of 2xSyberGreen Mix, 1pmol/l of reverse and forward primers, and nuclease-free water were used. The PCR program was used for 10 minutes of initial denaturation at 96°C, 40 denaturation cycles (Temp 94°C, Time: 30 sec), annealing (Temp: 57.2°C, Time: 35 sec), and extension (Temp:70°C, Time: 35 sec). The *GAPDH* gene was amplified according to the manufacturer's protocol. The equation E= [10(-1/SLOPE)-1] was utilized to examine the control as well as the target gene assays.

Statistical Data Analysis

Mean values of the CT of all samples were calculated in order to determine the gene expression. Relative *SCARB*1 gene

Table 1: Fasting Blood Glucose (FBG) and Body Mass Index (mean ± SD)

Groups	FBG mmol/L	*p value*	BMI Kg/m2	*p value*
I (Diabetic dyslipidemia)	13.40 ± 5.76	<0.001	26.38 ± 3.8	<0.05
II (Type 2 Diabetics)	10.35 ± 4.07		25.97 ± 3.57	
III (Control)	5.05 ± 0.523		23.88 ± 2.56	

Table 2: The cycle threshold of the *SCARB*1 gene expression

Groups	Mean ± SD of *SCARB1* gene (target gene)	Mean ± SD of *GAPDH* gene (ref)
I (Diabetic dyslipidemia)	20.49 ± 2.15	22.36 ± 2.27
II (Type 2 Diabetics)	21.504 ± 1.10	22.18 ± 2.23
III (Control)	20.72 ± 1.44	22.54 ± 3.45

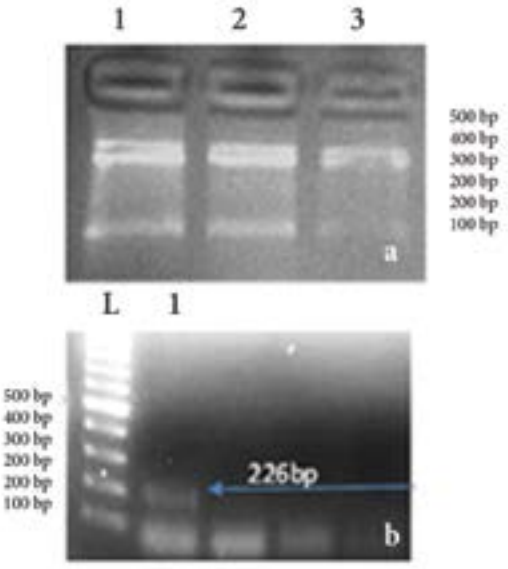

Figure 1: Isolation of Total RNA from peripheral blood & PCR of *SCARB*1 gene:

a: Lane 1-3 showing isolated RNA (Total).

b: L: 100bp DNA ladder, Lane 1: PCR of *SCARB*1 gene (226bp)

expression, with reference to the GAPDH gene, was analyzed by the $2^{-\Delta\Delta CT}$ method[14]. The difference of gene expression of the two groups was analyzed using the independent samples t-test. Analysis of the continuous variables was done by one-way ANOVA using SPSS 17 and was presented as mean±SD. Statistically significance was considered at a p<0.05.

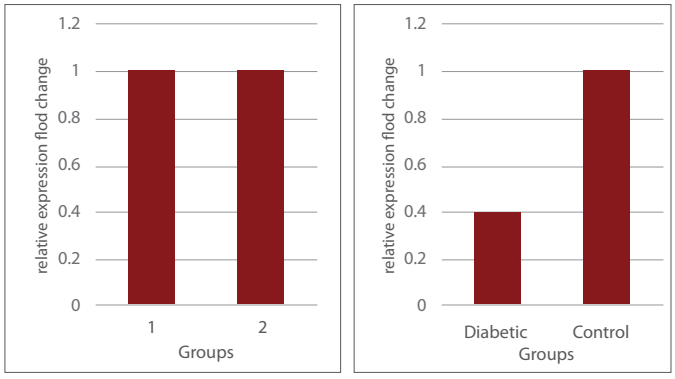

Figure 2: Relative Expression of *SCARB*1 gene in Groups

RESULTS

There were 47 females (51.6%) and 43 males (47.3%) in total. The level of FBS in Diabetic Dyslipidemia patients (Group I) was 13.40 ± 5.76mmol/L. The levels of FBS in diabetic patients (Group II) were 10.35 ± 4.07mmol/L and 5.05 ± 0.523mmol/L in healthy control (Group III) with p<0.05 (Table 1). In the Diabetic Dyslipidemia Group, the mean ± SD of BMI was 26.38±3.8kg/m^2, while it was 25.97 ± 3.578kg/m^2 in the diabetic Group and 23.88 ± 2.568kg/m^2 in control group with p<0.05.

At 260nm absorbance, no genomic DNA, proteins, or salts were seen. On a 1% agarose gel, total RNA was separated and found to be intact as 28S rRNA and 18S rRNA (Figure 1a). On the thermocycler, control Group's cDNA was used to optimize the PCR reaction for both genes *(SCARB1* and *GAPDH*). At an annealing temp of 57.4°C, a band size of 226bp was amplified (Figure1b).

The mean ± SD CT value for *SCARB*1 in Group I turned out to be 20.499±2.15 in comparison with a value of 21.504±1.10 in Group II, and 20.72±1.44 in Group III. In Groups I, II, and III, the mean ± SD CT values of the *GAPDH* gene were 22.36 ± 2.27, 22.181 ± 2.23, and 22.548 ± 3.45, respectively (Table 2). The mean CT values for the *SCARB*1 gene differed slightly between Groups. The relative gene expression analysis revealed a 1.0-fold increase in *SCARB*1 gene expression in Group I, which was the same as in the control Group. This data showed a statistically non-significant difference ((p≥0.05)) in the expression of *SCARB*1 gene between the two Groups. Type 2 diabetics (Group II) had a 0.4-fold increase in expression, which was less than the control Group (Group III) (Figure 2).

DISCUSSION

Lipoprotein receptors are involved in the signaling pathways that regulate cell functions. Scavenger receptor class B, type 1, plays a role in the recognition of oxidized LDL to prevent the process of atherosclerosis[15] and it's an HDL receptor. The majority of *SCARB*1 studies have mainly focused on mutational analyses, this is the first study on Pakistani diabetics.

The lower C_T value shows a higher abundance of gene and the high C_T value shows a low abundance of gene. However, results could not establish a direct link between *SCARB*1 gene

expression and diabetic dyslipidemia. The threshold cycles did not achieve any significant difference among the three Groups ($p \geq 0.05$). In a Chinese study, it was observed that HDL levels became dysfunctional in hyperglycemic conditions, which was linked to the downregulation of the *SCARB*1 gene mRNA[16]. Downregulation of this gene reduces HDL's cholesterol efflux capacity. Diabetes alters lipoproteins, and high TG levels may reduce the beneficial effects of SR-B1. These findings suggest that diabetes may influence *SCARB*1 expression at the transcriptional level. It was revealed that abnormal lipid levels resulted in induction of overexpression of miRNA-24 on the SR-B1 receptor protein, that resulted in the suppression of *SCARB*1 expression by targeting its 3 UTR[17]. Diabetes is caused by a decrease or insufficiency in insulin release. VLDL has been linked to hyperglycemic dyslipidemia, low HDL-C, apoB, and high triglycerides[18]. The HDL-C levels in Group I patients were found to be lower than normal, whereas Group II was within normal limits. Hyperglycemia may alter the metabolism of lipoproteins in type 2 diabetic patients. The glycemic index of Group I (patients with diabetic dyslipidemia) and Group II (diabetic) patients differed from the control. The majority of patients in Groups I and II were overweight compared to the control Group but Group I patients had higher BMI values compared to Group II. Though Group I and Group II subjects were newly diagnosed with diabetes Group I patients developed dyslipidemia. These findings also described the need to formulate awareness and monitoring programs for timely diagnosis of diabetes to control future complications[19]. The present study hypothesized that altered expression of *SCARB*1 gene affects the reverse cholesterol transport and HDL-C levels. The expression of *SCARB*1 gene was not changed in Group I (Diabetic dyslipidemia) while the lipid profile was remarkably deranged in the diabetic dyslipidemia Group. Moreover, fold-change showed a slight change in the expression of SCARB1 gene Group II (Diabetic) while lipoprotein levels were normal. However, data were obtained from 60 subjects and cannot apply to the whole population of diabetic dyslipidemia. Some patients of Group I and II were presented with higher CT values above 25 cycles compared to control Group. These results suggest that diabetes mellitus might change the expression of the *SCARB*1 gene.

CONCLUSION

Expression of *SCARB*1 gene was normal under diabetic dyslipidemia while slightly decreased in diabetic patients. The fasting blood glucose and BMI were independently altered in diabetic dyslipidemia.

Acknowledgment: Authors are thankful to the participants for voluntary participation.

Recommendation and limitations: Majority of patients was not willing to participate. The patients who presented with dyslipidemia without diabetes were not included due to limited funds. Large-scale studies will present better outcomes to understand diabetic dyslipidemia. Other genes can also be included.

AUTHORS' CONTRIBUTION

Khadeeja Siddique	Acquisition of data, Analysis and interpretation of data, Drafting the Article
Asifa Majeed	Conception and design, Analysis and interpretation of data, Critical revision

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ORIGINAL ARTICLE

ROLE OF ULTRASONOGRAPHY OF ABDOMEN AND CHEST IN EARLY DIAGNOSIS OF SEVERE DENGUE FEVER

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ABSTRACT

Objective: To assess the use of ultrasonography in quick diagnosis of severe dengue fever and to look at co-relation between ultrasound findings in abdomen/chest and the severity of dengue fever.

Design: Prospective study.

Place and Duration of Study: Fauji Foundation Hospital Rawalpindi for a duration of 4 months.

Materials and Methods: All referred patients with suspicion of dengue fever on basis of clinical presentation and laboratory investigations from age of 20 to 50 years were investigated by ultrasound abdomen & thorax within 1st one week of start of fever. Dengue fever presentation was classified on basis of WHO classification presented in 2011.

Results: In our study 80 cases were investigated and we found that Dengue Fever was more common in male population with male to female ratio of 3:1. On basis of revised classification of WHO in 2011 about Dengue Fever, we found 33 cases (41%) had non-severe dengue without any warning sign, 17 cases (21%) were having non-severe dengue fever with obvious warning signs & 30 cases (38%) had severe form of dengue fever. In our study all of the 80 cases had ultrasound abdomen and chest with in first week of start of symptoms. Most common findings on ultrasound were thickening of gall bladder wall which was found in 66 cases (82%), hepatomegaly in 49 cases (61%), ascites was there in 35 cases (44%), pleural fluid in 37 cases (46%), peri-cholecystic edema in 15 cases (19%) & splenomegaly in 11 cases (14%). Finding of pleural effusion & ascites in patients with dengue co-related directly with severity of illness and an early sign of disease progression.

Conclusion: Majority of the flood survivors reported poor health conditions with unavailability of timely treatment. Moreover, access to food, shelter, water and sanitation services was limited which highlights the ineffective flood relief services.

