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CHEIF EDITOR'S MESSAGE

This precious moment marks the beginning of a new chapter in the life of Foundation University Medical College (FUMC) whose history of academic excellence and of producing quality MBBS graduates is now well documented. I am pleased to contribute to this first issue of the Foundation University Medical College Journal (FUMJ). Its publication is a milestone of scholastic growth of FUMC.

Since its inception in 2002 it was our earnest desire to provide a platform for the faculty to publish their research work in their own journal, so that research outcomes, basic or applied, have impact on clinical practices and ultimately benefit the patients. Though over the period of time the contribution of the FUMC faculty and the specialists from the Fauji Foundation Hospital (FFH) has been quite substantial in the form of research papers published in international and national journals recognized by Higher Education Commission (HEC) and Pakistan Medical & Dental Council. The publication of journal could not materialize as we were more focused on capacity building, modernization of curriculum, teaching methodologies and advancement of research facilities.

Almost all the clinical departments of FFH are recognized for FCPS part II training and a lot of clinical research work is done by the trainees as a part of their postgraduate training, but somehow they are reluctant to publish. Similarly as a part of faculty development program many of our faculty members have acquired diplomas, M Phil and PhD degrees. Their work has been published at national and international level. The launching of FUMJ will thus provide a platform for rapid publication to all our faculty, residents and students and a quality journal for researchers to present their future research efforts. Departments and faculty members are working on a number of research projects under the auspices of Foundation University Islamabad and HEC. A Multi Disciplinary Lab (MDL) has been developed to start M Phil in Basics Sciences. I am hopeful that these efforts to inculcate research culture will translate into research publications and lead to development of FUMC as a centre of excellence nationally and internationally. To improve the health care delivery we need to integrate the clinical research with medical practices, creating a patient centered outcome that benefits the patients individually and collectively. For this I will strongly plead for contributions from our national and international colleagues and researchers.

I hope you will enjoy this issue and it is our commitment that FUMJ will not prove to be "Ah yet an another medical journal" in the medical fraternity. To effectively implement all these future plans, we will require constant support, cooperation and contribution from the researchers, staff and students.

While congratulating the editorial team for their hard work and great effort in publishing the first issue, I am very confident that under the visionary leadership of Professor M. H. Najmi, FUMJ will achieve its desired goals and international recognition.



Prof. Nasim Ul Majeed
Chief Editor

FOUNDATION UNIVERSITY MEDICAL JOURNAL

Vol-1 No.1, Jan - Jun 2014

Contents

Editorial	Page
Cadaver Dissection - should we consider other options? <i>Shahida Badsha</i>	1
<hr/>	
Research Articles	
Prescribing patterns of antimalarial drugs in Pakistan <i>Ayesha Janjua, Imrana Maqsood, Zarafshan Badar, Muzammil Hasan Najmi</i>	3
The gender difference of 2nd to 4th digit length and length ratio (2D:4D) in local population <i>Syed Muarraf Hussain, Saadat Ali Khan, Syeda Maria Ali, Syed Abdul Mughees Hussain</i>	11
Current trends in antimicrobial susceptibility profile of Methicillin resistant <i>Staphylococcus aureus</i> (MRSA) isolates – a multicentre experience <i>Fatima Kaleem, Javaid Usman, Irum Aftab, Afreenish Hassan, Farah Faqir, Maria Mushtaq Gill, Zakir Hussain, Samina Amanat, Nadia Wali</i>	15
Haematological parameters and clinical manifestations of acute Lymphoblastic Leukemia <i>Mehmood-ul-Hasan, Lubna Zafar, Huma Amin, Nazia Khalid, Nabila Rizwan, Zahur-ur-Rehman</i>	20
Frequency of intracranial complications in patients with Chronic Suppurative Otitis Media <i>Mohammad Afzal, Sadia Chaudhry, Amir Akbar, Zafar Ahmed</i>	25
<hr/>	
Community Health	
Knowledge of Hepatitis C virus among common patients visiting a tertiary care hospital in Pakistan <i>Ghulam Murtaza Gondal, Uzma Bano, Kamran Munawar, Tassawar Hussain, Mohammad Saheb Khan, Ghada Liaqat, Sehrish Arshad, Wajeeha Mehr, Sania Aqeel</i>	30
Assessment of quality of Soan River water <i>Nabeela Fazal Babar, Ashiq Hussain, Nosheen Zaidi</i>	35
<hr/>	
Physical Medicine	
Factors influencing Pakistani physical therapy student's decisions to train abroad: evaluation of a conceptual framework <i>Lajeela Akram, Salman Ikram, Furqan Ahmad Siddiqi, Arshad Nawaz Malik</i>	42
<hr/>	
Medical Education	
Role of teaching ethics in medical curriculum <i>Ghulam Murtaza Gondal</i>	47
<hr/>	
Case Report	
Optic nerve glioma with concurrent rhegmatogenous retinal detachment in a body with neurofibromatosis type 1 <i>Sana Nadeem, B. A. Naeem, Imran Elahi, Fariha Taimur</i>	50
<hr/>	
Guidelines for Authors	

EDITORIAL

CADAVER DISSECTION - SHOULD WE CONSIDER OTHER OPTIONS?

Basic Sciences provide the foundation upon which all clinical skills are built and the human body remains the focus of activity throughout the career of a medical professional. Thorough knowledge of human anatomy is, therefore, essential for a doctor to practice and communicate effectively^{1,2,3}. Traditionally, the primary means of understanding the human body has been cadaver dissection^{4,5,6,7}. However, changes in culture, society, the medical community and the medical curriculum have altered the environment and the trends for teaching anatomy⁸. The rapid expansion of medical knowledge has not been matched by an increase in the course duration for undergraduate education. The number of medical students has increased exponentially⁹ and new subjects have been added to the curriculum. It is, therefore, imperative that we re-evaluate the teaching methods, resources and allocation of time to courses such that the learning objectives in gross anatomy are achieved¹⁰.

While the need for doctors to have a sound knowledge of anatomy is undisputed, the question is whether, in the present scenario, they can gain it without performing the conventional, step-by-step cadaver dissection. The fifty-year long debate on whether dissection should continue or not has not reached a conclusion and a number of medical schools have adopted innovative teaching aids either replacing or supplementing dissection⁸. In Italy, for instance, dissections have become optional. In Lund, Sweden, dissections have been replaced by computer simulation software that creates 3D views of the body. In Toulouse, France, dissection is still a mandatory part of the curriculum, but it is not essential that each student should dissect individually, as was in the 1970s¹¹.

In the past, the only source of cadavers was unclaimed bodies or the bodies of executed criminals. Now, in many parts of the world, cadavers are obtained through voluntary donations. Donated cadavers make up 80% of the total in North American medical schools, while all the cadavers in the United Kingdom, Australia and Thailand are donated^{12,13}. Some Muslim countries like Saudi Arabia and Libya import cadavers¹⁴. In Pakistan, as in Muslim countries in Africa, unclaimed bodies remain the only source¹². With the surge in the number of medical colleges the supply has fallen

grossly short of the demand. As a result, there is a disparate student to cadaver ratio or no dissection at all. Many colleges make use of prosections, computer images and plastic models. Body donation is unheard of in Pakistan and any awareness programs could take decades to produce results¹².

Any learning method that is not supported by optimum effort and resources will fail to achieve its desired objectives. Dissection, per se, does not guarantee any of the objectives attributed to it if it is not carried out in an appropriate learning environment². Cadaver dissection also has its disadvantages: The color and texture of tissues and organs are not like real bodies, students may develop psychological problems, and there may be health hazards and ethical/legal issues^{15,16}. Plastic models are condemned for not recreating the life-like feeling and appearance of the human body but neither do the mummified bodies of the undernourished, compromised humans who never had a home or family when alive.

There is now a significant body of evidence to claim that it is possible to gain adequate practical knowledge of anatomy as well as lessons in compassion, respect for life and death, teamwork and humility without going through cadaver dissection^{15,17}. As one need not travel from pole to pole to learn the geography of the world, so undergraduates need not see the journey of the microfiltrate from the glomerulus to the urinary bladder or of the drug molecules from the gut to the cell receptors to comprehend these with the help of appropriate learning aids. Teamwork, group dynamics and self-directed learning can be inculcated during clinical sessions and small group discussions. Compassion and respect for life and death can be learnt more effectively in hospitals and communities where live people are capable of showing their emotions.

With advances in technology, medical educators can now routinely use high quality imaging and sophisticated interactive programs to project cross-sectional radiologic images and living anatomy in the classroom. In addition, highly realistic body painting of underlying structures and life-size full color transverse cryosections can be used. In fact, modern 3D reconstruction and imaging methods

provide views that are superior to those observed during dissection¹⁵.

Many medical schools are already experimenting with computer imaging techniques to create “electronic cadavers” that can be virtually dissected. According to a news report¹⁸, the Anatomy Society of India (ASI) has already endorsed the use of virtual cadavers. The “3D Indiana” is a digital cadaver which employs volumetric anatomy and has every organ, bone, muscle, nerve and blood vessel of the body. It is a fully navigable virtual human body which can be dissected to obtain a 3D view of every structure and organ¹⁸. Universities in Saudi Arabia are also using synthetic cadavers which have all the organs of a human body and prove better than cadavers that are often ravaged by illness or decomposition¹⁴.

In conclusion, it appears anatomy can be better learnt by linking the teaching of anatomy with surgeries and autopsies through early horizontal and vertical integration. This will reinforce basic anatomy in the context of its clinical relevance. Specialists can contribute to make the syllabus more outcome-based in accordance with good clinical practices and can improve their own core knowledge of anatomy while also addressing the staff shortages in anatomy teaching¹⁹. Well-trained faculty should effectively use computer software, virtual reality and radiology for motivating students to become self-directed, life-long learners with the zeal for enquiry and exploration.

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Dr Shahida Badsha
Professor of Paediatrics

PRESCRIBING PATTERNS OF ANTIMALARIAL DRUGS IN PAKISTAN

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ABSTRACT

Objective:

The objective of study was to determine the prevailing antimalarial prescribing practices so as to ascertain reason(s) underlying malaria treatment failures in Pakistan.

Place of study:

Study was conducted at MH, Rawalpindi; Benazir Bhutto Shaheed Hospital, Rawalpindi; PIMS, Islamabad; DHQ Hospital, Rawalpindi; BHUs and General practitioners of Rawalpindi / Islamabad.

Materials & Methods:

Retrospective collection of prescriptions containing antimalarial drugs was carried out in random with informed consent of concerned authorities. In case of general practitioners, prescription sampling was carried out from patients at chemist shops. Prescriptions were analysed on proforma designed in light of drug-use indicators identified by WHO Action Programme on Essential Drugs with some modifications. Data was analysed by SPSS version 16.

Results:

From total of 553 prescriptions studied, 107 were written for malaria patients of which only 9(1.63 %) had parasitologically confirmed disease. Diagnosis was presumptive in remaining 98(17.72 %) cases. Prescribed treatment was relevant to diagnosis in 126(22.78 %) cases. The antimalarial drug use in cases of undiagnosed fever (48.46 %) was partially relevant to diagnosis. Chloroquine was the most commonly prescribed antimalarial drug [440(79.57%) prescriptions]. Its dosage-schedule & treatment duration were appropriate in 237(53.86 %) and 265(60.23 %) prescriptions respectively. Alternative antimalarials 113(20.43%) and combination of antimicrobials with antimalarials 166(30.02%) were prescribed.

Conclusion:

Prescription audit has shown room for improvement. It is time for serious consideration towards irrational use of antimalarial drugs in Pakistan, since inappropriate prescribing plays a significant role in development as well as further propagation of drug-resistance in malaria.

Key words:

Antimalarial drugs, prescription patterns, Pakistan

INTRODUCTION

Drug utilization has been defined as the marketing, distribution, prescribing and the use of drugs in a society with special emphasis on the resulting medical, social and economic consequences¹. Malaria is a disease of immense importance to mankind, particularly in the tropical and subtropical countries. It threatens more than 50% of the world's population, undermining the health of families, endangering the survival of children and straining the economic resources of countries. According to latest estimates from World Health Organization, in 2009, there were 225 million cases of malaria and

an estimated 781,000 deaths worldwide². Evidence suggests that the prevalence is on the rise. Of the four species of human-infecting plasmodia, Plasmodium falciparum is the most virulent, producing severe disease that may lead to potentially lethal complications. WHO reported an estimated 311 million (range 270-400 million) cases of falciparum malaria, of which around 72% were in WHO region sub-Saharan Africa and 19% in WHO region South East Asia³.