Key words: *Dengue Fever, Ultrasound abdomen and chest, Gall bladder wall thickening, Ascites, Pleural Effusion*

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INTRODUCTION

Viral infections especially dengue fever is now one of very common viral infection all over the world caused by Flaviviridae family[1]. This acute viral disease is carried by mosquito and the cause is one out of four serotypes of virus genus Flavivirus[2]. Dengue Fever is found to be endemic for more than 100 years in tropics of South-East Asia and the western Pacific regions[3]. For last 30 years the cases of this infectious disease has shown a significant increase in endemic areas and is a major international public health problem with affecting a large number of populations[4]. Dengue Virus is basically RNA virus belonging to Flaviviridae family of and its transmission is by mosquito called Aedes Aegypti. So far four serotypes of this virus have been identified which are named as DENV-1, 2, 3 and 4[5]. Any of these four types can cause all types of symptoms and signs of this illness. Patients caught by one of the strain usually produces immunity for almost whole life to that specific strain but there is very short lived immunity for other 3 serotypes. There are three phases of this febrile disease: a phase of high grade fever, hypotension or shock and recovery phase[6] . During the first phase when there is swinging fever characterized as bi-phasic or 'Saddle back' that lasts for 3–6 days accompanied by Eye congestion and pain, facial flushing, skin rash, severe bodyaches, myalgia, arthralgia, severe headache and GI symptoms in the form of anorexia, nausea and vomiting etc. This is followed by a critical phase characterized by increased capillary permeability and presents as severe abdominal pain, tenderness, intractable vomiting, extreme lethargy and restlessness[7]. Liver is usually palpable less than 2 cm below costal margin. Investigations

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usually reveal an increased hematocrit along with rapid fall in platelet count. This is followed by recovery phase lasting for 2-3 days in which there is a gradual reabsorption of fluid from extravascular compartment. Diagnosis of dengue fever is mainly done with anti-dengue antibody which usually becomes positive around day 7 of start of symptoms and for this reason diagnosis is often delayed[8] . Ultrasound abdomen is widely available, non-invasive and relatively cheaper imaging modality available all over the world for early diagnosis of dengue fever in comparison with other modes of diagnosis[9] . Ultrasound should be utilized as first line diagnostic technique in any patient with suspicion of Dengue Fever even before results of serological tests are available especially in dengue hemorrhagic fever. Several studies are available in international literature that during any epidemic of dengue, ultrasonographic finding of increased thickness gall bladder wall which may or may not accompanied by poly-serositis in patients with high grade fever suggests the possibility of dengue hemorrhagic fever[10] . We conducted this study which also showed that ultrasound abdomen is very useful for early prediction of the severe form of dengue hemorrhagic fever.

CAPSULE SUMMARY

- Ultrasonographic evidence of Pleural effusion, Gall bladder wall thickening, mild to moderate ascites and Spleenomegaly are useful indicators of assessing of severe dengue fever.

MATERIALS AND METHODS

We conducted this prospective study in Fauji Foundation Hospital for a period of 4 months from August to November 2022. All patients between the age of 20 to 50 years admitted in medical ward with history of fever and suspected case of dengue fever on basis of presenting complaints and laboratory were considered for inclusion in study on basis of convenient sampling. Patients below and above this age range were excluded from study due to multiple other reasons of fever and co-morbid diseases. Initially data of 85 cases was taken for the study out of which 5 patients lost follow due to some reasons. Suspected patients were being investigated with blood complete picture, LFTs, chest X-Ray and renal function tests. All patients investigated for study were confirmed for Dengue with Dengue NS1 antigen and IgG, IgM antibodies. Moreover another confirmatory test named Hess capillary resistance test or Tourniquet test was performed around the upper arm by placing the sphygmomanometer cuff and inflating the pressure halfway from diastolic to systolic blood pressure for about 5 minutes. If there is appearance of more than 20 petechiae over an area of 1 square inch over the flexor area of forearm, the test was considered positive. This technique is considered is a very cheap and rapid screening test in patients with suspicion of Dengue fever.

All patients included in study had ultrasonography of abdomen & thorax done by consultant radiologist within 5 days of start of signs and symptoms leading to diagnosis of dengue fever. Ultrasonography of abdomen and chest with empty stomach was performed for better visualization of the gall bladder wall thickening, peri-cholecystic fluid collection and for presence of any calculi. Liver and spleen size was assessed along with presence or absence and quantification of ascites. Ultrasound thorax was also performed in sitting or supine position for evaluation of assessment of pleural spaces on both sides for pleural effusion.

RESULTS

On basis of clinical, laboratory features and ultrasonographic findings within 5 days of onset of fever, data of 80 cases was analyzed in our study. On basis of revised WHO Dengue case Classification done in 2011, 33 patients (41%) had non-severe dengue without any warning sign, 17 patients (21%) had non-severe dengue with some warning sign & 30 patients (38%) had worse form of symptoms of dengue fever. Seventy six cases (95%) completely recovered & 4 cases (5%) died. Out of 80 patients seen, 28 cases (35%) were from the ages of 20-30 years, 42 cases (53%) were between 30-40 years and 10 cases (12%) were between 40-50 years of age. In our study population 66% patients were male & 34% were of female gender. Male gender was more likely to be affected in comparison to female (ratio of 3:1), probably due to the fact that they are most of times working outside in our culture and are exposed more to mosquitoes especially in evening. In our study 98% of patients were having fever as most common symptom of the disease, severe bodyaches and myalgias were found in 60% of patients, vomiting in 80% of and skin rash was found in 21% of patients. Eye symptoms in the form of retro-orbital pain were found in 32% of cases, congestion of eyes in 75% cases, of patients. Among other variables a positive tourniquet test found 60%, petechiae were present in 40%, low blood pressure in 42% cases, shortness of breath in 24% of patients, oedema in 10%, jaundice in 5% & enlarged lymph nodes were found in 2% of patients.

In our study Dengue NS1 antigen was positive in 52 cases (65%), IgM seen positive in 42 cases (53.5%) & IgG seen positive in 12 cases (15%). Chest X ray PA view done on all cases shoed pleural effusion in 7 patients while it was normal in rest of patients. Ultrasound abdomen and chest was performed on all patients included in study within first 7 days of start of febrile illness and among the most common finding was thickening of gall bladder wall found in 66 cases (82.5%), enlarged liver in 49 cases (61%), ascites in 35 cases (44%), pleural fluid in 37 cases (46%), peri-cholecystic edema in 15 cases (19%) & enlarged spleen in 11 cases (14%). Patients with most common age group in our study were of 30-40 years of age. Ultrasound findings regarding severity of clinical findings also co-related with platelet count as shown in Table 1

DISCUSSION

Dengue fever has become globally one of most deadly

Table 1: Correlation of Ultrasonographic finding with platelet count

USG features	Platelet Count (per µl) - number (%)			Total Patients	P value
	<30000	30000 – 60000	60000 - 120000		
Fraction of patients with positive findings	40	23	17	80	
GB wall edema	36	23	7	66	<0.005
Hepatomegaly	30	13	6	49	<0.005
Ascites	25	8	2	35	<0.005
Pleural Effusion	25	9	3	37	<0.005
Pericholicystic Edema	9	4	2	15	<0.005
Spleenomegaly	5	3	3	11	<0.005

infection related health problem. So far many outbreaks have been reported all over the world[11]. As there is no specific medication of this disease, during an epidemic an early diagnosis of this deadly disease is one of the most important steps in management. Our study was carried out in an outbreak of dengue from August to November 2022 for a period of 4 months. Typical cases show an incubation period of 3 to fourteen days, with maximum peak of illness from 5 to 8 days. Some of other associated features are fever with chills, headache, severe back pain and myalgias and eye congestion as with other viral infections. Symptoms of dengue hemorrhagic fever are almost as of the classical form, but in addition to that there are bleeding manifestations depending on the severity of disease[12]. The spectrum of disease is divided into 4 phases[13] . Phase 1 is characterized by fever, constitutional symptoms with a positive tourniquet test. In phase 2 there are spontaneous hemorrhages over skin and gums presenting as petechiae, bruising over skin and gum bleeding or epistaxis. In phase 3 there are symptoms of phase 2 plus circulatory shortage and agitated behavior. Phase 4 is identified as complete circulatory shock with hypotension and low urine output. Moreover among all these phases there is thrombocytopenia with hemo-concentration. Phase 3 and 4 of disease is also termed as Dengue Hemorrhagic Fever.

Ultrasound abdomen is a very useful non-invasive technique for evaluation of patients suffering from severe dengue fever. In a study done in adults with dengue hemorrhagic fever, pleural effusion was seen 53% of patients, edema of gall bladder wall in 43%, and ascites was seen in 15% of cases[14]. In another study done in children with phase 1 and 2 of disease, pleural effusion was seen in 30% of patients, ascites in 34%, edema of gall bladder wall in 32% and swelling and enlargement of pancreas was seen in 14% of patients[15] . Recently an index was devised on basis of finding in ultrasonography that showed a shock predictive value (DHF-SSD). Score in this index range is from 0 to 12, on basis of parameters seen on ultrasound like pleural effusion, Morrison's pouch fluid, thickened gall bladder wall with a cut-off value of 5. Those patients above the value are having more chance for developing dengue hemorrhagic fever[16]. In an article written by Venkata Sai et al[17], ultrasonographic finding of gall bladder wall thickening with or without having poly-serositis in a patient with high grade fever gives high index suspicion of dengue fever. Another study by Joshi et al. done in Indonesia showed fluid collections in the peri-renal, para-renal, hepatic and splenic sub-capsular areas, pleural and pericardial effusions, enlargement of pancreas and hepato-splenomegaly in severe form of dengue fever[18] .

On basis of above studies and results of our study, it is obvious that ultrasound is a very helpful diagnostic modality for assessment of severity of Dengue fever. Although these observations are also seen in many other infections of viral or bacterial origin but on basis of factors like an epidemic, symptoms, signs and laboratory confirmation, cases of dengue fever can easily be identified. Therefore abdominal and chest ultrasound should be used as first line diagnostic technique in cases having high suspicion of Dengue fever even prior to availability of serologic test results for confirmation[19] . One of the limitations of our study was limited number of cases and sample collected from a single hospital although covering a wide geographical area of Rawalpindi and Islamabad. Further research is required to compare and analyze the ultrasound findings in different subsets.

CONCLUSION

Gall bladder wall thickening, mild to moderate ascites and splenomegaly found on ultrasonography are useful indicators of assessing the severity and early detection of complications of severe dengue fever even before the confirmatory serological laboratory results are available.

AUTHORS' CONTRIBUTION

Sumera Mushtaq	Conception and design
Ghulam Murtaza	Analysis and interpretation of data, Drafting the Article
Kiran Fatima	Critical revision
Kumail Kazmi	Acquisition of data
Qurat-Ul-Ain	Drafting the Article
Tassawar Hussain	Critical revision

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ORIGINAL ARTICLE

HEALTH AND LIVING CONDITIONS AFTER FLOOD IN PAKISTAN, 2022; EXPERIENCE OF ONE UNION COUNCIL

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ABSTRACT

Background: Despite being a disaster-prone country Pakistan has a low priority for disaster prevention in budget allocation, poor infrastructure for prevention and lack of training managing a natural calamity. In recent floods, many people lost their lives and shelters, exposing survivors to various diseases.

Objective: To assess the health and living conditions among flood affected union council of district Rajanpur Punjab, Pakistan.

Design: Cross sectional study.

Place and Duration of Study: BMY Health Research Unit, 4 months.