Pakistan is a subtropical country with highly conducive environment for breeding of mosquito. It is among 109 malaria endemic countries & is currently listed among moderately endemic countries for malaria. Malaria is the second most frequently reported ailments from public health sector⁴. Consolidated epidemiological data revealed that the malarial parasites plasmodium falciparum and plasmodium vivax have wide

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distribution and the primary vector species are *A. culicifacies* and *A. stephensi*⁵. Malaria also considerably affects the health of pregnant women & pediatric population⁶; and undernourished people⁷. Plasmodium falciparum is responsible mainly for fatalities and plasmodium vivax for morbidity and number of malaria attacks⁸. The disease thus results in substantial social and economic encumbrance consequently increasing direct cost to government and patients for medical facilities; as well as loss due to absenteeism from productive work or education⁹.

Irrational prescribing practices of antimalarial drugs, undoubtedly plays a pivotal role in the persistence as well as emergence of resistant malarial strains. Furthermore unnecessary and extravagant prescribing with alternative antimalarial drugs other than chloroquine leads to excessive cost of treatment, contributing to the economic burden¹⁰.

Increasing prevalence as well as development of drug-resistant malaria in Pakistan demands adoption of multi-dimensional strategies to cope with the situation¹¹. Hence this study was conducted to determine the prevailing antimalarial prescribing practices in order to ascertain the reason(s) underlying malaria treatment failures in Pakistan.

MATERIALS AND METHODS

Sampling: The prescriptions containing antimalarial drugs were randomly collected from various levels of health care facility including the tertiary care/teaching hospitals, general practitioners and basic health units located in Rawalpindi/Islamabad district. To avoid changes in the normal prescribing behaviour, retrospective collection of prescriptions was carried out with the informed consent of authorities of the concerned institutions. In case of general practitioners, the sampling of prescriptions was carried out from the

patients at chemist shops where they came to obtain their drugs.

Evaluation of prescriptions and data analysis: Prescriptions in the sample were analysed on a proforma designed in the light of drug-use indicators identified by WHO Action Programme on Essential Drugs¹² with some modifications, for the following parameters.

1. Total number of drugs in the prescription.
2. Number of drugs prescribed by generic name
3. Chemical class of the antimalarial drug prescribed.
4. Dosage form of the antimalarial prescribed.
5. Is the prescribed dosage appropriate?
6. If inappropriate, whether under or overdosage?
7. Is the advised duration of treatment appropriate?
8. If a drug other than chloroquine/amodiaquine is prescribed, was chloroquine-resistance confirmed clinically or parasitologically.
9. Is the diagnosis listed on the prescription?
10. Relevance of the diagnosis to the treatment.
11. Have other antimicrobials been prescribed along with the antimalarial drug?

The data was analysed on computer using the software SPSS version 16.

RESULTS

A total of 553 prescriptions of antimalarial drugs were studied, whose distribution in regards with institutions, prescriber groups and the sample size is shown in Table I, Figure 1 & 2.

Age & gender distribution of prescriptions is depicted in Table II.

Table-I: Prescribing pattern of antimalarial drugs (institutions, prescriber group and sample size)

PRESCRIBING PATTERN	SAMPLE SIZE OF PRESCRIPTIONS	
	No.	%
INSTITUTION		
Military hospital, Rawalpindi	103	18.62
Benazir Bhutto Shaheed Hospital, Rawalpindi.	47	8.49
Pakistan Institute of Medical Sciences, Islamabad	43	7.77
District Headquarter Hospital, Rawalpindi	40	7.23
Basic health units located in suburbs of Rawalpindi / Islamabad	204	36.88
General practitioners from Rawalpindi / Islamabad.	116	20.97
Total	553	100

PRESCRIBING PATTERN	SAMPLE SIZE OF PRESCRIPTIONS	
	No.	%
PROFESSIONAL STATUS OF THE PRESCRIBER		
Paediatricians	80	14.46
Medical specialists	58	10.49
Dermatologists	35	6.33
Medical officers (teaching hospitals)	60	10.85
Medical officers (basic health units)	204	36.89
General practitioners	116	20.98
Total	553	100

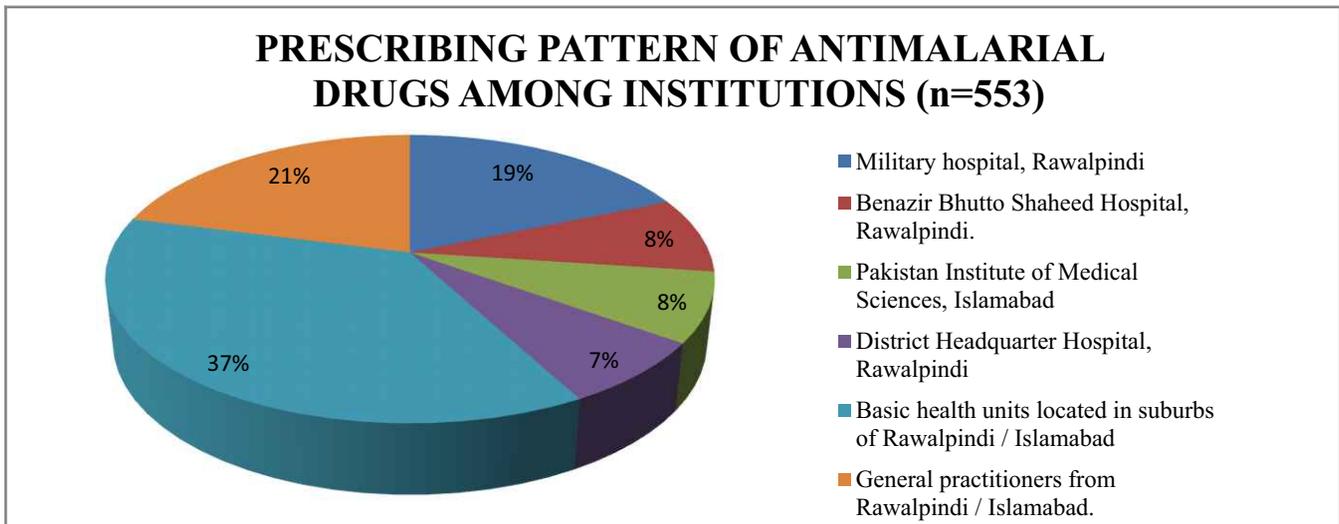


Figure-I: Prescribing pattern of antimalarial drugs among institutions.

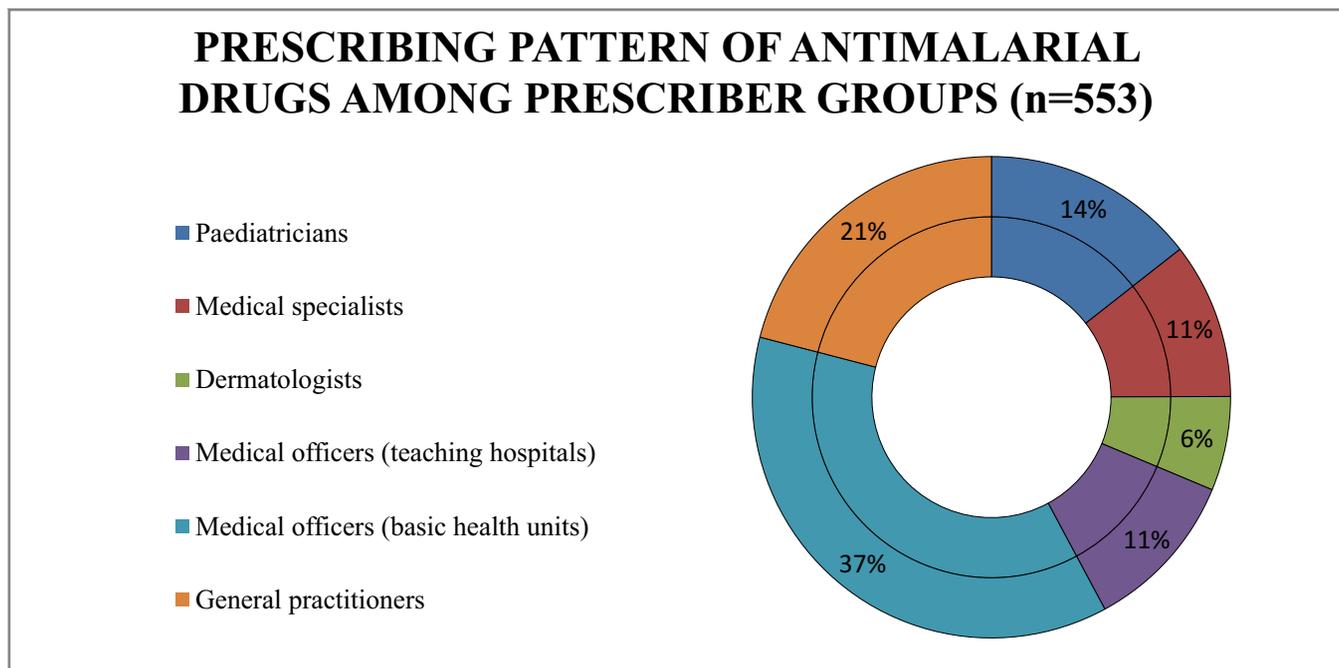


Figure-II: Prescribing pattern of antimalarial drugs among prescriber groups.

Table II: Prescribing Pattern of Antimalarial Drugs (Age and Gender of the Patients)

	CHILDREN	ADULTS	TOTAL
MALES	92 (16.64 %)	244 (44.12 %)	336 (60.76 %)
FEMALES	42 (7.59 %)	175 (31.65 %)	217 (39.24 %)
TOTAL	134 (24.23 %)	419 (75.77 %)	553 (100 %)

Out of 553, only 107 prescriptions in the study sample were written for patients of malaria of which only 9 (1.63 %) had parasitologically confirmed disease. The diagnosis was presumptive in the remaining 98 (17.72 %) cases as shown in Table III, Figure III.

Table III: Prescribing Pattern of Antimalarial Drugs (Relation to the Diagnosis) n = 553

Malaria (Parasitologically confirmed)	9 (1.63 %)
Malaria (Presumptive diagnosis)	98 (17.72 %)
Amoebic hepatitis	4 (0.72 %)
Rheumatoid arthritis	5 (0.9 %)
Tropical splenomegaly	(0.18 %)
Dermatological conditions relevant to use of chloroquine	9 (1.63 %)
Fever (undiagnosed)	268 (48.46 %)
Conditions not relevant to the use of antimalarials	60 (10.85 %)
Diagnosis not mentioned	99 (17.9 %)

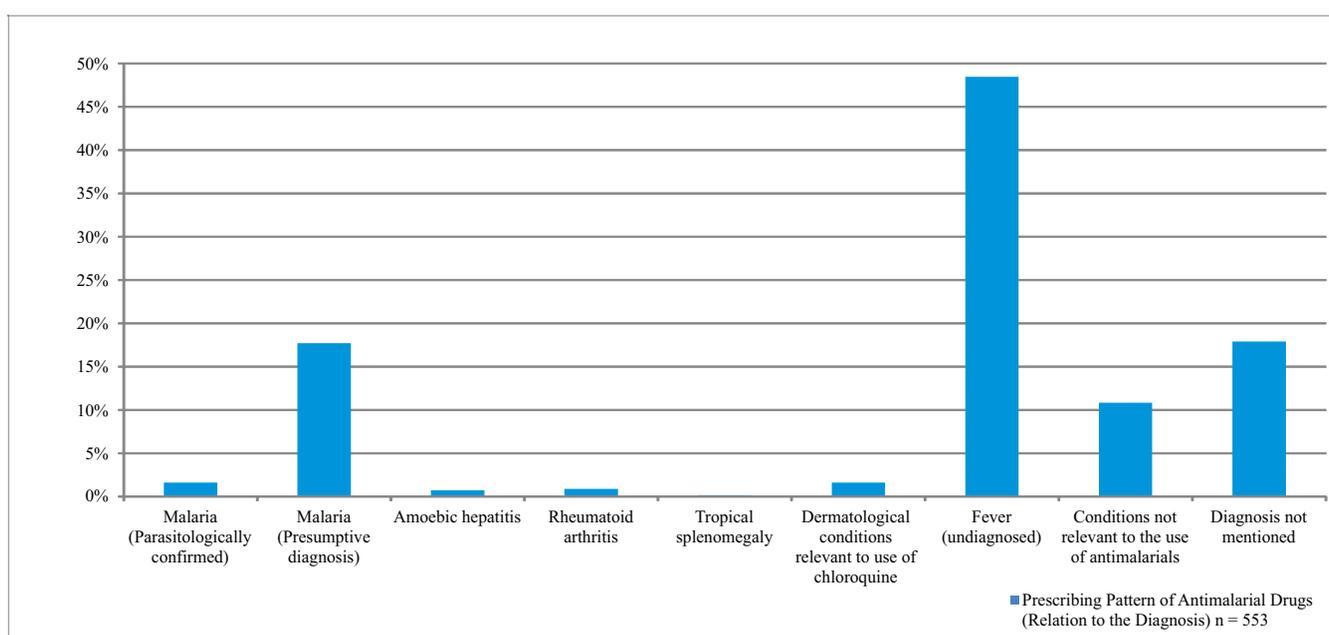


Figure-III: Prescribing Pattern of Antimalarial Drugs (Relation to the Diagnosis) n = 553

The treatment prescribed was relevant to the diagnosis in 126 (22.78 %) cases. The antimalarial drug use in cases of undiagnosed fever (48.46 %) was partially relevant to the diagnosis. Chloroquine was the most commonly prescribed antimalarial drug, encountered in 440 (79.57 %) of the prescriptions studied as shown in Table IV.