Materials and Methods: A survey was conducted on 12th post flood day in a medical camp in one selected union council of district Rajanpur Punjab, Pakistan. Individuals reaching the camp were included in study, if mentally stable and giving consent for data collection. Questions were asked to see prevalence of various diseases, access to health care and other life facilities. Descriptive analysis was done using SPSS version 20.

Results: Total of 116 individuals arrived in camp and out of them 71 individuals fulfilling criteria gave complete data. Many of them were suffering from acute illnesses including acute diarrheal illness (33.8%), respiratory illness (22.5%) and were coming from faraway distance with delay in treatment due to unavailable services. Almost half participants reported living in open space. Majority (79%) received their full meal only once a day.

Conclusion: Majority of the flood survivors reported poor health conditions with unavailability of timely treatment. Moreover, access to food, shelter, water and sanitation services was limited which highlights the ineffective flood relief services.

Key words: *: Health condition, water and sanitation, shelter, health services*

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INTRODUCTION

In recent years, natural disasters have caused major damage to entire well-being of the people in the world. Of all these disasters, floods have contributed most to the destruction and disruption of routine livelihood. Floods have killed more than 160,000 people around the world and 2.3 billion have already been affected severely in recent past[1]. Various international organisations reported that floods have pushed young children out of their houses on a massive scale, making them prone to several waterborne diseases, limiting their access to health facilities and contaminating the food supplies[2].

It is a common notion that the current situation of floods in Pakistan is generally a combination of mismanagement, widespread corruption and climate change. Various government institutions have at various times failed to measure the scale of floods and do appropriate planning. International communities at different platforms highlighted the fact that Pakistan lacks infrastructure that is resilient to floods[3].

Massive flooding is considered to be a result of global warming. This fact is now being seriously considered locally and internationally. Due to global warming, Pakistan has suffered the most damage as the glaciers have started melting more rapidly and the frequency of rains in the recent years have almost doubled. This increased frequency has led to massive destruction throughout the country. In recent flood since July 2022, many people have lost their valuables and are waiting for help[4]. Most districts of South Punjab, Khyber Pakhtunkhwa and Sindh are majorly affected due to massive rainfall episodes throughout the country[5].United nations have repeatedly given warning for outbreaks of water borne diseases during the floods like malaria, dengue, diarrhoea, scabies etc. A large number of mortalities have occurred while many are suffering from co-morbidities. According to UN children agency, 3.4 million children need immediate lifesaving assistance[6].

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This study has mainly focused on health conditions and life situation in Pakistan after floods 2022 within one union council in South Punjab. The selected union council of district Rajanpur is located in southwestern part of Punjab, to the west of Indus River. This region due to its geographical position close to a river, has been always vulnerable to damage by floods[7]. Floods affect regular livelihood of people, infrastructure gets collapse, crops are destroyed, and fertile agriculture lands are turned into barren land leading to a major economic crisis for the local people as their major source of income has been cultivation of crops. Currently, this region has been damaged to a great extent by the calamity[8]. The common health impacts of flooding are complex, including acute stress, malaria and cholera, depression, anxiety, and posttraumatic stress disorder (PSTD), loss of the existing health system and healthcare delivery services, damage to water and sewage systems and disruption to existing public health care programs[9]. During 2022 flood, health reports were published from areas of Sindh and Baluchistan, showing high number of gastrointestinal, respiratory, skin infections, but provision of treatment and other facilities regarding food, temporary residence and availability of sanitary products were not discussed[10].

CAPSULE SUMMARY

- The health and living conditions of flood survivors were assessed and following points were noted:
  - Overall health was affected.
  - A lack of appropriate preventive and curative services.
  - Food access was limited.
  - Poor access to drinking water, sanitation, and hygiene services.
- In light of the above it is recommended:
  - Funds be allocated from governmental and non-governmental sources prior to floods.
  - Funds to be directed towards training and construction of resilient infrastructures.

This study aims to assess the health and living conditions reflecting the post-disaster relief of survivors in Pakistan flood 2022. This survey will provide information for policy makers and stakeholders on effects of flood on living condition of local people for rehabilitation of people.

METHODOLOGY

This was a descriptive cross-sectional study conducted at BMY Health in a period of four months, starting mid-August to mid-December, in one flood affected union council of district Rajanpur Punjab, Pakistan. For participants selection, purposive sampling method was chosen. After approval from BMY ethics committee (protocol number BMY-ERC-01-2022), data collector team was sent with the medical camp team. A total of 116 subjects were received at a one-day free medical camp on 11th September 2022, which marked the 12th day after the flood. Participants of both genders and all ages were included in study, if they were resident of selected union council who survived flood, having no cognitive dissonance, consciousness disturbance, significant disorder of physical or mental functions. Verbal consent was obtained from each person before obtaining information. A semi-structure proforma in English was used. Questions were asked by data collector in local language Saraiki and responses were recorded on the proforma after translation in English. Variables noted include demographic details, presenting complaints, probable diagnosis, basic services available such as hygiene, safe drinking water, shelter, mosquito control services and food were also recorded in the questionnaire. Data record safety and confidentiality was maintained. Data was entered on SPSS v 20. Frequencies and percentages of variables were calculated.

RESULTS

A total of 116 subjects were received at medical camp on 12th post flood day in one union council in South Punjab in the month of September 2022. Population of area of medical camp was 23 thousand and it was estimated to receive 1000 survivors atleast, with essential medicines available for 500 people. However almost one tenth of the expected number of visitors was reported in camp, showing a lack of coordination in disaster relief services. Visitors of the camp were physically and emotionally disturbed. It took 10 minutes on filling each proforma and there was little difficulty in comprehension and filling the form because of the language gap between the volunteers and the data collectors. Out of 116, 32 patients did not give consent to participate in the research and 14 forms were incomplete, therefore final analysis was performed on 71 forms. Mean age of the participants was 39.13+14.61 with age ranging from 17-88. Among participants 28 (39.4%) were male and 43(60.6%) were females, with majority 47 (66.2%) as married. Among females 6 (13.9%) were pregnant, and 7(16.3) were in menopause. Frequency & percentages of demographic variables are presented in Table 1.

Table 1: Sociodemographic Variables (n=71)

	Variable	Result
Demographic	Age range	17-88 Years
	Male: Female ratio	1:1.5
	Married individuals	47(66.2%)
	Pregnant females	6(13.9%)
	Menopausal women	7(16.3%)
	Non-menopausal/ non-pregnant women	30(69.7%)
Education	Uneducated	26(36.6%)
	Primary	21(29.6%)
	Middle	2(2.8%)
	Secondary	13(18.3%)
	Higher Secondary & Above	9(12.7%)

I. Health Conditions

Majority of the individuals attending camp came for treatment of acute illnesses (91.5%) and most of them reported coming from faraway places (69%). Pregnant women were facing extreme difficulties in getting their antenatal monitoring. No laboratory investigations could be carried out. Frequency & percentages of health & health related services are presented in Table 2.

Table 2: Health condition on arriving camp (n=71)

Services	Response	Count (Percentage)
Purpose of visit	Acute Illness symptoms	65(91.5%)
	Routine Visit (antenatal)	6 (8.5%)
Distance from Heath care facility	Far	49 (69%)
	Near	22 (31%)
Delay in seeking healthcare services	Yes	68(95.8%)
Reason for delay	Family Restriction	3(4.41%)
	Non-availability of services	65(95.5%)
Duration of symptoms	< 3 days	48(67.6%)
	3 to 6 days	15(21.1%)
	>6 days	8(11.3%)
Types of symptoms (presenting complaints)	Diarrheas	25(35.2%)
	Abdominal Pain	17(23.9%)
	Vomiting	23(32.4%)
	Red eye	3(4.2%)
	Skin lesions	2(2.8%)
	Increased urinary frequency	3(4.2%)
	Burning Micturition	2(2.8%)
	Sore Throat	1(1.4%)
	Cough	9(12.7%)
	Headache	18(25.4%)
	Fever	39(54.9%)
	Vaginal Itching	2(2.8%)

Upon examination, individuals were found to have different illnesses. Out of these 35, 24(33.8%) were diagnosed as a case of acute diarrhea and 11(15.4%) as gastritis. Other prevalent infections included malaria in 14(19.7%), respiratory infections in 16(22.5%) and 10(14.1%) were suffering from dengue, refer to figure 1.

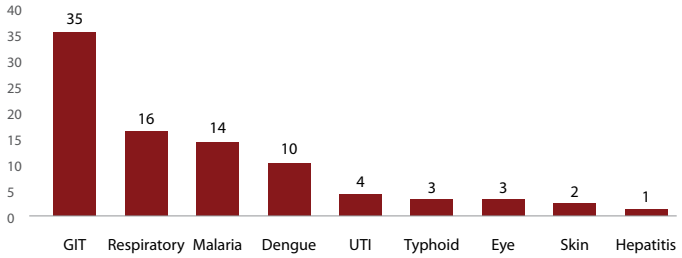

Figure 1: Probable Diagnosis for type of infections (n=71)

II. Basic Life Necessities

Among respondents only half of the flood survivors 34(47.9%) were living under some shelter like tent, building or house as shown in figure2.

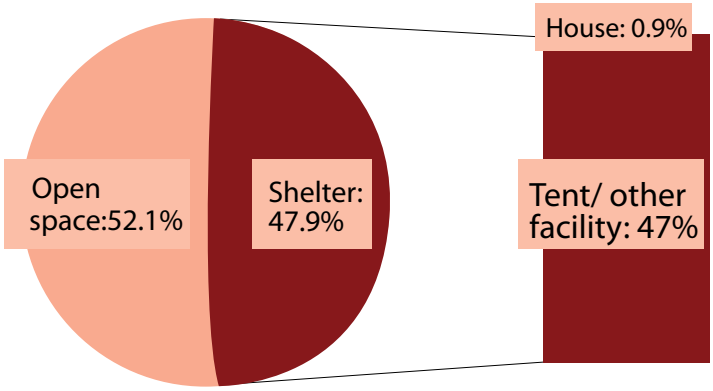

Figure 2: Type of living arrangement (n=71)

Those living in tent reported sharing room with >4 persons. Out of 31 persons using tent, 11 were sharing room with 4-6 persons, 19 were sharing with 7-10 persons while 1 was living with >10 persons in a room.

Water need was fulfilled by only 2 (2.8%) individuals. Only 1(1.4%) subject reported site cleanliness by garbage collection and others reported unclean living space. Stagnant water in surroundings was reported by 27(38%). Toilet facility was mostly available outdoors for 67 (94.3%) individuals. Bathing facility was available for only 14 (19.7%) people.

Regarding food 56 (78.9%) subjects mentioned that they received full meal once daily whereas 15(21.1%) mentioned they received twice daily. All of them reported that they received carbohydrates in some form, some received proteins and fruits, but none consumed nuts.

When subjects were asked about overall satisfaction with provision of the services 1(1.4%) were partially satisfied, 17(23.9%) were satisfied, 42(59.2%) were partially dissatisfied & 11(15.5%) were totally dissatisfied.