Table IV: Prescribing Pattern of Antimalarial Drugs -Overview (n = 553)

Chemical type of the antimalarial	CQ	AMQ	PYR+SDX	PYR+SDX+MEF	HFN	QUIN	MEF	PYR
	440 (79.57%)	39 (7.05%)	36 (6.51%)	9 (1.63%)	10 (1.81%)	13 (2.35%)	4 (0.72%)	2
Prescription by generic name	308 (70%)	Nil*	Nil*	Nil*	Nil*	13 (100%)	4 (100%)	2
Dosage form Oral	438 (99.55%)	39 (100 %)	36 (100 %)	9 (100 %)	10 (100 %)	5 (38.46 %)	4	2
Parenteral	2 (0.45%)	Nil	Nil	Nil	Nil	8 (61.54 %)	Nil	Nil
Dose Appropriate	237 (53.86%)	11 (28.21%)	19 (52.78%)	7 (77.78%)	10 (100%)	11 (84.62%)	4 (100%)	4
Under dosage	98 (22.27%)	10 (25.64%)	1 (2.78%)	0	0	0	0	0
Over dosage	53 (12.05%)	18 (46.15%)	16 (44.44%)	2 (22.22%)	0	2 (15.38%)	0	0
Appropriate for conditions other than malaria but sub therapeutic for malaria	46 (10.45%)	NOT A P P L I C A B L E						
Not possible to comment due to incomplete data	6 (1.36%)							
Duration of treatment Appropriate	265 (60.23%)	21 (53.85%)	22 (61.1%)	7 (77.78%)	10 (100%)	11 (84.62%)	4 (100%)	4
Inadequate	87 (19.77%)	2 (5.13%)	Nil	Nil	Nil	Nil	2 (15.38%)	Nil
Prolonged	45 (10.23%)	16 (41.03%)	14 (38.89%)	2 (22.22%)	Nil	Nil	Nil	Nil
Appropriate in diseases for which prescribed but prolonged exposure	43 (9.77%)	NOT A P P L I C A B L E						

CQ - Chloroquine, AMQ - Amodiaquine, PYR+SDX - Pyrimethamine+Sulfadoxine, PRY+SDX+MEF - Pyrimethamine+Sulfadoxine+Mefloquine, HFN - Halofantrine, QUIN - Quinine, MEF - Mefloquine, PYR - Pyrimethamine

Its dosage schedule & duration of treatment were appropriate in 237 (53.86 %) and 265 (60.23 %) prescriptions respectively. Almost similar prescribing trend has been observed among all prescriber groups. Prescribing patterns of antimalarial drugs in different prescriber groups are shown in Table V. Prescription of alternative antimalarial drugs other than 4-aminoquinolines and combination of antimicrobials with antimalarials are also depicted in Table V.

Table V: Prescribing pattern of antimalarial drugs among prescriber groups

	PRESCRIBER GROUP					
	PAEDS n = 80	MED SPEC n = 58	MO (HOSP) n = 60	MO (BHU) n = 204	GP n = 116	OVERVIEW n=553
Chemical type of drug						
CQ	46 (57.5%)	44 (75.86%)	56(93.33%)	201(98.53%)	58(50%)	440(79.57%)
AMQ	12(15%)	2(3.45%)	1(1.67%)	Nil	24(20.09%)	39(7.05%)
PYR+SDX	8(10%)	Nil	1(1.67%)	3(1.47%)	24(20.09%)	36(6.51%)
PYR+SDX+MEF	6(7.5%)	2(3.45%)	1(1.67%)	Nil	Nil	9(1.63%)
HFN	4(5%)	Nil	Nil	Nil	6(5.17%)	10(1.81%)
QUIN	2(2.5%)	10(17.24%)	1(1.67%)	Nil	Nil	13(2.35%)
MEF	2(2.5%)	Nil	Nil	Nil	2(1.72%)	4(0.72%)
PYR	Nil	Nil	Nil	Nil	2(1.72%)	2(0.36%)
Alternative to 4-aminoquinolines	34(42.5%)	14(24.14%)	4(6.67%)	3(1.47%)	58(50%)	113(20.43%)
Combination with antimicrobials	40(50%)	26(44.83%)	10(16.67%)	26(12.75%)	64(55.17%)	166(30.02%)

CQ - Chloroquine, AMQ - Amodiaquine, PYR+SDX - Pyrimethamine+Sulfadoxine, PRY+SDX+MEF - Pyrimethamine+Sulfadoxine+Mefloquine, HFN - Halofantrine, QUIN - Quinine, MEF - Mefloquine, PYR - Pyrimethamine

Discussion

Prescribing patterns of antimalarials drugs, in various prescriber groups with different professional standings and at various levels of health care facility, were studied to assess the aspects peculiar to malaria chemotherapy. The highest number (204 i.e. 36.89 %) of prescriptions were written by medical officers working at basic health units, thus reflecting a greater incidence of febrile illnesses in the rural areas, which might be related to the socio-economic and environmental factors. 60.76 % of the prescriptions were served to the male patients, which may reflect a higher incidence of febrile illnesses among the males but, probably, it was related to the male-dominant social structure where males take preference over the females even in seeking treatment for an illness.

Chloroquine was the most commonly prescribed

antimalarial drug in all the professional groups, with variable frequency. It was less commonly prescribed by the paediatrician (57.5 %), which is probably related to the bitter taste of chloroquine that makes it difficult to administer the drug to the children. The general practitioners prescribed chloroquine in 50 % prescriptions, which was the lowest among various prescriber groups in this study, reflecting a propensity of GPs to prescribe the second line drugs quite often without a real need for them. This could be due to the influence of promotional campaigns of the drug manufacturing companies or the better financial status of the patients attending clinics of the private practitioners.

Chloroquine was followed by amodiaquine (7.05%) in frequency of prescription. It was more commonly prescribed by the general practitioners

(20.09 %) and paediatricians (15 %). The later sometimes prefer amodiaquine to chloroquine because of the better taste in syrup form. The serious adverse effects of agranulocytosis and hepatotoxicity caused by amodiaquine¹³ should however, not be overlooked.

Pyrimethamine sulfadoxine combination was prescribed in 6.51 % prescriptions. This is an inexpensive drug combination for chloroquine-resistant cases of malaria. Its mechanism of action, however, favours rapid development of resistance and its indiscriminate use without confirmation of resistance should be discouraged. The use of quinine in 17.24 % prescriptions could have been related to severe form of *falciparum* malaria although the prescribing data was insufficient to confirm this assumption.

Proper dosage schedule of chloroquine to administer 25 mg of base over three days was described in 53.86 % prescriptions containing this drug. An under-dosage of the drug was noted in 22.27 % prescriptions while an over-dosage was seen in 12.05 % cases. The under-dosage of chloroquine was mostly due to omission of the second dose of the drug, which is administered six hours after the initial loading dose. Such prescriptions delivered a total dose of 20 mg base per kg of body weight. In majority of the cases of *falciparum* malaria, with full sensitivity of the parasite to the drug, these regimens may provide a cure of the infection. However, presence of adequate immunity in the patient is important for a satisfactory response in these cases. In the presence of partially resistant progeny of the parasite, such regimens may assist in selection of less sensitive strains.

In 10.45 % prescriptions of chloroquine, the drug was prescribed for conditions other than malaria. The doses employed in these diseases are much smaller than the antimalarial dose of the drug and duration of treatment is prolonged, sometimes over months or years. In view of the emergence of chloroquine-resistance in *Plasmodium falciparum*, there is a need to review the use of chloroquine for these conditions as it might contribute to selection of the less sensitive or resistant strains of the parasite.

Duration of chloroquine regimen was appropriately specified in 60.23 % prescriptions of the drug. The duration of treatment was inadequate in 19.77 % and prolonged in 10.23 % prescriptions. This was besides 9.77 % prescription in which prolonged use

of chloroquine was rationally recommended for conditions other than malaria. These factors seem to be significantly contributing to the drug pressure in our community.

Only 9 (1.63 %) prescriptions were written for parasitologically confirmed malaria. In others, clinical (17.72 %) or presumptive (48.16 %) diagnosis of malaria had been made. In wake of the limited access to the facility of laboratory diagnosis and the cost and time involved in the process, it is customary in most of the malaria-endemic countries to base the diagnosis on clinical picture only. In Kenya, OTC antimalarial medicines are popular first treatments in children and adults. However, it results in significant over-treatment with antimalarial drugs¹⁴. In a clinical study conducted in Quetta, Pakistan, out of 1831 patients presented with malaria symptoms, only 338 (18.45%) were found positive for malarial parasite¹⁵. Screening of 2.82 million blood slides in years 2004 & 2005 in Sindh, Pakistan, 68,000 slides were reported positive for malarial parasite with an estimated annual parasite incidence of 5.6/1000 population and 3.85/1000 population in years 2004 & 2005 respectively¹⁶. It is therefore, apparent that presumptive treatment of malaria results in over-use of antimalarial drugs to a very great extent. This may be considered to be another very important factor contributing to drug pressure.

In our sample of study, the diagnosis carried on 60 (10.85 %) prescriptions was not relevant to the use of antimalarial drugs. This irrational prescribing practice could only be expected to result in toxicity and development of resistance to these drugs. Combinations of antimalarials with other antimicrobial drugs were observed in 30.02 % of the total prescriptions studied. The practice reflects the diagnostic dilemma of these prescribers who tried to ensure therapeutic coverage for various causes of the fever in their patients, without being able to ascertain the cause.

We conclude that the prescription audit of antimalarial drugs has shown a room for improvement. It is the time for serious consideration towards irrational use of antimalarial drugs in Pakistan, since inappropriate prescribing plays a significant role in development as well as further propagation of drug-resistance in malaria¹⁷.

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THE GENDER DIFFERENCE OF 2nd TO 4th DIGIT LENGTH AND LENGTH RATIO (2D:4D) IN LOCAL POPULATION

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ABSTRACT

Background

In human hand the 2nd and 4th digit length and ratio (2D:4D) are thought to be related to pre-natal hormonal exposure and were different in male and female subjects. Such observations have not been addressed at local level. This ratio establishes at 14th week of gestation under the influence of HOX gene which does not change in adult life. The present study focused on the anthropometric difference in 2nd and 4th digit ratios between male and female.

Method

Digit length was measured from palmer surface of the hand from most proximal crease to the tip, using ordinary compass and ruler. The ratio was calculated by dividing the length of the 2nd digit with the 4th digit. Data were displayed as mean and standard deviation (SD), descriptive statistics and student's t-test were used for analysis through SPSS version 10. Statistical significance of $p \leq 0.05$ was accepted. The strength of relationship between length and ratio of 2nd and 4th digits of right and left hand of male and female subjects was worked out.

Results

The data of the study show demonstrated the significant difference in the length of 2nd and 4th digit and the ratio in female and male subjects. The mean value and standard deviation of 2D, 4D, R2D:R4D and L2D:L4D are shown in table 1 and the difference in length and the ratio between male and female subjects are statistically significant. Figure 3 also compare the R2D:R4D and L2D:L4D in male and female and the ratio difference is stronger in R2D:R4D of male and female subjects.

Conclusion

The present study showed that the male have shorter digit ratio than female.

Key Words:

Digit ratio, 2D:4D, sexual dimorphism

Introduction:

The hand has fascinated the human kind since long. It has been the subject of studies since ancient times. The shape, skin marking and length of digits in recent past has been extensively studied.^{1,2} It has been noticed that there are differences in hands of female and male. The difference between length of second digit and fourth digit was first noticed in 19th Century.³ It has recently been suggested that this difference in male and female in 2D:4D rise appears in utero relevant to the concentration of sex steroids.⁴ The ratio 2D:4D has been related negatively to pre natal testosterone and positively

with pre natal estrogen.⁵ This anthropometric feature has been studied in various ethnic populations but the study in our country is lacking. This ratio has also been implicated in various personality traits.⁶ The aim of present study was to ascertain the anthropometric difference in second and fourth digit ratio in local population of Rawalpindi Islamabad, Pakistan.

Subject and Method:

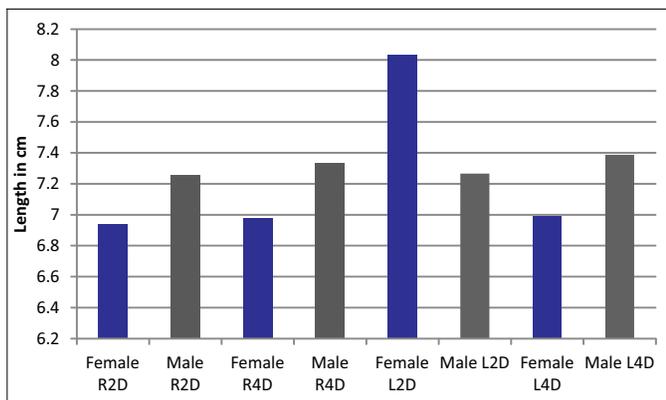
This study was carried out in Rawalpindi Medical College Rawalpindi from October 2012 to January 2013. A cross sectional comparative study involved 100 subjects (50 male and 50 female) between 18 to 40 years of age. They were selected randomly from different urban areas of Rawalpindi and Islamabad. The subjects with injury and physical deformity were excluded. All measurements were made with

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Table 1: Mean \pm Standard Deviation for 2nd digit, 4th digit, their ratio between right and left hand of male and female subjects.

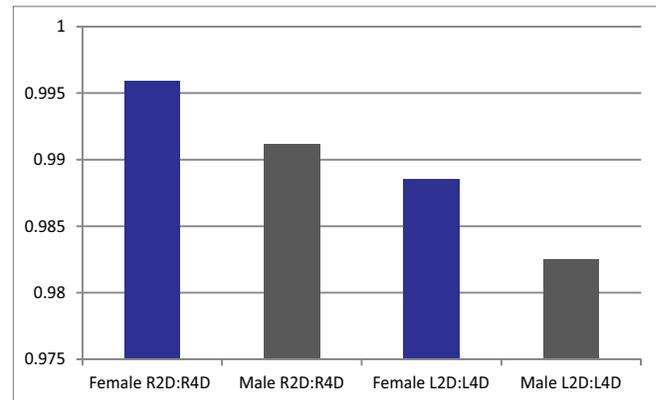
Parameters	Mean \pm S.D(cm) (Female)	Mean \pm S.D(cm) (Male)	Sig. Level
R2D (cm)	6.94 \pm 0.27	7.25 \pm 0.50	P < 0.01
L2D (cm)	8.04 \pm 0.49	7.26 \pm 0.55	P < 0.01
R4D (cm)	6.97 \pm 0.30	7.33 \pm 0.63	P < 0.01
L4D (cm)	6.99 \pm 0.33	7.38 \pm 0.57	P < 0.01
R2D:R4D	0.995 \pm 0.03	0.991 \pm 0.04	P < 0.01
L2D:L4D	0.988 \pm 0.02	0.982 \pm 0.03	P < 0.01

**Figure 1: The length of R2D, R4D, L2D & L4D (in cms) of female and male subjects**

digit fully extended. The length of the second digit designated as 2D (index finger) and fourth digit designated as 4D (ring finger) and was measured in centimeters with compass and ruler from most proximal crease on palmer side to the distal end of both hands. The ratio 2D:4D of right and left is also calculated. The handedness of the subject is also enquired and data has been analyzed by SPSS (Version 10). Mean values and standard deviation was calculated for male and female subjects viz parameters R2D, R4D, R2D:R4D, L2D, L4D and L2D:L4D. Student's t-test was used to analyze the parameters studied in both male and female subjects and level of significance was calculated at $p < 0.05$.

Results

The results of the study showed that the length of 2nd and 4th digit and their ratio between right and left hands of male and female subjects were significant

**Figure 2: The difference of R2D:R4D and L2D:L4D (in cms) of female and male subjects**

with p value less than or equal to 0.01 (Table 1). Length of the 2nd digit was found smaller than the 4th digit in male and the 4th digit was smaller than 2nd digit in female (Fig. 1). While the ratio 2D:4D was found smaller in male than in female subjects. The ratio was found stronger in right hand than in left hand in both genders (Fig.2).

Discussion

Determination of length and its ratio in right and left hand fingers of male and female gender ascertained that the female had longer second digit than fourth digit while the male had longer fourth digit than second digit. This was also reflected as higher digit ratio in female than in male and this ratio was found positively co-related with hand preference. The digit length was known to be influenced by in utero exposure to testosterone and estrogen. Prenatal testosterone has been documented as an important

factor in the development of extra genital sexual dimorphism such as hand preferences.⁷ The pattern of formation of the digit has also been related to the function of the gonads.⁸ Prenatal testosterone comes from maternal testosterone and the fetus itself from 8th week to mid-gestation.⁹ The fetal source is dependent on the differentiation of testes. So the differentiation of gonads, the digits and the toes are under common control of HOX genes, therefore the pattern of the digits is reflection of function of the gonads. Ratio between 2nd and 4th digits in males tends to be lower than in females.

Ratio of 2nd digit in right hand (R2D:R4D) is the marker of the inutero testosterone levels and a predictor of other extra genital traits like autism, dyslexia, migraine, stammering, auto-immune disease, sexual preferences and spatial, language, music and mathematical abilities.^{10,11,12,13} The differentiation of urogenital system and appendicular skeleton in vertebrate is under the control of HOX gene.¹⁴ The posterior most genes (HOX_d and HOX_a) are responsible for limb and genital development. Changes in HOX_d and HOX_a gene result in variation of length of digits and function of Leydig cells and production of testosterone. Right hand ratio of 2D:4D is specifically considered as the marker of inutero testosterone level and predictor of extra genital traits.¹⁵ This has been demonstrated in various studies on human as well as experimental studies in other vertebrates.^{16,17} Pre-natal exposure to testosterone, estrogen and maternal stress during pregnancy reflected as maternal corticosterone which is responsible for difference in length and ratio of male and female. These changes get established in 13th week of gestation and are not influenced during later life¹⁸. The experimental studies also demonstrated that there were estrogen receptors on 2nd digit and androgen receptors on 4th digit. In activation of these receptors there result in increased chondrocyte proliferation in 4th digit. Second phalanx of fourth digit in male with hair as compared to second phalanx of 2nd digit in male¹⁹ also supports this finding. There are 19 genes responsible for influencing the length of the digit and affecting the 2D:4D ratio which may be linked to sex dependent behavior and diseases of immune system, cardiovascular disorder and number of cancers.^{20,21,22}

Conclusion

The present study shows that the male has shorter digit ratio than female which could be due to their

pre natal hormone exposure.

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CURRENT TRENDS IN ANTIMICROBIAL SUSCEPTIBILITY PROFILE OF METHICILLIN RESISTANT *STAPHYLOCOCCUS AUREUS* (MRSA) ISOLATES - A MULTICENTRE EXPERIENCE.

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ABSTRACT

Introduction:

Staphylococcus aureus has always been considered a major pathogen associated with serious nosocomial as well as community acquired infections. Glycopeptides, drug of choice for this deadly superbug have a narrow spectrum of activity, restricted to most Gram-positive bacteria. These drugs are associated with hospitalization, intravenous administration, and unacceptable side effects.

Aims and objectives:

The aim of our study was to evaluate in vitro efficacies of currently available and effective antibiotics against methicillin resistant *Staphylococcus aureus*, so as to formulate a better empirical therapy for our local use.

Materials and Methods:

The study was conducted over a period of two years (Dec 2010–Dec 2012) in the National University of Sciences and Technology, Department of Microbiology, Army Medical College Pakistan, PAEC General hospital Islamabad and Quaid I Azam International Hospital Islamabad. Four hundred and seventy nine Methicillin resistant *Staphylococcus aureus* isolates from the clinical specimens were subjected to the determination of in vitro susceptibility against various antimicrobials using Kirby Bauer disc diffusion technique.

Results:

All the isolated MRSA organisms were highly susceptible to vancomycin, linezolid, daptomycin, quinupristin/dalfopristin and tigecycline. Other drugs found to be effective were chloramphenicol and minocycline. Most of the MRSA isolates were isolated from pus followed by nasobronchial lavage samples.

Conclusion:

Vancomycin, tigecycline, linezolid and minocycline were effective against methicillin resistant strains of *S. aureus*. This study suggests that chloramphenicol and rifampicin also have good in vitro efficacy for methicillin resistant *Staphylococcus aureus*. Oral dosing option for linezolid, chloramphenicol, minocycline and rifampicin can allow earlier discharge of hospitalized patients and thus reducing health care expenses as well as will help us in reducing the chances of emergence of glycopeptide resistant strains.

Key words: Methicillin resistant *Staphylococcus aureus*, Susceptibility pattern.

Introduction:

The genus *Staphylococcus* includes many human

pathogens, in which *Staphylococcus aureus* is the most important one. It has overcome most of the therapeutic agents that have been developed in the recent years.¹ As the problem of drug resistance to penicillins mediated by the production of beta-lactamase has become prevalent, so because of it most of the effective first line empirical therapies have been thrown out of the scene. After around

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eight years of Penicillin discovery, approximately eighty percent hospital acquired Staphylococcal infections were untreatable by using penicillins.¹ The introduction of beta-lactamase resistant semi-synthetic penicillins in the early 1960's provided temporary relief, but that also ended with the emergence of Methicillin (oxacillin) Resistant *Staphylococcus aureus* (MRSA), discovered shortly after methicillin became freely available for clinical use.²

MRSA that are encountered in the community (outpatient settings) arise either as a result of acquisition of the *mec A* gene complex by susceptible *S. aureus* strains, or by person to person carriage of hospital strains into the community.³ Many of these both hospital as well as community acquired MRSA isolates are becoming multidrug resistant and are susceptible only to glycopeptide antibiotics. Low level resistance even to glycopeptides is on rise at present and there is emergence of Glycopeptide intermediate *Staphylococcus aureus* strains (GISA) and Vancomycin intermediate *Staphylococcus aureus* strains (VISA).¹ The prolonged hospital stay, indiscriminate use of antibiotics, lack of awareness, receipt of antibiotics before coming to the hospital etc. are the possible predisposing factors for MRSA and GISA emergence. For hospital as well as community acquired MRSA, there are relatively few agents that still maintain high levels of activity.^{2,3} When this scenario is combined with the propensity of certain community clones to exhibit certain virulence factors and toxins such as Panton Valentine Leuckocidin (PVL), it raises concern about future therapeutic options for *S. aureus* infections encountered in the outpatient as well as in patient settings.^{1,4} The accurate knowledge of prevalence of MRSA and their current antimicrobial profile is necessary in the selection of appropriate empirical therapy for these infections. Control of MRSA in hospital is essential. It can be

achieved by proper implementation of hospital infection control measures and regular surveillance activity by hospital infection control team.³ In addition to the issue of increasing MRSA infection rates among inpatients, the recognized emergence of MRSA beyond the hospital or healthcare settings into the community has raised another substantial public health concern about this superbug.⁴ Therefore, we planned this study to determine the current antimicrobial profile of MRSA isolates from our local hospitals, so as to formulate an appropriate as well as cost effective empirical therapy.