Table 3: WASH (Water, Sanitation and Hygiene Services) status (n=71)

Service	**Type**	Need fulfilled (n)	Unmet need (n)	**Total (n%)**
Drinking Water		Enough amount	Not enough	
	Bottled water	**2**	**22**	24 (33.8%)
	Boiled water	**0**	**1**	1 (1.4%)
	Other sources	**2**	**44**	46 (64.7%)
		Proper facility	No proper facility	
Toilet facility	**Indoor**	**4**	**0**	4 (5.6%)
	Outdoor	**24**	**43**	67 (94.3%)
		Cleanliness maintained	No cleanliness maintained	
Waste management facility	Routine Garbage collection	**1**	1	2 (2.8%)
	No Garbage collection	**0**	**69**	69 (97%)
	Clearance of stagnant water	**1**	43	44 (62%)
	No clearance of water	**0**	27	27 (38%)

Table 4: Availability of Necessary Commodities (n=71, for sanitary pads n=43)

Variables		n (%)
Meal frequency	Once	56
	Twice	15
Food sources	Carbohydrates (Roti, chawal, Dalia, etc.)	71
	Proteins (chicken, mutton, beef, egg)	7 (9.9%)
	Fruits	1(1.4%)
	Vegetables	38(53.5%)
	Milk	20(28.2%)
	Nuts	0
Mosquito Prevention services	Nets	3(4.2%)
	Mosquito coils/ lamps	10(14.1%)
	Mosquito repellent lotions	15(21.1%)
Sanitary pads	Need fulfilled	0
	Unmet need	30
	Not applicable	13

DISCUSSION

This study aimed to assess the health conditions and living situation after floods of 2022 in Pakistan. The survey was conducted in a flood affected union council of district Rajanpur Punjab, Pakistan. This study included both males and females. Among respondents 47.9% were living in some form of shelter like tent, building or house and 52.1% were living in open space. Clean site was reported scarcely. Majority (95.8%) of respondents were delayed in seeking medical attention. Stagnant water in surroundings was reported by many. Regarding food subjects mentioned that they received full meal once daily whereas some mentioned they received twice daily. All of them reported that they received carbohydrates in some form. Some received proteins (animal sources), few consumed fruit, vegetables, and milk but no one consumed nuts.

The survey also showed that most of the flood survivors were suffering from acute diarrheal illness (33.8%) due to questionable sanitation and hygiene. The frequency of infectious disease was almost similar in floods of 2011, August in Rajanpur, Punjab with 30% gastrointestinal infections, respiratory tract infection (21%), eye infections (7%), malaria (4%), ENT infections (5%) and skin infection (33%)[11]. However, in 2011 study of the same district, skin infections were far more frequent (33%) as compared to 2022 study (2.8%). Difference maybe because of different timing of floods, and lower sample size in present study. Usually, acute diarrheal diseases remain prevalent in the flood prone areas even after months. Floods leave immediate and long-lasting effects on health[1]. Acute respiratory infections (25%) were also reported as many people were living in closed spaces at the same time. As big percentage of our respondents were sharing closed space, they can be considered three times prone to transmission of respiratory tract infections. The risk of spread of respiratory infections depends on multiple factors such as time of exposure, number of people in same space, and intensity of mixing[12].

Skin and eye infections such as conjunctivitis, red eye and skin lesions of different etiologies were frequently caused by direct contact with contaminated water. Due to unavailability of proper toilet facilities, several cases of urinary tract infections were received. Availability of clean water was an issue leading to improper personal hygiene. Only 33.8% of respondents were getting bottled water while only 1% used boil water. 14.1% respondents were using mosquito coils and 21.1% were using repellents as a prevention to mosquito borne diseases. Only 4.2% had access to mosquito nets. These measures are somehow effective in combating infections[13]. Similar study in recent flood showed stagnant water, and lack of facilities leading to the risk of malaria, dengue, and other water-borne disease epidemics[14].

Pakistan has been blessed by immense amount of water resources which are especially tributaries of Indus River. Northern parts of the province receive good amount of rainfall throughout the year, while southern part mostly relies on monsoon rainfall (July to August) that enhance the crop capacity of these areas and can have torrential rains[15]. Due to poor planning and mitigation strategies, a large population is always at risk for floods[9-16]. To assess the vulnerability, a household study was conducted in Pakistan which showed 95% of population did not have any access to any emergency plans or awareness regarding measures in case of flood. Nearly half of population did not receive any warning signs due to official negligence[17]. Individuals approached in our survey were emotionally disturbed and only 71 gave data. Out of these 71, mostly were not satisfied with the relief services and expressed lack of attention by government authorities. This endorses what has been reported by many reporters including surveyors of district Rajanpur where flood victims kept calling for help[18].

This study has managed to overcome the scarcity of quantitative data to identify issues of flood survivors for future disaster planning. The problems faced by the individuals were thoroughly inquired. This article however doesn't highlight those people who couldn't reach medical camp on that specific day when the research was conducted. Due to this, the factual results of the research might not be generalizable over all district. Moreover, as a result of inability to access, incapacitated patients suffering from major diseases might have gone unrecorded on that day at the medical camp. Another weakness of this article is that it was mainly a one-time study. A lot of cases might have not been reported to the camp due to lack of access and awareness about the camp. Also, the number of respondents were limited. Due to limited resources study was conducted at only one union council. Situations of different union councils that are affected from flood can vary according to the availability of facilities, management and according to community response.

CONCLUSION AND RECOMMENDATIONS

This study showed that health of flood survivors was badly affected and the lack of appropriate preventive and curative services added up to the misery of affected. Food access was limited and there was poor access to drinking water, sanitation and hygiene services for majority of the people.

To break the cycle of disaster, respond, recovery, and relief, we need funds for the preparation and planning before disaster. Government should allocate the funds before disaster so that the effects of disaster can be minimized by directing these resources towards training of the people and resilient infrastructures that will not only save lives and disabilities but will also reduce the expenditure on rescue and relief. Although Pakistan is a disaster prone country but unfortunately no funds were allocated to natural calamities in financial plan for the fiscal year 2022-23 but after the flood, 5 billion Rs. were granted for National Disaster Management Authority (NDMA) for rescue, relief and compensation for death and injuries to affectees of the floods. Funding for disaster risk reduction can be enhanced by aligning public and private, domestic and international investment with national and local disaster risk reduction strategies.

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AUTHORS' CONTRIBUTION

Nafeesa Naveed	Conception and design, Drafting the Article
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Musa Nadeem	Drafting the Article
Dr.Fariha Salman	Conception and design, Analysis and interpretation of data, Drafting the Article, Critical revision
Dr.Faiza Raheem Paracha	Acquisition of data
Dr.Hamna Khan	Drafting the Article, Critical revision

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ORIGINAL ARTICLE

ACCURACY OF CEPHALOMETRIC IMAGES ACQUIRED WITH ANDROID SCANNER APPLICATIONS

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ABSTRACT

Objective: The aim of this study was to compare the ability of two scanner applications for capturing the image of the lateral cephalogram films with dimensional accuracy.

Design: Cross sectional study.

Place and Duration of Study: Department of Orthodontics, Rehman College of Dentistry, Peshawar and one year.

Materials and Methods: Thirty lateral cephalogram radiographic films were scanned with two cell phone applications, Camscanner™ and Office Lens™, and were compared with original digital images. The images were imported into Viewbox 4.0™ for common variables of cephalometric analysis. All the images were calibrated digitally, the original cephalometric film scan was considered as gold standard. Repeated measures ANOVA was used to identify any differences between the groups.

Results: No significant differences were found between the original image and scanned images. Camscanner™ performed slightly better in linear measurements while in angular measurements both were found equally accurate.

Conclusion: Both CamScanner™ and Office Lens™ produced accurate image capture of lateral cephalogram and can safely be used for cephalometric scanning.

Key words: *Cephalometry, Scanner Apps, Android Apps*

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INTRODUCTION

Lateral cephalogram is a commonly used radiograph in orthodontics for the purpose of evaluation of different anatomical structures of human skull[1,2]. These include skeletal, dental and soft tissue structures, and are evaluated in relation to each other by means of angular and linear measures on cephalometric tracings. Cephalometric analysis is important in dentistry and orthodontics for diagnosis, orthodontic and orthognathic surgical treatment planning, treatment evaluation and record keeping[3-5]. Mostly this analysis has been performed on manual cephalometric films and hand tracing of the structures. This method is time-consuming for practitioners, there is always a chance of misreading the measuring instruments, and extra storage space is needed to store radiographs and it is difficult to save and retrieve data[1,6,7].

When compared to more conventional cephalometric techniques, digital cephalograms provide a number of benefits[1,4,7-9]. Digital images require less physical space to store, fewer employees to manage the storage, and are simpler to organize than analogue images. It can be easily shared and transferred for discussion purposes. The errors related with measurements (measuring instruments and personal errors) are reduced since the calculations are done automatically in dedicated softwares. Moreover the images can be manipulated (for visualization enhancement) in terms of contrast and brightness and thus the landmark identifications can be made easier[7,10-13].

Several methods exist to digitize the manually obtained films. These include flatbed transparency scanning and photography[9,14,15]. Both methods have been shown to have good accuracy of cephalometric analysis, especially the angular analysis. With the advent of smartphone apps for acquisition of documents, it is logical to be curious about the accuracy of these apps in acquiring the cephalometric image from the manual films [1-3].

Whichever method is used for the acquisition of the cephalometric films, it should be accurate, reliable, economical, safe and reproducible[4-6]. The widespread availability of smartphones and the ease and efficiency with which they can take photographs make them an attractive alternative[1,7]. Moreover, the recently introduced "scanner" apps can potentially reduce the distortions associated with photographing as there are options such as zooming for accurate marking of the corners of the cephalometric image. These apps then automatically correct the image for viewing [1,8,9].

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Recently, many smart phone applications (apps) have been introduced for scanning documents. There is a potential for their use in dentistry for speedy scanning radiographs and digitizing those radiographs on screen. Few Indian studies were found regarding similar apps however no study to our knowledge was done in our country[10,11]. In clinical orthodontics the efficacy of scanner applications needs to be tested before bringing them into routine use. Hence, this study's aim was to compare the ability of two scanner apps to capture dimensionally accurate images of lateral cephalogram films. The null hypothesis was that there was no difference in the measurements between the original image and the images acquired with the apps.

MATERIAL AND METHODS

This study was conducted at the department of Orthodontics, Rehman College of Dentistry, Peshawar, Pakistan.It was a cross-sectional study. Ethical approval was granted by the ethical committee of the RCD. Data collection was done between 1st Nov 2018 and 1st Dec 2018 by convenient sampling technique. Pre-treatment lateral cephalograms radiographic films were randomly collected from the patient files. The images and films with reasonable clarity, brightness and contrast were included in the study. Cephalograms with multiple missing teeth, artefacts obscuring the identification of important landmarks and other structural abnormalities were excluded. Each radiograph was acquired directly via a digital cephalometric machine (CS 8100, Care Stream dental).

A hard film printed at 1:1 ratio of the same radiograph was then scanned by using two scanner applications from an android cell phone (Samsung Galaxy S4) i.e. CamScanner (INTSIG information) and Office Lens (Microsoft corporation). Distance of about 12 inches was maintained from the film for accurate scanning, with the cellphone camera roughly over the center of the film. The edges of the captured image were then adjusted if needed with the edge identification tools. Images acquired were then stored in joint photographic experts' group (JPEG) format (2048x1536 pixels). The scanned images were then imported into Viewbox™ 4.0 (Dhal Software, Italy). All the images were calibrated digitally using the nasion pointer graduation scale (Fig.1). Landmarks were identified and 6 linear and 10 angular measurements from common analysis were taken (Table 1). The landmarks were digitized and analyzed in Viewbox software.