Materials and Methods:

It was a descriptive cross sectional study conducted from Dec 2010 - Dec 2012. Proper ethical approval from the ethical review committees of the respective hospitals was taken before start of the study. Samples received from patients admitted in clinical wards of Military hospital Rawalpindi, PAEC general Hospital Islamabad and Quaid I azam International Hospital Islamabad were processed. All *Staphylococcus aureus* isolates encountered in routine clinical specimens were identified morphologically and biochemically by standard laboratory procedures including tube coagulase test and DNase test using DNase agar (Oxoid Ltd, Basingstoke, Hampshire, England). MRSA screening was performed on Mueller-Hinton agar using 6 µg/ml oxacillin and 30 µg cefoxitin discs as per Clinical and Laboratory Standards Institute (CLSI) guidelines.⁵ Susceptibility to antimicrobial agents was determined by the modified Kirby Bauer disc diffusion method using following antimicrobial discs: Vancomycin (30µg), Linezolid (30µg), Teicoplanin (30µg), Tigecycline (30 µg), Tetracycline (30µg), minocycline (30µg), Doxycycline (30µg), Quinopristin/Dalfopristin (15µg), Ciprofloxacin 5µg, Chloramphenicol(30 µg), Trimethoprim/ sulphamethoxazole

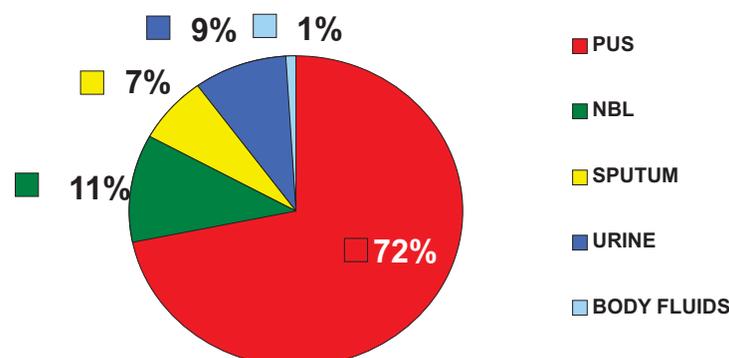


Figure1: Percentage of MRSA Isolated from various specimens n =479

Table 1: Sensitivity pattern of MRSA against various antibiotics. n= 479, n*= 182

Antibiotic	Sensitive	Resistant	% Sensitive
Vancomycin	479	0	100%
Daptomycin*	182	0	100%
Linezolid	479	0	100%
Quinopristin/Dalfopristin	479	0	100%
Minocycline	450	29	94%
Teicoplanin	435	44	91%
Chloramphenicol	435	44	91%
Tigecycline	431	48	90%
Doxycycline	340	63	84%
Trimethoprim/sulphamethoxazol	311	168	65%
Tetracycline	287	192	60%
Rifampicin	285	194	59%
Ciprofloxacin	145	334	30.45%
Erythromycin	89	390	18.5%

(1.25/23.75 µg), Rifampicin (5 µg), Macrolides (Erythromycin 15 µg) (Oxoid Ltd, Basingstoke, Hampshire, England) as per CLSI guidelines.⁵ Only 182 out of 479 isolates were tested against daptomycin (30 µg) because of non availability of daptomycin discs at various centers and was evaluated according to Food and drug administration (FDA) criteria that is ≥ 16 mm zone of inhibition for sensitive.⁶ Descriptive statistics were used to figure out frequency of resistance or sensitivity for each antimicrobial.

Results:

A total of 479 MRSA isolates were isolated during the study period. All of the isolated MRSA were found to be sensitive against vancomycin, daptomycin, linezolid and quinopristin/dalfopristin. Four hundred and fifty isolates (94%) were sensitive to minocycline, (435) 91 % to

teicoplanin and chloramphenicol each, whereas (431) 90% isolates were sensitive to tigecycline. Only 30% and 19% of the isolates were found to be sensitive against fluoroquinolones and macrolides respectively as shown in table 1.

Majority of MRSA 72 % were isolated from pus samples followed by nasobronchial lavages samples (11%) as shown in figure. 1.

Discussion:

A study conducted at the Army medical college in year 2009 indicated that there was no reduced susceptibility of vancomycin against MRSA isolates as indicated in our study as well, but 4% VISA strains were detected in a study carried out in King Edward Medical College Lahore in 2004.^{1,7,8} Regional studies show VISA incidence as 3.3% in Srinagar Kashmir (2003), 6% in India (2007) and 7.5% in Iran (2008).^{9,10,11}

The resistant rates to chloramphenicol, ciprofloxacin, erythromycin, gentamicin, tetracycline and trimethoprim/sulfamethoxazole were 44.0%, 73.7%, 89.1%, 65.7%, 61.0% and 67.0% respectively in a study carried out in Beijing China.¹² The results of our study are in accordance with a study carried out at Aga Khan University Karachi in 2009 which showed variable susceptibility pattern with high resistance rates to tetracycline (82%), clindamycin (79%) and rifampicin (50%). Resistance to fusidic acid (9%) and chloramphenicol (10%) was low.¹³ A study carried out at Lahore in 2009 showed that only 4% of MRSA isolates were sensitive to fluoroquinolones, whereas 30% of isolates were found to be sensitive in our study.¹⁴

A study by Kaleem *et al* in year 2009 indicated that linezolid and quinipristin/ dalfopristine are highly effective against MRSA infections along with older but not commonly used drugs like chloramphenicol and minocycline also show good in vitro efficacies.

¹In our study 100% of the isolates were sensitive to linezolid which is complemented by an Iranian study carried out in 2009.¹⁵ In that study tigecycline was also found to be 100% effective, whereas in our study tigecycline showed 90% efficacy.¹⁵ A study conducted in Rawalpindi 2009 compared the minimum inhibitory concentrations (MIC) of linezolid and vancomycin and concluded that these both drugs have similar in vitro activities against MRSA isolates.¹⁶ Chen *et al* in year 2010 reported that most of the strains of *Staphylococcus aureus* were resistant to tetracycline, erythromycin, clindamycin, gentamicin, chloramphenicol, trimethoprim-sulfamethoxazole, and ciprofloxacin but were susceptible to rifampicin and vancomycin.¹⁷

Conclusion:

Vancomycin, daptomycin, linezolid and quinipristin/ dalfopristine are highly effective against MRSA. Tigecycline though effective but enhances health care costs enormously, but the drugs famously used for gram positive cover like macrolides are almost ineffective in case of MRSA infections.

This study suggests that chloramphenicol and minocycline/ doxycycline also have good in vitro efficacy for methicillin resistant *Staphylococcus aureus* infections. Oral dosing option for linezolid, chloramphenicol, minocycline and rifampicin can allow earlier discharge of hospitalized patients and thus reducing health care expenses as well as will help us in reducing the chances of glycopeptide

resistant strains emergence. Current trends in antimicrobial profiles should be extensively studied so as to formulate a better, efficacious, and cost effective empirical therapy for our local use against dreadful organisms like MRSA. Hospital infection control programmes should monitor the current trends of antimicrobial resistance against MRSA continuously and effectively to keep guiding local physicians.

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HAEMATOLOGICAL PARAMETERS AND CLINICAL MANIFESTATIONS OF ACUTE LYMPHOBLASTIC LEUKEMIA

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ABSTRACT

Background:

The clinical presentation of acute leukemias is quite variable in children and adult. The present study was designed to assess the hematological and clinical presentation of acute leukemias in these two age groups.

Methodology:

This retrospective study was conducted in Fauji Foundation hospital from 2009 to 2011. A total of 40 diagnosed patients of acute leukemias were included in the study. These patients were divided into children and adults according to their ages. Common clinical and haematological findings of the disease in these two age groups were noted. Distribution of these patients according to gender and FAB morphological classification were also investigated.

Results:

Out of 40 acute lymphoblastic (ALL) cases, 23 (57.5%) were children while 17 cases (42.5%) belonged to adult age groups. Incidence in males was higher than in females in children. Fever, hepatomegaly and splenomegaly were the most common clinical findings at the time of presentation in children where as generalized weakness along with hepatomegaly and splenomegaly was observed more frequently in adult patients with ALL. L2- morphological subtype was more common in adults (53%) while L1 morphological subtype was the predominant form (61%) in childhood ALL.

Conclusion:

ALL is more common in children with higher incidence in males (65%) than in females. The clinical presentation of acute leukemias in children and adults is unpredictable. L2 type is more prevalent in adults while L1 type is more prevalent in childhood ALL.

Key words:

Acute Lymphoblastic Leukemia, Adult ALL, childhood ALL, clinical presentation, hematological parameters.

Introduction

Acute lymphoblastic leukemia (ALL) is a heterogeneous disease in terms of its pathology as well as the populations that it affects¹. ALL predominates as an acute hematological malignancy in children but may occur at any age². It is considered most common pediatric malignancy accounting for 25% of childhood cancers. Peak age of ALL is observed at 2-5 years in childhood³. Adult acute lymphoblastic leukemia (ALL) is a significantly different disease when compared to

childhood ALL⁴. It is uncommon in adults and represents about 15% of all leukaemias and usually affects young adults, about half the cases are under 50 years of age. Its occurrence is rare over the age of 70 years^{4,5}. The incidence of leukemia is slightly higher among boys in children and in adults also it is reported to be more common in men than women⁵.

The presenting clinical features of the acute leukemias are due to uncontrolled proliferation of malignant cells leading to replacement and suppression of normal hematopoietic cells and infiltration into extramedullary organs⁶. Anemia, infection and hemorrhages due to bone-marrow failure are the most common complications of this disease and may lead to death⁷. The common laboratory findings of ALL are low hemoglobin,

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abnormal leukocyte and differential counts and thrombocytopenia which are usually present at the time of diagnosis⁸. Adult ALL disease is significantly different from childhood ALL and it may present with marked differences both in terms of biological factors and clinical outcomes⁹.

To establish the diagnosis of leukaemia definitively bone marrow aspiration is essential. In contrast to normal bone marrow which has fewer than 5% blasts, leukaemic marrow generally is almost completely infiltrated by blasts cells⁸. Morphologically these blast cells have been classified according to the FAB (French, American and British) criteria into three subtypes, L1, L2 and L3. This system of classification is still valid and has been proven to be clinically reproducible¹⁰.

The clinical and laboratory presentation of acute lymphoblastic leukaemia in these two different age groups have been well described in Western literature but unfortunately there is scanty published data available from Pakistan. This study was undertaken to assess the clinical presentation and laboratory features of ALL in children and adult age groups.

Materials and Methods:

This was a retrospective study conducted at Fauji Foundation Hospital Rawalpindi on 40 consecutive patients of ALL (17 adults and 23 children). These patients have reported to either medical Orthopediatric wards from February 2009 to February 2011. They belonged to all age groups, both sexes and mixed socio-economic status. Their detailed information regarding age, sex, clinical presentation, ethnicity and family history was retrieved from medical records of the hospital.

Only newly diagnosed patients of ALL who have not received any chemotherapy were considered. Relapsed cases after complete remission and patients in blast crisis previously suffering from chronic myeloid leukemia (CML) were excluded from study.

The diagnosis of ALL was established on the basis of clinical history, physical examination and laboratory investigation including CBC and examination of peripheral blood and bone marrow smears. These patients were further categorized according to morphological type of blast based on FAB criteria of ALL into L1-L3.

Statistical analysis was done using spss version 17 software. Gender distribution and various clinical and laboratory parameters were expressed in terms

of percentages.

Results:

A total of 40 patients of diagnosed acute lymphoblastic leukemia (ALL) were included. Patients comprised of age range of 2-56 years (median age of children was 7 years, median age of adults were 40 years) and they belonged to both sexes. These patients were divided into two groups. First group included children equal or less than 12 years of age. The other group included adult patients equal to or more than 12 years old.

The difference in the pattern of age and gender distribution in Acute Leukemia are shown in Table- 1. ALL was found to be more frequent in children. Overall males have formed significant majority of the patients in both age groups but this difference was more significant in childhood cases. (Table-1). Figure 1 shows equal distribution of disease in all ages from 2 to 12. Quite variable pattern of disease distribution is noted in adult patients which shows young individuals below 40 years are affected more. (Fig. 2).

Figure 3 represents the presenting feature in both age groups at time of diagnosis. Fever, hepatomegaly and splenomegaly were the most common presenting features in childhood ALL whereas generalized weakness, bleeding gums and bone pains were seen more frequently in adults as compared to children. Lymph nodes were equally enlarged in both age groups (Fig.3).

Mean leukocyte count was slightly higher in children as compared to adult patients (Table -2).

However no significant difference in the mean haemoglobin levels, mean platelet count and percentage of blasts in bone marrow was observed in both age groups (Table -2).

Table 3 demonstrates overall distribution of ALL subtypes according to FAB classification. This distribution in children and adults showed a contrasting pattern for L1 and L2. In children L1 was found to be the most frequent subtype. In comparison, L2 was the most frequent subtype in adults (Table-3).