All analyses were carried out using SPSS Software version 22.0. Shapiro wilk test demonstrated the normality of the collected numeric data. Repeated measures analysis of variance was used to identify any differences between the groups using SPSS software. The level of significance was set at $p \leq 0.05$. Clinical significance was set at 2 degrees / mm or more difference between the methods. The data obtained from 3 groups, Original, Camscanner and Office Lens, were compared and tabulated.

Figure 1

CAPSULE SUMMARY

- Scanner apps are a convenient way of digitizing manual cephalometric films
- The images obtained from two scanner apps (Camscanner™ and Office Lens™) were evaluated for linear and angular measurements accuracy
- Both scanner apps demonstrated the same accuracy for linear and angular measurements.

RESULTS

Descriptive statistics are given in Table 2. Number of females in the sample were more (64%) than males (36%).

Means and standard deviations of angular measurements via the three modalities are given in Table 3. The original image values were slightly smaller than the scanned images values but no statistically significant differences were seen in any of the ten angular measurements ($p>0.05$).

Means and standard deviations for the linear measurements are shown in Table 4. There are six linear measurements. Camscanner performed slightly better in linear measurements, but the difference was not statistically significant ($p> 0.05$).

Excellent Reliability was observed for all measurements ($r\geq0.8$) (Figure 2, Figure 3, Figure 4)

DISCUSSION

In this study 30 lateral cephalograms were scanned with two android softwares, CamScanner and Office lens. The original radiograph along with scanned images were analyzed via a software Viewbox for 10 angular and 6 linear measurements. We found no statistically or clinically significant differences among the images.

Table 1: List of angular and linear measurements used in the study.

ANGULAR MEASUREMENTS	LINEAR MEASUREMENTS
SNA: Angle between cranial base 'SN' to point A	Wits: Point A and point B distance perpendicular on occlusal plane
SNB: Angle between cranial base to point B	LAFH: Distance between subnasale to menton
ANB: Angle between Nasion point A line to Nasion point B line	OB: Amount of upper incisors overlap on lower incisors
SNMP: Angle between cranial base to mandibular plane	OJ: Horizontal distance between lower incisor labial surface to upper incisal edge
SNPP: Angle between cranial base to palatal plane	LL-E: Lower lip to E-Line Distance
PPMP: Palatal plane to mandibular plane Angle	UL-E: Upper lip to E-Line Distance
IMPA: Lower incisors to mandibular plane angle	
UIPP: Upper incisors to palatal plane angle	
UISN: Upper incisors to cranial base angle	
NLA: Nasolabial angle	

Table 2: Descriptive statistics

GROUP	GENDER		TOTAL
	Males (36%)	Females (64%)	
Original	11	19	30
Cam Scanner	11	19	30
Office Lens	11	19	30
Total	33	57	90

Table 3: Means and standard deviations for angular measurements

Variables	Original image		Office lens		Cam scanner		P value
	Mean (°)	SD (°)	Mean (°)	SD (°)	Mean (°)	SD (°)	
SNA	80.7	4.0	81.4	4.4	80.9	4.8	.482
SNB	77.2	4.6	77.7	4.4	77.4	4.5	.488
ANB	3.4	3.7	3.6	4.0	3.5	3.8	.626
SNMP	32.9	7.4	33.7	7.9	34.3	7.7	.972
SNPP	7.0	3.3	7.5	2.7	7.6	3.0	.981
PPMP	25.9	7.0	26.2	7.5	26.7	7.4	.503
IMPA	97.4	8.1	96.3	8.7	95.8	8.4	.393
UIPP	114.7	9.7	117.2	8.1	116.7	7.9	.770
UISN	107.7	9.5	109.6	8.3	109.0	8.3	.918
NLA	101.7	12.7	101.2	13.6	100.2	12.4	.597

Table 4: Means and standard deviations for linear measurements

Variables	Original image		Office lens		Cam scanner		P value
	Mean (°)	SD (°)	Mean (°)	SD (°)	Mean (°)	SD (°)	
Wits	1.6	5.2	1.2	5.0	1.9	5.0	.824
LAFH	65.8	9.9	65.6	8.2	64.7	8.1	.522
OB	1.0	2.5	0.89	2.6	0.9	2.5	.592
OJ	5.4	3.7	5.8	3.9	5.6	3.9	.775
LL-E	-1.54	3.1	-1.8	3.3	-1.4	3.4	.513
UL-E	-4.0	2.6	-4.6	2.8	-4.1	2.7	.431

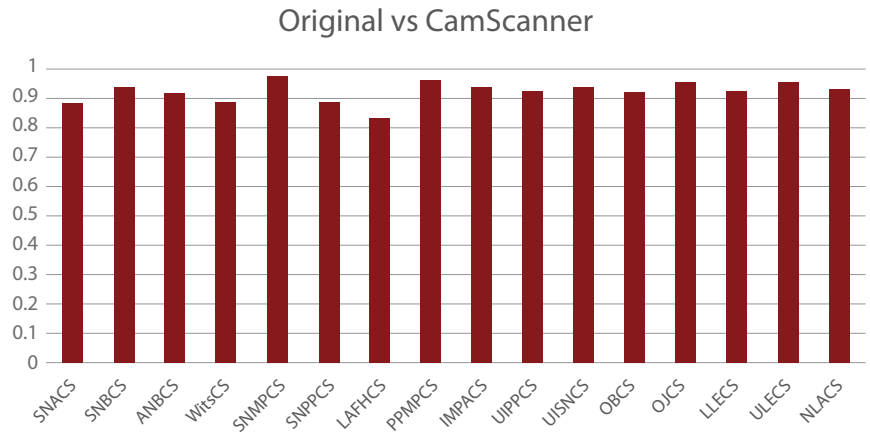

Figure 2

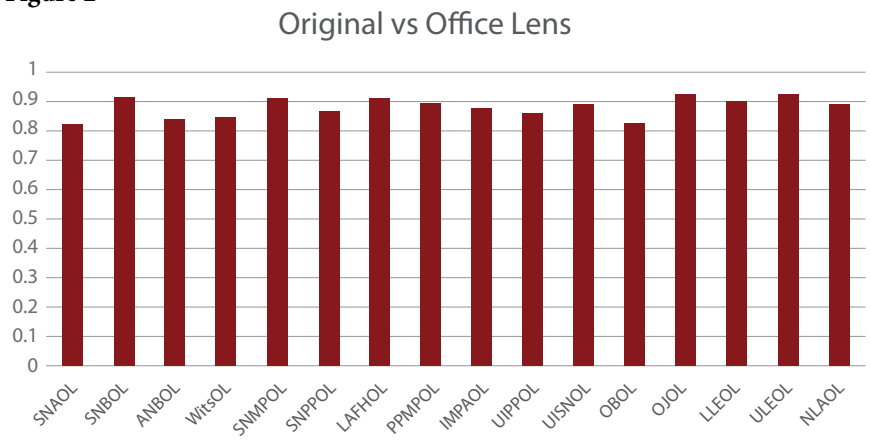

Figure 3

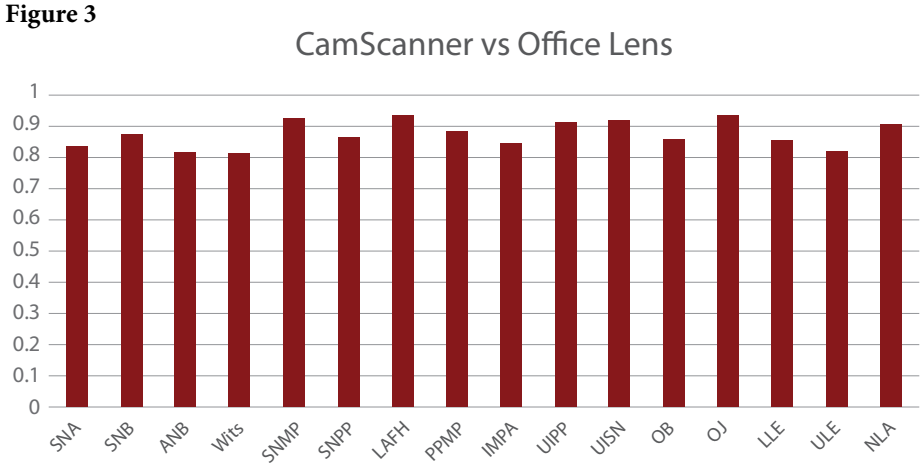

Figure 4

The accuracy of cephalometric analysis depends upon the correct landmark identification, tracing, measurement, and magnification[4,12]. All these factors are in turn a function of clear and visible anatomical landmarks on radiographs. If there is some distortion of the image during acquisition, the landmark position can be affected and hence the resulting analysis may be inaccurate. The experience of the operator also affects the correct recording of the landmarks[13]. The operator in this study had 4 years' experience in cephalometric tracing and analysis.

Many similar studies comparing the manual and digital cephalometric analysis have used fiducial landmarks for standardized linear and angular measurements for the accuracy, along with the cephalometric angles and distances [4,6,14]. We chose to test only the cephalometric measurements because previous such studies have found excellent correlations of these analysis with fiducial landmarks [6,14,15]. We set the clinical significance at 2 point difference (mm or degrees) or more. It is reasonable to assume that at least this much difference is required for labeling cephalometric reading different.

It is important to test the linear and angular measurements

separately to definitively assess the amount of distortion and magnification that can occur during the scanning process. Studies using flatbed scanner with transparency adapter reported little or no distortion and hence accurate linear and angular measurements [6,16]. Akshay Mohan et al also compared digital cephalograms taken with OneCeph mobile app with manual cephalograms and found no statistical significant difference in the analysis. They also brought into notice the use of such apps in rural areas for starting timely orthodontic treatment[11] . since it is an era of artificial intelligence and many researchers compared traditional manual cephalometry with fully automated intelligence and found a good correlation in between the two , suggesting the reliable use of them interchangeably [17]. In contrast Collins et al reported limited accuracy for linear measurements with photographed lateral cephalograms[14].

While there are many scanner apps which could perform this function, we chose the most common ones for this study. The scanner apps can be found on both android and iOS platforms; however, we used the android apps. There is no reason to assume that there would be any difference in the apps in iOS.

The gold standard in this study was taken as the original acquired digital image digitized with Viewbox software. There are other softwares available, however Viewbox has been shown to be accurate and reliable in almost all situations [8,18,19].

None of the differences with linear or angular measurements were statistically or clinically significant. This is in accordance with previous studies which were done on different modalities such as photographed, scanned and digitized cephalograms[4,5,14,16]. However, it must be noted that since these apps have not been tested before for this purpose, direct comparisons could not be made with the results of the above mentioned studies. The ability of these apps to minimize the distortion errors most probably account for the better performance of these images in comparison to simply photographed images.

As for the reliability, Fleiss et al[20] noted that a correlation coefficient of 0.75 or more indicates excellent reliability of measurements. In our study, all coefficients were more than or equal to 0.80, indicating excellent reliability.

Digital images are superior to manual films in many ways. The image is obtained is clear, and contrast, brightness and other image parameters can be adjusted for better visualization[14]. Archiving and sharing images is easier, and on screen digitization can efficiently perform required analysis. These advantages prompt for conversion of the previously taken manual cephalometric radiographic films into digital films[4,14,19]. Scanner apps seem to be a reasonably fast and accurate method to achieve this objective.

LIMITATIONS

Our study had several limitations. We did not assess the interrater reliability of measurements. Only one software was used for digital analysis and only two apps were compared. Future studies can focus on increasing the number of scanning apps and multiple measurements for assessing the reliability of the data.

CONCLUSION

Both Office Lens and CamScanner accurately scanned the cephalograms with minimal distortions

Angular and linear measurements were comparable to the original analysis with both scanner apps.

Scanner apps can safely be used for cephalometric image capture, and subsequent digital cephalometric analysis.

AUTHORS' CONTRIBUTION

Rehana Fayyaz	Acquisition of data, Analysis and interpretation of data, Drafting the Article
Sohrab Shaheed	Conception and design, Analysis and interpretation of data, Critical revision

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ORIGINAL ARTICLE

SELF-ASSESSMENT OF CRITICAL THINKING AND ACTIVE LEARNING IN UNDERGRADUATE DENTAL STUDENTS USING FLIPPED CLASSROOM TECHNIQUE AND JOURNAL CLUBS

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ABSTRACT

Objective: To self-assess critical thinking and active learning using techniques of flipped classroom and journal club among undergraduate dental students of Dental College HITEC-IMS.

Design: Cross-sectional descriptive study.

Place and Duration of Study: Dental College HITEC-IMS, 06 months.

Materials and Methods: Study participants included first year students. Flipped classroom strategy was adopted for pre-decided topics in classes of physiology and journal clubs were also introduced in all these sessions. Students discussed and presented the topics given to them in the form of power point presentations which were judged by the faculty. Students evaluated their critical thinking and active learning at the beginning and conclusion of the study using a validated questionnaire. The data was analyzed using frequencies/percentages and comparison was done (pre and post test) to see improvement in active learning and critical thinking using SPSS. The paired student t test was used for the pre- and post-testing, and a p-value of 0.05 was regarded as statistically significant.

Results: A total of 46 students with mean age(years) 19 ± 1 participated, out of which 14% were males and 86% were females. A 14-item questionnaire showed an improvement in active learning by setting learning objectives (80%) and utilizing multiple learning strategies (87%). Comprehension of discussion and self-directed learning improved to 87%. Critical thinking improved with hypothesis generation along with group performance (87%) and analyzation of knowledge using concepts (85%). Reflection on action improved learning to 80% in our settings. The mean values for pre-test and post-test samples were 2.5 ± 0.35 and 2.7± 0.43 respectively. Using a paired student t test, results with a p value of 0.03 were found to be statistically significant.

Conclusion: The results of our study reveal that combining journal club and flipped classroom techniques strengths the evidence-based inquiry among undergraduate dental students, enhances their critical thinking and active learning. We recommend to incorporate these teaching learning strategies as permanent part of the curriculum.

Key words: *active learning, critical thinking, journal club, flipped classroom*

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INTRODUCTION

In the modern era of evolving medical education, novel teaching and learning strategies have been adopted worldwide. The millennial learners are moving at a fast pace and no longer relish the old, boring and traditional teaching styles incorporating the lectures[1]. Teaching strategies are now molded so that the complex subjects under the tree of health sciences can be delivered with ease and effectiveness. As evident from research and experience, traditional didactic lectures do not assist students to acquire cognitive skills and active learning abilities that are essential for educating future health professionals. Students prefer interactive learning strategies to improve their overall performance[2]. Many of the institutions are now shifting from traditional didactic to interactive pedagogies[3]. Because of the recent COVID-19 pandemic, teaching approaches have been transformed, thanks to virtual classrooms. In the similar context, flipped classroom and journal clubs have gained immense appreciation for incorporating active learning and critical thinking abilities[4,5]. The teaching methods employed in Pakistan's medical education sector are antiquated. Poor curriculum design and a lack of research has exacerbated the problem[6].

Flipped classroom is innovative interactive learning technique that improves cognitive learning instead of passive learning. This technique helps the students learn at their own pace and self-assess their active learning in phases. Active learning can also be imparted through journals clubs for practical understanding of the topic especially in healthcare professions.

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Journal clubs help in improvement of knowledge, presentation skills, critical thinking and self-directed learning process. It also promotes a positive attitude of students towards research at undergraduate level[7].

Despite the fact that medical education is evolving at a fast pace, many institutions across Pakistan still lacks the instructional techniques to keep up with these developments[8]. More importantly, many institutions are only beginning to implement innovative teaching methods. Tech-savvy students of current generation must be introduced to these novel concepts and learning pedagogies in order to keep up with the World Health Organization's list of "Five Star Physicians'" essential competencies. Therefore, we have implemented the flipped classroom and journal club technique to assess their active learning and critical thinking using Self-Assessment Scale on Active Learning and Critical Thinking (SSACT).

CAPSULE SUMMARY

Combination of journal clubs and the flipped classroom teaching method as teaching-learning techniques in undergraduate dental program improved the learning and cognitive capacities of the students making them more critical thinkers and active learners.

METHODOLOGY

Over a 6-month period, a cross-sectional descriptive study was conducted on the first-year BDS students at Dental College HITEC-IMS. The Institutional Review Board (IRB) of the Dental College HITEC-IMS, Taxila granted ethical approval. All 1st year BDS students (n=46) participated in this study.

The study was conducted during Physiology sessions. The two sessions were implemented in the 1st block which spanned over the period of three months. Traditional system of curriculum is followed at dental college HITEC-IMS. The important topics selected for these sessions were related to the content delivered i.e., myasthenia gravis and vitamin B12 deficiency. The sub topics included were; causes, signs and symptoms, pathophysiology, lab investigations, treatment and critical analysis of the article. The students were informed of the learning objectives a week before the session. They were given pre-reading material in the form of lecture notes, videos and journal club articles which were uploaded on the google classroom. The faculty guided the students for preparing these sessions. The students were split into five groups of ten students each. Each group was given a different topic to prepare. On the day, the students came prepared with the material provided to them. They discussed the topic with particular emphasis on active learning and critical thinking process followed by PowerPoint presentations on the next day. The group presenters were selected randomly.

Each group was given a time of 15 minutes to present their topic which was followed by question-and-answer session among students and faculty. These presentations were judged by a senior faculty panel consisting of 6 members. The Judgment criteria was adopted from University of Texas, School of Undergraduate Studies available on their website [9].

DATA AND STATYSTICAL ANALYSIS

After obtaining informed consent, questionnaires were provided to the students at the start of the study (pre-test) and after completion of two sessions (post-test). The students filled Self-Assessment Scale on Active Learning and Critical Thinking (SSACT) [10] questionnaire under the direct supervision of one of the co-authors to self-assess the improvement in active learning and enhanced critical thinking. The questionnaire consisted of 14 items related to active learning and critical thinking. The 5-point Likert scale was converted to a 3-point Likert scale for ease of data analyses [11]. The responses were classified as 1 = strongly disagree, 2 = neutral and 3 = strongly agree. Data was analyzed using SPSS version 26. The frequency and percentage-based quantitative data were analyzed using descriptive statistics. Pre and post sample testing was done using paired sample statistics where mean values are given as mean ± SD and statistical significance for the paired student t test was set at p 0.05.

RESULTS

A student cohort of (n=46) participated in study. The age range of Students was from 18-21 years with average of 19 (14% males and 86% females) and they belonged to similar demographic background i.e., Punjab. The Results of the two components are:

1. Active learning: It was easy for the students to comprehend the summary of the discussion after the intervention which was 76% initially and increased to 87%, shown in table 1. Results of post-test showed that 80.4% of students were now able to set their own learning objectives during these sessions efficiently, when compared to the start of the study 58.7%. Improvement seen in management of independent study and team work was 67.4% post-test. The reflection of learning process improved from 67.4% to 80.4% pre and post-test respectively. The majority of students agreed that they could study independently using various forms of the flipped classroom and journal club technique, however, there was no noticeable statistical difference between the pre- and post-testing periods. (table 1).

2. Critical thinking: The most notable finding was improvement in group performance from 76.1% in pre-test to 87% in post-test shown in table 1. A marked improvement of thirty percent was seen in hypothesis generation by the students while discussing any problem. In subsequent sessions, the application of previous knowledge from independent study and analyzation of knowledge utilizing ideas showed considerable improvement from 69% to 84%. Students were able to formulate scenario-based questions which improved from 63% to 76.1% before and

Table 1: Frequencies and Percentages on SSACT scales along with areas identified for both sessions.

Areas identified		Frequencies					
		Pre-test			Post-test		
		Strongly agree	Neutral	Strongly disagree	Strongly agree	Neutral	Strongly disagree
Self-Assessment response on scale of Active Learning							
1.	Setting my own learning objectives	27 (58.7%)	14 (30.4%)	5 (10.9%)	37 (80.4%)	5 (10.9%)	4 (8.7%)
2.	Utilizing multiple learning strategies for independent learning	40 (87.0%)	2 (4.3%)	4 (8.7%)	40 (87.0%)	4 (8.7%)	2 (4.3%)
3.	Comprehending the summary of discussion	35 (76.1%)	8 (17.4%)	3 (6.5%)	40 (87.0%)	5 (10.9%)	1 (2.2%)
4.	Effective management of independent study	26 (56.5%)	11 (23.9%)	9 (19.6%)	31 (67.4%)	10 (21.7%)	5 (10.9%)
5.	Enhance team work	16 (34.8%)	22 (47.8%)	8 (17.4%)	31 (67.4%)	11 (23.9%)	4 (8.7%)
6.	Reflection of my learning process	31 (67.4%)	11 (23.9%)	4 (8.7%)	37 (80.4%)	8 (17.4%)	1 (2.2%)
Self-Assessment response on scale of Critical Thinking							
7.	Formulation of scenario-based questions	29 (63.0%)	8 (17.4%)	9 (19.6%)	35 (76.1%)	6 (13.0%)	5 (10.9%)
8.	Communication of ideas	28 (60.9%)	15 (32.6%)	3 (6.5%)	35 (76.1%)	9 (19.6%)	2 (4.3%)
9.	Performance in group	35 (76.1%)	8 (17.4%)	3 (6.5%)	40 (87.0%)	4 (8.7%)	2 (4.3%)
10.	Application of previous knowledge from independent study	32 (69.6%)	9 (19.6%)	5 (10.9%)	38 (82.6%)	5 (10.9%)	3 (6.5%)
11.	Analyzation of knowledge using concepts	32 (69.6%)	10 (21.7%)	4 (8.7%)	39 (84.8%)	5 (10.9%)	2 (4.3%)
12.	Linking new and previous knowledge	35 (76.1%)	6 (13.0%)	5 (10.9%)	35 (76.1%)	10 (21.7%)	1 (2.2%)
13.	Explanation in own words	36 (78.3%)	8 (17.4%)	2 (4.3%)	35 (76.1%)	9 (19.6%)	2 (4.3%)
14.	Hypothesis generation to discuss a problem	18 (39.1%)	18 (39.1%)	10 (21.7%)	32 (69.6%)	9 (19.6%)	5 (10.9%)

after the test respectively. No statistically significant results were obtained from linking new and old knowledge or explanation in their own words (table 1).