Groups have been well described in Western literature but unfortunately there is scanty published data available from Pakistan. This study was undertaken to assess the clinical presentation and laboratory features of ALL in children and adult age groups

Table- 1: Age and gender distribution of ALL patients (n=40)

Type of ALL	MALE %	FEMALE%	TOTAL
CHILDHOOD ALL (GROUP I) < 12 years	17(61%)	6 (39%)	23 (57.5%)
ADULT ALL (GROUP II) >12 years	9(53%)	8(47%)	17(42.5%)



Figure- 1: Age distribution in childhood ALL(n=23)

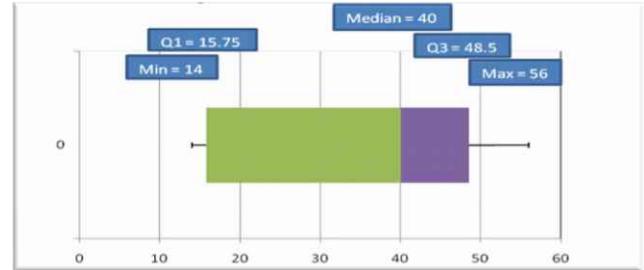


Figure-2: Age distribution in adult ALL (n=17)

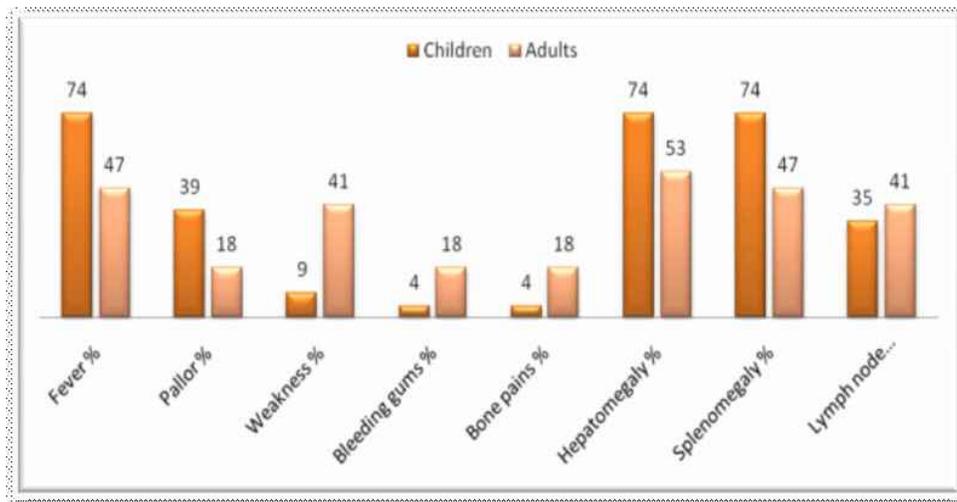


Figure-3: Clinical presentation at time of diagnosis in patients with childhood and adult ALL

Table-2: Laboratory findings at time of diagnosis in patients with childhood and adult ALL

Laboratory Features	Childhood ALL		Adult ALL	
	Mean±S.D	Range	Mean±S.D	Range
Leukocyte count (X10 ⁹ /L)	98±230.02	2.2-848	70.3±144.45	2-444
Hemoglobin levels (g/dL)	6.8 ± 1.91	3-9.5	6.8 ±2.44	2.6-10.4
Platelets count (X10 ⁹ /L)	45± 56.03	1-276	42 ±76.93	4-303
Percentage of blast cells in marrow %	91±9.67	60-100	88± 8.32	60-95

Table-3: Distribution of cases of ALL according to FAB classification

Morphological classification(FAB)	Childhood ALL % N=23	Adult ALL% N=17
L1	14 (61%)	7 (41%)
L2	7 (30%)	9 (53%)
L3	2 (9%)	1 (6%)

Discussion

Acute Lymphoblastic leukemias are cancers that arise from lymphoid stem cells, which normally mature into white blood cells, also known as leukocytes¹¹. They have different biological behavior in pediatric and adult age groups.

In our study age distribution of acute leukemias showed that 57.5% of patients were below 12 year and 42.5% were adults. The results were comparable to that of local as well as western studies reported previously^{7,10,11}. Median age in patients with childhood ALL was found to be 7 years in our study which is in agreement to study carried out earlier in Karachi on our local population reporting median age in children to be 6.5 years¹². Similar findings have been observed in India reporting 7 years as a median age in children suffering from ALL¹³. In our adult group the median age was found to be 40 years, which is also in accordance to previous report showing median age of 38.5 yrs in adult patients¹⁴.

In childhood ALL it was observed that boys are affected more commonly than girls with a sex ratio of 3:1. This is in accordance to previous studies reporting similar male to female ratio¹². However in adult ALL male to female ratio was found to be 1:1 in our study which was contrary to local study carried out in Agha Khan hospital in Karachi showing definite male preponderance in adult age group similar to that reported in western literature⁹.

There are no major differences in presenting clinical features in paediatric or adult ALL patients in our study except for the bleeding gums which was more commonly seen in adults. Similar findings have been observed in a study carried out on patients of ALL in Chicago which reports that there is no significant clinical and/or biological difference between young and adult patients at time of the presentation¹⁵. Our results showed 70% of the patients presented with fever, hepatomegaly and

splenomegaly in childhood ALL. Studies from other countries also report 70% to 75% hepatomegaly and/or Splenomegaly in childhood ALL. Another study on childhood ALL reports 80% of patients presenting with lymphadenopathy¹⁶ while we observed lymphadenopathy only in 35% of our paediatric study group.

Regarding haematological parameters the pediatric and adult ALL groups were unexpectedly similar in our study. It has been reported earlier that adults more often have high white cell counts at time of diagnosis¹⁷ but we failed to elicit this finding as our pediatric population presented with comparatively high leukocyte counts.

We used FAB criteria for classification of ALL patients. The results indicated that most patients with childhood ALL in our study had L1 morphology whereas in adult group increased frequency of L2 morphology was noted. A study conducted earlier on Iraqi population supports our findings¹⁰. Other studies previously done on children with ALL also report L1 to be the most common type of subset in children according to FAB morphological classification (18,19).

Conclusion:

Acute lymphoblastic leukaemia affects children more than adults, with a higher male to female ratio in children. L1 subtype is more frequent in children where as L2 subtype is more commonly seen in adults patient with ALL.

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FREQUENCY OF INTRACRANIAL COMPLICATIONS IN PATIENTS WITH CHRONIC SUPPURATIVE OTITIS MEDIA

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ABSTRACT

Background:

Chronic suppurative otitis media is a very serious disease. It can result in complications which can be both intracranial and extracranial. The most common intracranial complications are meningitis, lateral sinus thrombosis and temporal lobe abscess.

Objective:

The objective of this study is to find out the frequency of intra cranial complications in patients with chronic suppurative otitis media and to assess the early presentation of complications so as to reduce these complications in these patients.

Study design:

Cross sectional study

Place & duration:

Department of E.N.T Sandeman Provincial Hospital Quetta, Pakistan. The study period is from 1st May 2007 to 2nd November 2008.

Material and Method:

One hundred and fifty patients with discharging ears were taken for study from O.P.D and ward, Sandeman Provincial Hospital Quetta. Convenience non probability technique sampling was done.

Result:

Out of 150 patients with discharging ear, 82 (54.7%) were males and 68 (45.3%) females. Age ranged from 4-60 years. Pure tone audiometry was done in 143 (95.3%) patients. X-ray mastoid law's view was taken in all patients (100%) and CT-Scan was done in 32 (21.3%) patients who were suspected with intra cranial complications. Higher suspicion originated in patients who had symptoms like headache, tinnitus, vertigo, fever, neck rigidity and fits. Intra cranial complications were found in 3 (2%) of the patients while 147 (98%) had no intra cranial complications. 1 (0.7%) female patient aged 15 years was diagnosed with otogenic brain abscess, another female child of 4 years with acute meningitis while 1 (0.7%) male patient aged 25 years was also diagnosed with otogenic meningitis.

Conclusion:

The frequency of intra cranial complications is consistent with data reported in literature and other studies. Complications were common in young females less than 25 years of age. The most common complications were brain abscess and meningitis.

Keywords:

Chronic suppurative otitis media, meningitis, intra cranial complications, brain abscess.

Introduction

Chronic suppurative otitis media is a common

disease because it can result in complications that can be both intracranial and extracranial¹.

However, the mortality rate of complications due to this disease has been decreased in the last decade due to advent of high doses of appropriate antibiotics². But the incidence of complications is still frequently seen³, which may be due to poor

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socio-economic conditions, ignorance of disease, lack of education and awareness about health care⁴.

The complications of chronic suppurative otitis media usually occur in young patients with female predominance. This female predominance is attributed to late presentation because of social reasons or due to susceptibility to the destructive effect of cholesteatoma^{5,6}.

Acute intensification of chronic suppurative otitis media (safe) usually leads to rapid intracranial spread. Cholesteatoma (CSOM unsafe) is the most common cause and removal of the disease is very important to prevent recurrence⁷.

Routes of spread of infection to cranial cavity are usually direct erosion of bone through anatomical pathways and previous trauma which may be surgical or non surgical.

The common intracranial complications of chronic suppurative otitis media are brain abscess, lateral sinus thrombosis and meningitis. Rare complications include extradural abscess, subdural abscess, cortical thrombophlebitis, dural herniation and otitic hydrocephalus⁸⁻¹⁰.

The objective of this study is to find out the frequency of intracranial complications in patients with chronic suppurative otitis media and to assess the early presentation of complications in our set up so as to reduce these complications in patients with chronic suppurative otitis media.

Material and Method

This cross-sectional study was conducted at the Outpatient and Inpatient Department of ENT, Sandman Provincial Hospital Quetta from 1st May 2007 to 2nd November 2008. A total of 150 patients with chronic suppurative otitis media were selected. Patients of all ages and both sexes with CSOM were included in the study. However patients of CSOM due to chronic granulomatous diseases like tuberculosis were excluded from the study as tuberculosis is a very common disease in developing countries but it rarely affects the middle ear¹¹.

The patients were evaluated by history and

investigations. All patients with chronic suppurative otitis media (CSOM) were examined thoroughly. Clinical findings were confirmed by examination under microscope (EUM). Pure tone audiogram in 143 (95.3 %) patients and x-ray mastoid in all the patients were done. When clinical features predicted the presence of possible intracranial complications, a CT scan of the temporal bone or a lumbar puncture was performed. Patients diagnosed with brain abscess were treated surgically by neurosurgeons followed by intravenous antibiotics for 6 weeks. Patients with meningitis were treated conservatively with antibiotics (intravenous) at least for 2 weeks. These patients underwent mastoid surgery as soon as their general condition became stable for general anesthesia. All relevant information including patient's age, sex, occupation history, type of intracranial complication was documented on pre-designed proforma.

Statistical software SPSS-10.0 was used for statistical data analysis. Mean and standard deviations (SD) were calculated for quantitative variables. Frequencies and percentages were computed to present all categorical variables. Chi-square/Fisher exact test was applied to compare significance of intracranial complications between gender and age groups. P<0.05 was considered statistically significant.

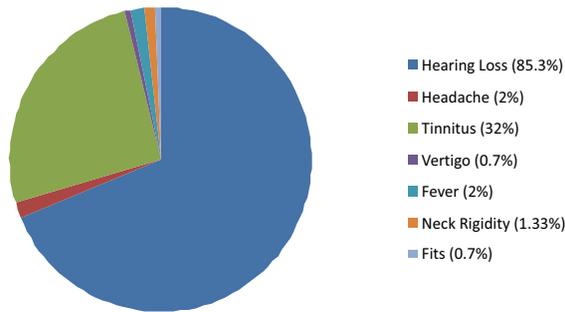
Result

Out of 150 patients of CSOM, there were 82 (54.7%) males and 68 (45.3%) females with male:female ratio of 1.21:1. Majority of the patients (32%) were found in their second decade of life followed by 27% in their third decade of life. Mean age was computed 23.57±12.4 (ranging from 4 to 60) years. Discharge was the significant complaint that was reported by all (100%) patients followed by hearing loss in 128 (85.3%) headache in 3(2%), tinnitus in 48(32%), vertigo in 1(0.7%), fever in 3(2%), neck rigidity in 2(1.33%) and fits in

Table 01: Showing Gender Distribution

Gender	Result		Ratio
	Female	68	(45.3%)
Male	82	(54.7%)	1.21

Fig: 1 Percentage Symptomatology leading to complications



only 1 (0.7%) patient. A significant number of patients (38.7%) were studied followed by 32 (21.3%) government servants, 15 (10%) were having their own business, 11 (7.3%) laborers, 26(17.3%) were non-working domestic ladies and 8 (5.3%) were non-working or unemployed men. On examination PTA (audiometry) was done in 143 (95.3%), X-ray mastoid law's lateral. view was taken in all patients (100 %) and CT was done in 32(21.3%) patients. Intra cranial complications were found in 3 (2%) patients while 147 (98%) had no intra cranial complication. Among these 3 patients out of 150, 2(1.33%) were females and 1 (0.7%) male (p=0.590). All three patients with intracranial complication were aged 25 years or less (p=0.279).One (0.7%) female patient aged 15 years was diagnosed to have otogenic brain abscess. Another female child of 4 years was diagnosed meningitis while one (0.7%) male patient aged 25 years was diagnosed with otogenic meningitis in this study.

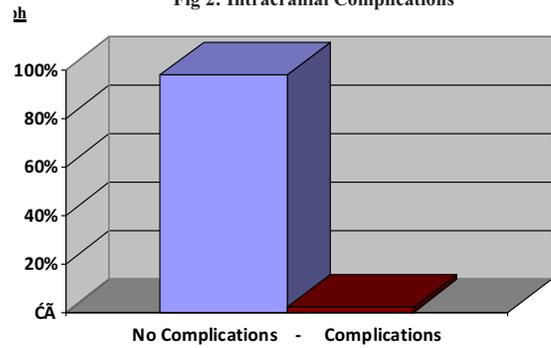
Discussion

In this study intracranial complications were found. This is consistent with the study done by Osma et al. which revealed that out of 2890 patients 57(1.97%) patients had intra cranial complications⁶.