The mean values for pre-test and post-test samples were 2.5 ± 0.35 and 2.7± 0.43 respectively. Statistically significant results were obtained using paired student t test with the P value of 0.03

DISCUSSION

The findings of our study suggest that flipped classroom and journal club is a highly effective method for teaching physiology. These techniques were introduced as a class activity, which the students enjoy in comparison with traditional lectures. The sessions of flipped classroom and journal club led to noticeably greater grasp of the instructional objectives as shown in table 1 and had already been proven in various studies [12]. Moreover, our study shows it has potential to improve students' academic performance by increasing disciplinary understanding and satisfaction as they achieve their own preset learning objectives in the end.

Results demonstrated a considerable value in favor of group discussions and topic comprehension (table 1). Through resource and instructor access, it personalizes learning, fosters higher-order thinking through problem-solving, and involves students in cooperative learning through peer groups. Similar results were obtained showing that environments that promote group learning seem to have more consistently positive student learning patterns[13].

Our study's use of journal clubs in conjunction with flipped classroom strategies is one of its strengths. This assisted the

students in understanding the value of research which is also proven in studies conducted worldwide[14]. Students found it fascinating to connect their academic knowledge with several case studies in the journal club article. This made it easier for students to comprehend how medical information is used. An important finding of our study was increased ability of students in comprehending the summary of discussion in these sessions, promoting active learning. This positive attitude helps in better engagement, question generation and learning motivation as proven in various studies[15]. Moreover, students were able to reflect their own learning process. Students' critical thinking skills can grow through the adoption of a reflective practice, evidence of which is shown in various studies[16].

For items gauging critical thinking one of the highlights of our results showed, scenario-based question formulation or problem solving became easy for the students as shown in table 1. Our study shows that students were now able to generate a hypothesis to solve a problem and were motivated to think and asses the cases provided in the journal club articles critically as seen in previous studies done on postgraduate medical and dental students[17].Researches have proven that journal clubs help students by improving their cognitive capacity and clinical application of knowledge. It also allows students to have in-depth discussions about a case or an illness[18]. Insignificant results were obtained in area of linking new and old knowledge (table 1), which improves as the learning of the students will progress in subsequent years of basic and clinical sciences training[16,17,18].

Comparison of pre and posttest results showed that all the elements contributing to active learning and critical thinking had significantly improved using combined flip classroom and journal club techniques. Individually, these strategies have engaged the millennial learners in learning effectively[19] and improved the learning process[20]. These techniques provide the ideal setting for teaching evidence-based medicine and concentrate on critically reviewing recent literature and applying it to patient care[21] in undergraduate settings.

CONCLUSION

The results of our study reveal that combining journal club and flipped classroom techniques strengths the evidence-based inquiry among undergraduate dental students, enhances their critical thinking and active learning. We recommend to incorporate these teaching learning strategies as permanent part of the curriculum.

LIMITATIONS

The outcome of the study could not be generalized because it was limited to a single educational environment. These parameters must be taken into account if this finding is to be applied in other educational contexts. Another obstacle that affects student learning and assessment is faculty turnover.

AUTHORS' CONTRIBUTION

Maryam Ahmad	Conception and design, Acquisition of data, Analysis and interpretation of data, Drafting the Article
Sadaf Mumtaz	Conception and design, Critical revision
Ambreen Gul	Critical revision
Qudsia Iqbal	Acquisition of data
Ayesha Jabeen	Acquisition of data

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CASE REPORT

ACUTE URTICARIA AND LOCALIZED STAPHYLOCOCCAL SKIN SYNDROME IN CHILDREN WITH SARS CORONA VIRUS INFECTION; CASE REPORT

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ABSTRACT
We report two cases of corona virus infection who presented to Dermatology department with unusual manifestations. First case had fever, urticaria and angioedema with upper respiratory tract symptoms and the second case presented with bullous impetigo progressing to localized staphylococcal skin syndrome.
Keywords: *SARS-CoV2, Angiotensin converting enzyme, Urticaria, Impetigo, Staphylococcal Scalded Skin Syndrome.*
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INTRODUCTION

The general clinical features, course of disease, and outcome of SARS-CoV-2 infection differ between adults and children. Likewise some skin manifestations are more common in children, for instance, chilblains, erythema multiform (EM) and cutaneous Kawasaki-like- syndrome. Incidence of urticaria has been underestimated in children and the usual presentation is urticarial lesions in an otherwise asymptomatic patient[1]. Bullous impetigo progressing to localized SSSS has never been reported with Corona infection. We report two cases of SARS corona virus infection in children presenting with unusual dermatological feature. First case had fever, urticaria and angioedema with upper respiratory tract symptoms and second case presented with bullous impetigo progressing to localized staphylococcal skin syndrome.

CAPSULE SUMMARY

Two cases of covid in children with unusual cutaneous features are presented.

First case: Fever, urticaria and angioedema with upper respiratory tract symptoms

Second case: Bullous impetigo progressing to localized staphylococcal skin syndrome.

Case 1

A 4-year-old boy presented with complaint of generalized urticarial rash of one day duration. He had low grade intermittent fever with running nose, sneezing and mild non productive cough. Urticarial lesions had progressed and were associated with angioedema of eyes , hands and feet. He was admitted in child ward and vitals were monitored 8 hourly. Urticaria charting was done and injection Hydrocortisone 5mg/kg/day and Injection Chorpheniramine 0.1 mg /kg/day in divided doses were initiated. His PCR for SARS-CoV-2 was positive. Response to treatment was good with no new lesions and older lesions settled in 48 hours. He was discharged on 4th day on syrup Loratadine 5 ml daily with follow up in out door clinic.

Case 2

A two and a half years old male child was referred from emergency department for low grade fever of three days and sudden onset of a bullae on back for one day which has busted and given rise to a crusted lesion The child was irritable and the effected area was tender to touch. He had no history of recent respiratory or skin infections. Examination revealed widely distributed impetiginized plaques on face (Figure 1) and back. His clinical diagnosis was extensive Bullous impetigo. He was admitted in child ward and advised inj. vancomycin 500mg iv in 30 min infusion once a day. Follow up of the case on second day revealed that his lesion on the back has extended to involve more then half of his back (Figure 2) indicating a localized SSSS. Vancomycin induced Toxic Epidermal Necrosis (TEN) was also kept in differential diagnosis as a possible cause of this worsening of the lesions. Injection Vancomycin was stopped and injection linezolid was initiated. PCR for SARS-CoV-2 was advised which came out to be positive. Skin biopsy showed splitting of epidermis between granular and spinous layer confirming staphylococcal scalded skin syndrome and excluding TENS. Patient was discharged on day 5 with complete resolution of skin lesions.

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Figure 1: Impetiginized lesion

Figure 2: Extension of lesion on the back.

DISCUSSION

SARS-CoV2 is an enveloped, positive-sense, single-stranded RNA virus with crown-shaped surface spike proteins[2]. The spike protein interacts with Angiotensin converting enzyme 2(ACE-2), which making it easier for the virus to bind to target cells' cell surfaces. Viral entry into the cell is facilitated by cellular serene proteases. ACE-2 expression is primarily found in airways, GIT, skin and other body organs and is one of the major risk factors for vulnerability[3]. Viral clearance in SARS CoV2 is caused by type 1 IFN-mediated antiviral responses and activation of CD4, TH1, and CD8 cytotoxic cells[4].

There are two categories of cutaneous manifestation of SARS-CoV-2, (i) inflammatory and (ii) vascular. Inflammatory include maculo-papular or morbilliform lesions, urticaria, vesicular lesions, and Kawasaki like syndrome in children and vascular include chilblain like lesions, petechial/purpura and livedoid eruption. Urticaria, vesicular rash and maculo-papular rash is seen in all age groups, but chilblains, Erythema Multiforme (EM), and cutaneous features of Kawasaki-like syndrome are more common in children and young patients[1,5,6].

Urticarial lesions are less common in pediatric population and are seen in otherwise asymptomatic children. Our first case was symptomatic having urticaria presented with fever, upper respiratory tract symptoms and angioedema of the face. Bullous impetigo progressing to localized Staphylococcal Scalded Skin Syndrome has not been documented before as a feature of SARS-CoV-2 infection. Our second case initially presented with bullous impetigo which progressed to localized SSSS. Differentiation from Vacomycin induced TEN was made on biopsy.

SARS-CoV-2 cutaneous manifestations have been increasingly reported and dermatological findings prompt patient isolation and testing[5]. Sometime SARS-CoV-2 infected children may present to dermatologist as sole or unusual manifestation of the disease. It is important for the dermatologist to be well versed with the increasingly common and the newly described cutaneous manifestations of SARS-CoV-2 infection since it may help them to make the correct diagnosis.

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CASE SERIES

NEKAM'S DISEASE: THREE CASES FROM A FAMILY WITH AUTOSOMAL RECESSIVE INHERITANCE

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ABSTRACT
Nekam's disease, also known as Keratosis Lichenoides Chronica is an uncommon, keratinizing disease of skin and mucosa. Flat-topped violaceous papules & nodules on the dorsum of the extremities are its defining features. Reticulate, linear lesions along with telangiectasias and scaling involves seborrheic areas. Herein, we report three cases from the same family, with Nekam's disease. There have been a few case reports published, making it a rare disease.
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INTRODUCTION

Nekam's disease or Keratosis Lichenoides Chronica (KLC) is an uncommon, mucocutaneous condition of unknown etiology[1]. It appears in 20-50 years of age and affects both male and females. Clinically it presents with violaceous papules and nodules arranged in reticulate and linear pattern on the dorsal aspects of hands, feet, extremities and buttocks. Seborrhea like scaly rash with visible telangiectasia over the scalp, neck and face may be present[2]. It follows a chronic, progressive course[3]. It was initially called as "Lichen Planus and Lichen Ruber Acuminatus Morbilliform disease" by Kaposi, in 189 Nekam[4] named it "Porokeratosis Striate Lichen" on observing palmoplantar hyperkeratosis in the case reported by Kaposi[5]. In 1972 Margolis et al[3] introduced the term Keratosis Lichenoides Chronica . More than 100 cases have been reported so far, however there's still a controversy whether to consider Nekam's disease as a separate entity or as a part of a disease spectrum like Lichen Planus, Lichen Simplex Chronicus or Lupus Erythmatosus[6]. Histologically, there can be hyperkeratosis, follicular parakeratosis, alternating acanthosis and epidermal atrophy. Interface dermatitis along with negative immunofluorescence is present[2,6]. The following three cases describe typical features of the disease in centrofacial distribution and in members of the same family with autosomal recessive pattern of inheritance.

Case 1

A 13-year-old boy, student of 8th grade, resident of Mianwali presented with erythematous papular eruption in seborrheic distribution of face, trunk and limbs since early childhood. It was not associated with itching, photosensitivity or

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Figure 1: Erythematous papules and plaques confluent in seborrheic region of face. B. Alopecia scalp. C&D. Discrete violaceous papules on Chest and trunk E. Papules with scale in groin F. Papules buttock and back

fever. Lesions worsened during summer and remitted in winter. On cutaneous examination there were multiple violaceous papules with rough glistening surface coalescing over the forehead in a reticulate pattern and formed plaques on nose, periorbital area, cheeks, and chin (Fig 1A). Multiple skin colored to violaceous hyperkeratotic discrete papules, were disseminated over chest, abdomen, upper arms, back, thighs and lower limb. Papules were denser and more grouped in groin, genital area and buttocks (Fig 1C&1F). Hyperpigmented plaques were present in both axillae. There was loss of eye lashes and eye brows. He had three well demarcated round to oval hair loss patches on the scalp along with seborrheic dermatitis like scales all over the scalp (Fig 1B). Nails, palms, soles, post auricular region, bulbar and genital mucosa were normal.

CAPSULE SUMMARY

Three cases of rare Nekam's disease are reported with unusual centro-facial distribution in members of the same family with autosomal recessive pattern of inheritance.

Case 2

A 14-year-old girl, student of 8th grade and resident of Mianwali presented from same family presented with rash on face, scalp, trunk and flexures since childhood. Systemic enquiry was unremarkable. Rash aggravated in summer while spontaneously recovered to near normal in winter. On examination she had multiple violaceous papules on face, in a reticulate manner on forehead and coalescing to form plaques over bridge of nose, periorbital area and chin (Fig 2A). She also had similar papules along hairline (Fig 2C). Similar skin colored to violaceous papules discrete and forming a reticulate network were present on her back and flexures (Fig 2 D&F). Seborrheic dermatitis like scales were present on scalp (Fig 2B).

Case 3

A 3-year-old boy, resident of Mianwali presented with rash on his face, trunk, buttocks and flexures since the age of 2 months. He also had history of exaggeration of rash in summer and resolution in winter. On examination he had multiple violaceous papules on the face predominantly in Centro-

Figure 2: (A) Papules in seborrheic distribution face. (B) Seborrheic dermatitis scalp. (C) Papules along hair line. (D) Papules on back. (E) Papules in elbow flexure. (F) Papules back

Figure 3: (A) Face. (B) Seborrhoeic dermatitis scalp. (C) Discrete papules on chest. (D) Papules back. (E) Keratotic papules back. (F) Angular chelitus

facial distribution i.e. involving forehead, periorbital area, and bridge of nose, upper lip and chin [Fig 3A). Similar skin colored to violaceous hyperkeratotic papules was present on the chest, back and buttocks with relative sparing of abdomen in a reticulate pattern [Fig 3C&E). He also had involvement of flexures, axillae and groins. There were abundant scales on the scalp (Fig 3B). He also had white plaques on his tongue along with apthous ulcers and angular cheilitis (Fig 3F). There was no involvement of nails, palms and soles.

Differentials of Lichen Planus, Lupus Erythmatosus, Keratosis Lichenoides Chronica (Nekam's disease), and Dariers disease were considered in view and investigated accordingly. Blood complete picture, biochemistries and ANA of all 03 cases were normal. Skin biopsy on histopathology showed hyperkeratosis with parakeratosis, alternate areas of acanthosis and epidermal atrophy. Granular layer was thickened, whereas basal cell vacuolar degeneration was seen at dermoepidermal junction along with mixed cellular infiltrate comprising of lymphocytes, plasma cells and histiocytes. Follicular plugging was also noted along with dilated vessels which confirm the diagnosis of Nekam's disease.

All of above described cases are siblings from a single family. The pedigree is consistent with autosomal recessive inheritance due to presence of affected cases in both genders and skip generations.

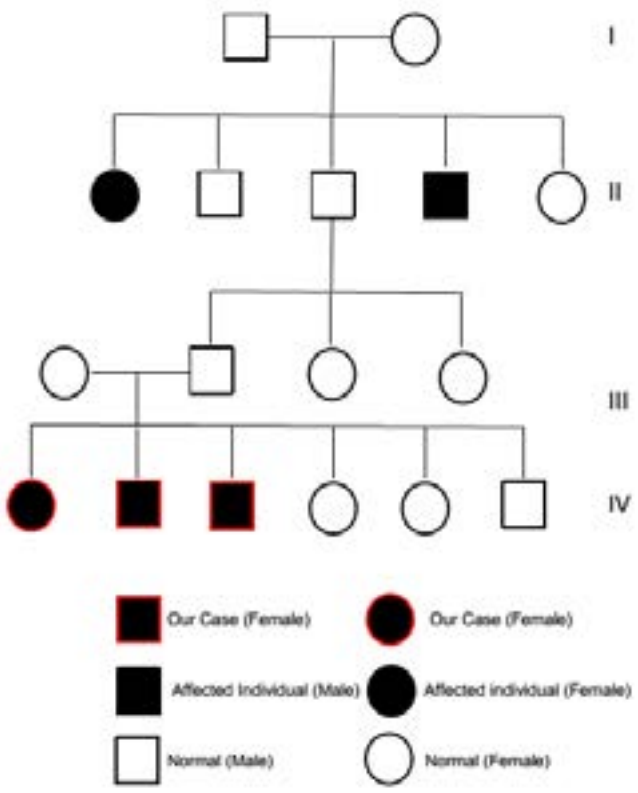

Figure 4: Pedigree showing Autosomal Recessive Pattern of Inheritance

DISCUSSION

Nekam's disease is a reticulate dermatosis that primarily affects adolescents and the young adults, with a slight male predominance (1.35:1)[4]. Rosacea like facial seborrheic dermatitis is present in 75% of cases[3,7]. In 50% of the cases, aphthous ulcers can be found on oral mucosa[8]. Ocular mucosa can also be involved in the form of conjunctivitis, uveitis, iridocyclitis and blepharitis[9]. Forty percent patients can have palmoplantar keratoderma[4,10]. Nail dystrophy is present in 30% of the cases with the commonest nail findings include paronychia and longitudinal ridging[11]. Similarly, hyperkeratotic papules can also be found in males over the scrotum and penis[1]. Multiple aphthous ulcers on the oral mucosa and violaceous edged erosions on the inner side of the prepuce have been reported[12]. In above mentioned cases we had violaceous papules in reticulate pattern on face, trunk and flexures, along with genital involvement in both male patients and seborrhea in all three cases. Oral mucosal was involved in one case. In contrast to two cases described with improvement in summer, these 3 cases reported worsening in summer[13]. It has been observed that Nekam's disease is strongly associated with Glomerulonephritis and Lymphoproliferative disorders8 whereas on histopathological findings of porokeratosis and amyloid deposition can be seen[14]. Nekam's disease has a prolonged, chronic & progressive course of illness and is usually resistant to treatment. Successful treatment has been done using phototherapy without[15,16] or with Acitretin[17]; Etretinate[18] and photodynamic therapy[19].

Our cases responded well to topical steroids and emollients with improvement in erythema and number of papules. They were counselled about hydration and sun protective measures.

CONCLUSION

Nekam's disease is a rare condition. It should be ruled out in patients with apthous ulcers, seborrheic dermatitis or lichen planus. The evaluation of similar cases can lead to diagnosis of more cases of this disorder.

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DIAGNOSTIC CHALLENGE

Check the correct answer on page 91

Case 1

Figure 1: MRI Pelvis

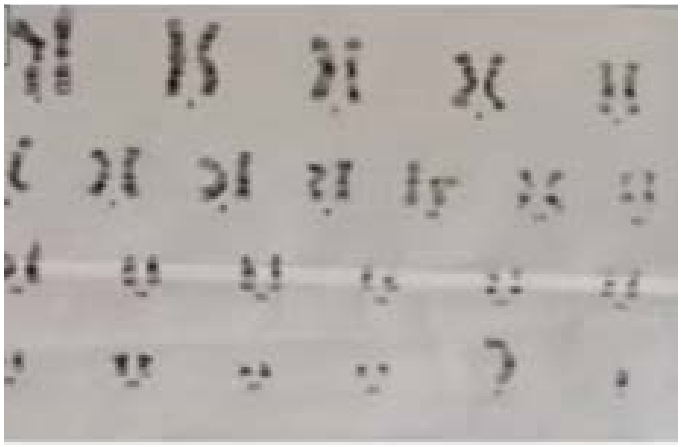

Figure 2: Chromosomal analysis

A 13 year old female referred from dermatology department with complaints of hirsutism and hoarseness of voice for last 1 year. Her menarche is not established yet. General physical examination revealed the type 3 hirsutism on Ferryman and Gallwey scale, with no secondary sexual characteristic. On inspection of vulva, clitoromegaly is noted.

What is your diagnosis?

Case 2

Figure 1: Fetal ultrasound

Figure 2: Neonatal X-ray Abdomen plain

A 32-year-old healthy primigravida with a normal pregnancy was scheduled for her 34th-week obstetric evaluation. The ultrasound showed a single fetus in cephalic presentation, with a normal weight for gestational age and with dilatation of gut loop. The amniotic fluid index was normal, and no other fetal anatomic anomalies were observed.

Correlate the pictures and give your diagnosis?

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DIAGNOSTIC CHALLENGE Answers

Case 1

Diagnosis

Disorder of sex development. (Androgen Insensitivity Syndrome)

Background

The disorder of sex development (DSD) prompts multiple medical, surgical, ethical, psychosocial, and physical issues for patients and their parents.

- The management should be focused on three main domains; initial stabilization, accurate diagnosis, and decisions on the gender of rearing and planning of surgical intervention and hormonal treatment.
- Gender assignment is cumbersome and needs to be justified bearing in mind a variety of factors, such as genitalia appearance, surgical options, and views of the family related to cultural, social, and religious beliefs
- The patient had already been raised as a girl until the time of diagnosis; it is profound that a female gender identity may have already been developed in a subconscious way.
- For ethical and psychosocial issues its better not to reveal the underlying condition to the patient himself, till her preference of gender is fully evaluated.
- Social and cultural factors may be important modifiers in this process, since different societies do not accept this patient-based approach.

Our Patient

As female gender was assigned at the time of birth due to appearance of external genitalia and she was raised as a girl, later on at puberty the problem of hoarseness of voice and hirsutism resulted in detail evaluation of patient and testis was also found at the level of deep inguinal ring. Multidisciplinary approach involving the surgeon and urologist on the functionality and fertility aspect on conversion to either sex was taken into account. Initially parents were counseled about diagnosis, sex of rearing, functionality, fertility and psychological issues. Parents at this stage were reluctant to involve patient as she is minor and has not reached the age of decision making that is 18 years legally. However they were encouraged to involve patient and psychologist before any final decision. Involvement of plastic surgeon and urologist will be needed later.

Case 2

Diagnosis

Intestinal atresia

Background

- Intestinal atresia occurs between one in 1,000 and 5,000 live births
- Fetal bowel dilatation is characterized by fluid-filled intestinal loops which measure at least 15 mm in length or 7 mm in diameter
- Ultrasonographic image of dilated fetal bowel is a sign of intestinal mechanical or functional obstruction and differential diagnosis include bowel atresia or stenosis, malrotation with volvulus, meconium ileus, total colonic aganglionosis, and meconium plug syndrome
- Before 24 weeks' gestation, bowel loops are not recognized because there is no efficient gastric peristalsis.The bowel dilatation only became evident in the third trimester.
- Despite low rate of sensibility and specificity, ultrasound plays an important role in the management and diagnosis of fetal bowel dilatation. It offers an opportunity for parental counseling and for choosing patients who need transfer to a specialized center which is of upmost importance as it allows prompt treatment and reduces the risk of complications.

Our Patient

Multidisciplinary approach initiated, with gynecologist, pediatrician, radiologist and surgeon after the diagnosis. Patient opted for delivery in the hospital and referral of baby after delivery if need arise. She underwent spontaneous vertex delivery at 36+4 weeks, and delivered baby boy of 2.8 kg alive with APGAR SCORE of 9/10. After delivery detail evaluation of baby was done by pediatric department and referred to pediatric surgical unit, for surgical correction of intestinal atresia. The surgery was done in pediatric surgical unit and post operative recovery of the baby was smooth.

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