Majority of the patients among CSOM (32%) were found in their second decade of life followed by 27% in their third decade. We found that intra cranial complications were more common in patients who were <25 years which is in similarity with other studies^{5,7,10,12-15}. The reason behind this may be that this is the most health conscious group. Our cases do not differ a lot from the large series reported in the literature. Studies performed in Thailand showed a rate of 0.36% of intracranial complications (ICC) in 32 patients within a period of 13 years¹³.

Out of 150 patients of CSOM, there were 82(54.7%) males and 68(45.3%) females with male: female ratio of 1.21:1. The reason behind is not clearly

Fig 2: Intracranial Complications



understood, but it might be possible that males get medical attention more frequently than females. In our study, discharge was the significant complaint that was reported by all (100%) patients of CSOM followed by hearing loss in 128 (85.3%), headache in 3 (2%) tinnitus in 48 (32%) and vertigo in 1 (0.7%), fever in 3 (2%), neck rigidity in 2 (1.33%), and fits in only 1 (0.7%) patient.

As to the most common form of presentation of ICC, there are some differences in the literature. Penny backer et al., in 1961, reported 200 cases of ICC , 85 cases were of of temporal lobe and cerebellum abscess, 28 cases of otitic hydrocephalus, 13 cases of meningitis and 8 cases of lateral sinus thrombosis¹⁶. Kuczkowski and Mikaszewski reported 503 cases of ICC (372 by COM and 131 by AOM), 80.7% had only a single complication and 19.3% had multiple complications. The most common ICC was meningitis (35.2%), extradural abscess (24.2%), lateral sinus thrombosis (17.9%), cerebral abscess (12.7%), cerebellar abscess (7.0%), hydrocephalus (2.8%) and cavernous sinus thrombosis (0.2%). Data from the second report is close to ours in relation to frequency of findings despite the relatively different distribution which occurred mainly because of our small simple size. It is important to highlight that there were also adult in the sample.

Meningitis was the most common intracranial complication (ICC) in our study (2/3, 66%) but there may be direct invasion of the disease/ inflammation in areas close to the meninges (abscess, thrombophlebitis) or hematogenic dissemination from the infected ear (more frequent in AOM cases). Signs and symptoms included discharge from ears, headache, fever, hearing loss, vertigo, tinnitus and neck rigidity as well as positive Kerning and Brudzinski signs. CSF was turbid in color, cell count raised with predominance of polymorphs, protein levels raised, sugar reduced and chlorides were diminished.

It is important to perform a tympanic paracentesis

for collection of material and drainage. Treatment consists of intravenous antibiotics therapy. In cases of recurrent meningitis, middle ear and mastoid exploration is indicated. All our patients presented with meningitis in agreement with the literature as the most frequent ICC.

In a study done by Chowdhury MA et al, they reported central perforation in all patients in tubotympanic (group I) and atticofacial (group II) types. In atticofacial type, hearing impairment was more than tubotympanic disease. Complications were more in atticofacial type of disease. In-group II, post auricular sinus (25%) was the commonest extracranial complication followed by subperiosteal abscess (18%) and meningitis (10%). Among groups the mortality rate was only 4% in group II and was due to intracranial complications. The study recommends early detection and effective surgical treatment of the disease to improve the situation⁵.

The findings of our study are in accordance with the other studies done by Chotmongkol et al.¹⁷ and Rupa et al.¹⁸. Studies of Chowdhury et al. and Kurien et al. conclude meningitis to be the commonest intracranial complication followed by brain abscess^{5,19}.

Amongst the brain abscess patients, temporal lobe abscess (27.27%) was more common than cerebellar abscess (18.18%). This finding is also in accordance with the study of Bluestone et al. and Lund^{6,20}. Multiple complications were seen in only 3(9.09%) patients. It could be due to small sample size. However, Gupta et al. reported the incidence of multiple complications being 47.82%²¹.

CT scan confirms the diagnosis. Treatment consists of intravenous antibiotics. Surgical drainage is made by the neurosurgeon in cases that do not progress well. If possible, we should perform a mastoid exploration.

In this study we don't have the higher rate of ICC within 2 years. There may be a higher incidence but our sample size was small. This was the limitation of our study. However, we know that duration of the disease, time of diagnosis and early intervention reduce the number of complications²². There is a requirement of more multi-center studies for factual findings in local population.

Conclusion

The frequency of intracranial complications (3.2%) is consistent with that of reported in literature and other studies. However with the advent of antibiotics complications of chronic suppurative otitis media have been reduced. Complications are more common in females and in the age group <25 years. Brain abscess and

meningitis are the commonest intracranial complications.

Even though lesser than in the past, ICC by otitis media continues to be a risk situation to patients with high mortality rate. Suspicion of complications arises by the presenting complaint of the patient. High index of suspicion is essential for diagnosis and skillful management.

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KNOWLEDGE OF HEPATITIS C VIRUS AMONG COMMON PATIENTS VISITING IN A TERTIARY CARE HOSPITAL IN PAKISTAN

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ABSTRACT

Background:

Worldwide prevalence of Hepatitis C is 3% and due to lack of effective vaccination for prevention, emphasis is put on counselling of patients and contacts especially those at risk.

Aim:

Aim of our study was to determine the awareness of various modes of transmission and knowledge about hepatitis C virus in common patients coming to a tertiary care hospital irrespective of their disease and serological status.

Methods:

A self-reported Proforma consisting of 15 questions (both in English and in Urdu translation) was completed by 302 patients in medical outpatient department of Fauji Foundation Hospital Rawalpindi.

Results:

Out of the 302 study participants only 12 % were aware of the fact that Hepatitis C is becoming a major health hazard in Pakistan. Although majority of study population knew that it is a viral infection and primarily affects the liver and can be transmitted by contaminated needles, unsafe sex and surgical and dental instruments but knowledge regarding other transmission routes like blood donations, malarial parasite, tattooing and traditional piercing of ear and nose in females by contaminated instruments was very poor. There are a lot of misconceptions regarding disease complications and preventive measures as most of people responded that dietary restrictions can prevent disease complications.

Conclusions:

More vigorous education programs are needed in our population to raise awareness about HCV infection, its transmission routes and preventive measures in general public.

Key words:

Hepatitis C virus, transmission routes, knowledge, misconceptions

Introduction

Viral hepatitis is a serious health problem affecting almost two billion people around the world and out of these at least 170 million people are suffering from chronic hepatitis C infection¹. In the coming decades Hepatitis C infection is expected to affect two- or threefold more people and therefore is expected to be one of the leading causes of morbidity and mortality². At present no effective

and safe vaccine is available to confer protection against Hepatitis C infection; therefore emphasis should be given to implementation of primary prevention measures in order to reduce the risk of transmitting HCV infection³. Acute onset of hepatitis C is rarely identified and chronic infection is often asymptomatic, causing many individuals to be unaware of their infection. Screening forsake blood and blood products, use of disposable syringes and needles and implementation of universal precautions have dramatically reduced the risk of infection in the medical setting⁴. Health education, counseling and testing of individuals at risk are the recommended strategies for controlling HCV infection⁵. HCV-infected patients are advised

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not to donate blood, body organs, other tissues or semen and not to share toothbrushes, razors or other personal care articles that might be contaminated with the blood of the sufferers⁶. Pakistan is a developing country with poor socioeconomic, educational and health standards due to very low budget spent on health and education. Treatment of chronic hepatitis C is very expensive and result in complications as well. Hence there should be more stress on preventive measures to avoid the spread of this deadly disease⁷. Knowledge of patients and staff about viral hepatitis and its mode of transmission can prevent the spread of this disease in community as nursing staff can convey accurate information to the patients and their families about the various aspects of Hepatitis C. Adequate education and a healthy lifestyle prevents the disease from progressing to cirrhosis or cancer. Therefore effective training is essential to ensure that these concepts are understood well and put into practice at all health care facilities⁸. Our aim was to determine the level of knowledge about Hepatitis C and its transmission in common patients coming to a tertiary care Hospital.

Methodology

This is a cross sectional study conducted in

outpatient department of medicine in Fauji Foundation Hospital (FFH) affiliated with Foundation University Medical College (FUMC). The study was conducted on common patients sitting in outpatient department regardless of their illness. Children below the age of 12 and patients suffering from some psychiatric problem were excluded from study as they are expected to be unable to give desired information. Patients below primary level education were also excluded from study therefore most of our patients were able to read newspapers and can have other modalities of awareness like electronic media. Patients who already have diagnosed Hepatitis C infection or patients suffering from advanced complications of Hepatitis C were also excluded. Health care workers like doctors, staff nurses, ward boys and aayas were also excluded. On average about 200 patients daily visit medical OPD with various diseases. Medical students of final year MBBS class of Foundation University Medical College collected the data on a Proforma after taking the written informed consent. For convenience only 15 to 20 patients were interviewed daily from OPD in a separate room. Almost 360 patients were interviewed from which 302 patients completely agreed to give consent and completed the survey.

Agreed to questions	Males (n=11.6)%	Females (n=18.6)	Significance (value)
Hepatitis C is a major health problem in Pakistan	12(10.4)	25(13.5)	0.43
Hepatitis C is a fetal viral disease	66(57.4)	118(63.8)	0.27
Hepatitis C primarily affects the liver	58(50.4)	84(45.4)	0.39
Hepatitis C is transmitted by unsterilized needles and surgical/dental instruments	53(46.1)	94(50.8)	0.43
Hepatitis C can be transmitted by contaminated blood and blood products	38(33.0)	85(45.9)	0.03
Hepatitis C can be transmitted by tattooing and ear/nose piercing	11(9.6)	5(2.7)	0.01
Hepatitis C is transmitted by unsafe sex	44(38.3)	54(29.2)	0.10
Hepatitis C is transmitted by breast feeding	22(19.0)	34(18.28)	0.02
Hepatitis C is transmitted by barber equipments	50(43.1)	62(33.33)	0.21
Do you know the complications Ascities, Upper GI bleed, Encephalopathy)	44(38.3)	52(28.1)	0.07
Dietary restrictions (Perhaiz) is recommended	75(65.2)	109(58.9)	0.28
Hepatitis C remains asymptomatic in initial stages	28(24.3)	22(11.9)	0.01
Hepatitis C is completely curable	31(26.9)	30(16.2)	0.03
Hepatitis C can cause liver cancer	29(25.2)	33(17.8)	0.13
Hepatitis C can be prevented by vaccine	80(69.6)	113(61.1)	0.14

The survey form consisted of two components, one for personnel characteristics and other about the questions regarding knowledge of Hepatitis C. Personnel characteristics included age, gender, marital status, residence, educational status and occupation of patients. The other part of questionnaire included knowledge about hepatitis C regarding its importance, mode of spread, complications and preventive measures. Data was analyzed using SPSS version 17 and frequencies of questions regarding knowledge of Hepatitis C were calculated in percentages. In order to calculate the differences in knowledge variables by gender, chi-square test was applied and p-value of less than 0.05 was taken as significant.

Results

The average age of the participants was 36 years. Majority of our patients were adults except two patients, one male and one female who were at the age of 15 and 17 respectively. Out of the 302 study participants 186 patients were females and 116 patients were males. Majority of the participants were married (58 percent) and residing in urban areas of Rawalpindi and Islamabad (68 percent). Table 1 shows the response to questions regarding knowledge of Hepatitis C among patients. Only 10% males and 13.5% female population were aware of the fact that Hepatitis C is becoming a major health hazard in Pakistan. The majority of study population knew that it is a viral infection and primarily affects the liver and can be transmitted by contaminated needles, unsafe sex and surgical and dental instruments. However they had poor knowledge of transmission risks related to other contaminated materials like blood donations, malarial parasite, tattooing and traditional piercing of ear and nose in females by contaminated instruments. There are a lot of misconceptions regarding disease complications and preventive measures as most of people responded that dietary restrictions can prevent disease complications.

Discussion

History of viral hepatitis is almost as old as known human history, however over the period of last 10 years much progress is seen regarding the epidemiology and natural history of viral hepatitis especially Hepatitis C infection⁵. The estimated global prevalence is around 3-5%, which means that there are almost 170 million patients of HCV all around the world with a potential to develop cirrhosis. It means that Hepatitis C infection will be a leading indication for liver transplantation in

future⁹. Pakistan is home to approximately 10 million HCV infected people¹⁰. The above data clearly points towards the importance hepatitis C infection as being a significant public health problem worldwide especially in developing countries¹¹. Adequate health education, counseling and early testing of people at risk is a major challenge for us to control the spread of disease. Awareness about the disease is necessary in prevention and control of disease particularly among general public visiting to hospitals. Recently a report on Hepatitis and Liver Cancer showed the lack of knowledge and awareness about hepatitis C among paramedical staff, social-service providers, and the general public, even among communities at high risk for hepatitis C infection¹².

Misconceptions about the disease transmission and lack of awareness about preventive measures can lead to spread of disease in people with low socioeconomic status and poor educational level in developing countries like Pakistan¹³. Although in our study people living in urban area still have a lot of misconceptions, adequate educational level and residence in urban areas does affect the level of knowledge about Hepatitis C infection¹⁴. It was also found that there is an increase in the awareness and knowledge of HBV and HCV with the increase in the level of education and with higher income¹⁵. Targeted community-wide awareness-raising campaigns and health care worker education is required to improve knowledge of HBV and HCV¹¹. Knowledge of transmission of hepatitis C virus by blood and blood products is generally better recognized as compared to other route¹⁶ as it was also seen in our study. In a study done at Istanbul it was seen that other modes of transmission were either overestimated (skin contact, sharing toilet and clothes) or under-recognized (blood-contaminated objects).

Pakistan has one of the highest frequencies of injections and intravenous drips in the world for unnecessary minor ailments¹⁰. Patients take this practice as "Taqat" meaning energy and a faster way of treatment as compared to oral drugs. These misconceptions and malpractice for common ailments is leading to spread of this deadly disease especially in rural areas. These unnecessary injections and drips may be attributed to a lack of knowledge and understanding and a high patient demand for this practice¹⁰. Improvement in knowledge regarding misconceptions and preventive measures plays a major role in control of the disease¹⁷. Our study showed a significant gap in

knowledge about Hepatitis C although majority of our study subjects were residing in urban areas and belonging to educated families. Knowledge was particularly poor about the different modes of disease transmission. A majority believed that a vaccine is available for this disease. There are a lot of misconceptions particularly about the dietary restrictions like "Perhaiz" can result in improvement in symptoms of disease. Our study suggests that more attention should be given to providing health education about risk factors and prevention of infection in general public. Information should be given that there are no specific dietary recommendations to prevent the spread of complications of disease. Family physicians, general practitioners and trained paramedical staff can play very important role on this task. More interventional studies are needed to assess the reasons for this lack of knowledge and misconceptions. There is need to enhance public awareness about Hepatitis C infection and to evaluate the effects of various current interventions on this task.

Conclusion

In conclusion, more vigorous education programs are needed in our population at all levels to raise awareness of HCV infection. Transmission of infection through blood and related products is although better recognized; efforts should be made to get awareness about other modes of transmission in general public. There is need to have this study on a larger probability sample from different geographical areas to achieve more generalized and authentic results.

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ASSESSMENT OF QUALITY OF SOAN RIVER WATER

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ABSTRACT

Background:

A steady deterioration in river water quality has been observed over a period of several decades, this results in fast declining availability of usable fresh water. Loads of domestic sewage, municipal, industrial & agricultural waste find it's way into river water that adversely effect ecosystems & health of humans.

Objective

To study changes in all three parameters physical, chemical & biological of soan river water along its specified length.

Design

Descriptive Cross Sectional.

Place & Duration

Soan river, between April-Oct 2010

Material & Methods

Purposive Sampling technique was used to collect water samples from seven locations along the length of Soan river, keeping in mind factors that affect river water quality. Water samples were analysed for estimation of Turbidity, pH, Electrical conductivity, hardness, Chlorides, Nitrates, Sulphates, Total Dissolved Solids, total viable count & thermotolerant coli.

Results

Conductivity remains within normal range with minimum of 250 micro S/cm to a maximum of 1270 micro S/cm. The turbidity varied between 80 NTU to 510 NTU, pH ranged between 7.0 to 7.7, hardness varied between 150 – 650 mg/dl, chloride varied between 25- 75 mg/dl. Total Viable Count (TVC) varied between a minimum of 1.4×10^2 to a maximum of $3.4-4.0 \times 10^2$. Most probable number /100ml were 240 which is above the normal WHO permissible values <200/100ml.

Conclusion

Fresh water sources are subject to more variation in physical, chemical & biological factors as compared to marine water. Change in the water quality of river is related to the activities that happens upstream & along its edges for a considerable amount of time. This quality change affects the ecosystem of the river and people directly or indirectly using this river water for drinking or irrigation purposes.

Key Words

Surface water, Water pollution physico-chemical & biological parameters, Soan River

INTRODUCTION

River pollution is a serious public health issue as river water quality is an important health index. In the past the rivers were able to clean themselves by

breaking down pollutants¹. After Industrial revolution the volume of waste has risen and the type of waste has also changed. Today, industrial effluents mix with domestic waste, sewage, phosphates and heavy metals like lead and mercury, pathogenic discharge caused by poorly managed livestock are main sources of pollution. People who live near the rivers throw their refuse into the water. All these pollutants are not biodegradable even

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some are highly toxic¹. The toxic substances in the water can kill the plant life, animal life and in some cases, the human life. Therefore monitoring the quality of river water & other water reservoirs is mandatory for river conservation as well as for sustainable development².

Soan river is a major tributary of the left bank of the River Indus. It is not only important source of scenic beauty but provides water for irrigation for the people of Potohar region³. It starts from a small village Bun in the foothills of Patriata and Murree and ends by joining in the left bank of river Indus at Kalabagh Major tributaries include Lai, Ling, Korang and Sil. Soan river supports a major eco system of Potohar region³. Rohu is the main species of fish in this stream³. Rawal Dam Constructed on Korang River in 1960 is the main source of water for Rawalpindi city. Many anthropogenic activities and quick industrialization taking place in catchments areas upstream has significant influence on Rawal Dam. The soan river receives loads of untreated sewage, domestic & industrial wastewater which has deteriorating effect on the quality of river water at a very large-scale. The municipal and sewage wastes when discharged of into river water has negative impact on water qualities of the reservoir⁴. The effects of the bad river quality include origination and spread of serious disease e.g. Hepatitis A, Acute gastroenteritis, cholera, chronic diarrhea and possible death⁵ serious damage to marine life⁶.

Water quality is critical to the health and habitat of both humans and animals. Water pollution has adverse affects on ecosystem, on health of aquatic organisms, humans and animals. It is essential to monitor regularly the quality of water in order to check the state of pollution in river bodies. Communication of this information to general public and policy makers is necessary not only for development of policies but for the conservation of fresh water resources⁷.

Increasing level of pollution of river Soan during last few decades is a cause for alarm. Two major sources of pollution are construction waste from housing colonies developing along the bank of soan river in recent years, that is dumped directly into river that increase the turbidity of river water & sewage and municipal waste that also includes plastic shopping bags & used cardboard packing. This increased pollution changes the quality of water which in turn effect the ecosystem of river

and people who directly or indirectly use this river water.

A continued pro-active planning and implementation by municipal water managers, agricultural producers and watershed residents can help to speed up improvements and slow down further deterioration of water quality in the river. A survey was therefore planned to analyze water quality of river soan and to identify sources of pollution & to suggest measures to reduce pollution in river water.

OPERATIONAL DEFINITIONS

Electrical Conductivity of river water expresses the capacity of aqua system for conduct of current. pH of an aqueous system is measure of the acid-base equilibrium on a scale of 0-14. Total Dissolved Solids (TDS) represents contents of various mineral present in water.

Turbidity is the cloudiness or haziness of a fluid caused by suspended solids that is generally invisible to the naked eye. The measurement of turbidity is a key test of water quality.

Hardness generally depends on the presence of Mg and Ca ions and at the same time presence sum of carbonate and non carbonate hardness.

Total viable count actually represents the number of colony forming units (cfu) per ml of the sample.

Most probable number of coli forms bacteria / 100 ml (showing the bacterial colonies which usually exist in guts of human & other warm blooded animals). Presence of thermo tolerant coli form (fecal) /100 ml. presence of thermo tolerant coliforms is definitive proof of faecal contamination.

MATERIALS & METHODS

A cross sectional study was conducted to assess the physical, chemical & bacteriological quality of river soan. Purposive sampling technique was used & seven water samples were taken along the length of river Soan. Physical characters studied were colour, pH, Turbidity, Electrical conductivity. Chemical characteristics included were Total Dissolved Solids & hardness. Carbonates, Bicarbonates, Calcium, Magnisium, Cholrides, Nitrates & Sulphate. Bacteriological quality of water was assessed by presence of total viable count, no of coli form / 100 ml (showing the bacterial colonies which usually exist in guts of

warm blooded animals) and presence of thermo tolerant coli form (fecal) /100 ml. All the above indicators were compared with river water quality parameters of WHO to indicate any probable pollution in study samples.

Samples were taken according to Standard method given by WHO for surface water⁸ and analysis of these samples were carried out in Nutrition Division of National Institute of Health Islamabad. Clean Sterile 500 ml bottle with airtight sealing cap were used for collection of sample. Bottle mouths were half dipped at approximately 45 degree angle and were allowed to fill up on their own slowly. Bottles were dipped as near to the middle of the stream as possible. Soon after collection samples were sealed, labeled, imported packed in ice and dispatched immediately.

Seven Samples were taken on same day along the length of Soan River. These sites were chosen based on either the prevalence of the disturbing factors or the length of river itself. Each sample was collected from at least 5 km distance from other.

Sampling Locations

- A: River Soan near Sihala
- B: River Soan alone at Kaak Bridge Islamabad highway
- C: River Soan alone before joining Korang River
- D: Korang River just before joining Soan River
- E: Nalla Lae alone at Lae Bridge just before joining Soan River
- F: Soan River + Korang River below Soan bridge

GT Road

- G: Soan River + Korang River + Nalla Lae after Soan Bridge

RESULTS

A total of 5 samples were collected from Sihala to Soan Bridge at GT road and 2 samples were taken from Nalla Lae and Karang river right before joining River Soan. Sites were chosen while keeping in mind factors, such as increased urbanization, industrialization, household and sewage dumping which directly or indirectly affect river water quality.

Table number one depicts Physical parameters in the samples collected. All samples were turbid mean turbidity level was 230.7 with a S.D. of ± 372 . Turbidity near Saihala was 170 NTU, 190 NTU at Kaak Bridge, 210 NTU before Bahria Town, and 315 NTU after Bahria Town, 140 NTU after Soan Bridge. While Korang River and Nalla Lae had turbidity values of 510 NTU and 80 NTU respectively. Mean conductivity was 509 micro S/cm with a S.D. of ± 372 conductivity near Saihala was 250 micro S/cm, 260 micro S/cm, at Kaak Bridge 300 micro S/cm before Bahria Town 266 micro S/cm after Bahria Town, 620 micro S/cm after Soan Bridge, 600 micro S/cm at Korang River and 1270 micro S/cm at Nalla Lae. Mean Ph value was 7.38 with a S.D. of ± 0.26 Ph values was 7.7 near Saihala, 7.0 at Kaak Bridge, 7.2 before Bahria Town, 7.5 after Bahria Town, 7.3 after Soan Bridge. While Korang River and Nalla Lae had ph values of 7.3 and 7.7 respectively.

TABLE I Physical parameters in samples collected along the length of Soan River

Physical parameters	A*	B*	C*	D*	E*	F*	G*	MPL (WHO)
Colour	Turbid	Colourless						
Turbidity	170	190	210	510	80	315	140	≤ 29 NTU
Conductivity	250	260	300	600	1270	266	620	1275 Micros/cm

A*: River Soan near Sihala

B*: River Soan alone at Kaak Bridge Islamabad highway

C*: River Soan alone before joining Korang River

D*: Korang River just before joining Soan River

E*: Nalla Lae alone at Lae Bridge just before joining Soan River

F*: Soan River + Korang River below Soan bridge GT Road

G*: Soan River + Korang River + Nalla Lae after Soan Bridge

MPL*: Maximum Permissible limits (WHO)

TABLE II Chemical parameters in samples collected along the length of Soan River

Chemical parameters	A*	B*	C*	D*	E*	F*	G*	MPL (WHO)
TDS mg/dl	187	195	225	450	925	200	465	1000
Hardness mg/dl	150	150	225	285	650	150	335	500
Calcium mg/dl	40	40	60	90	120	40	100	200
Magnesium mg/dl	12	12	18	14	84	12	20	150
Chloride mg/dl	25	25	25	37	75	25	45	25
Nitrates mg/dl	2	2	3	2	3	3	2	10
Sulphate mg/dl	14	11	22	55	110	16	61	200

A*: River Soan near Sihala

B*: River Soan alone at Kaak Bridge Islamabad highway

C*: River Soan alone before joining Korang River

D*: Korang River just before joining Soan River

E*: Nalla Lae alone at Lae Bridge just before joining Soan River

F*: Soan River + Korang River below Soan bridge GT Road

G*: Soan River + Korang River + Nalla Lae after Soan Bridge

MPL*: Maximum Permissible limits (WHO)

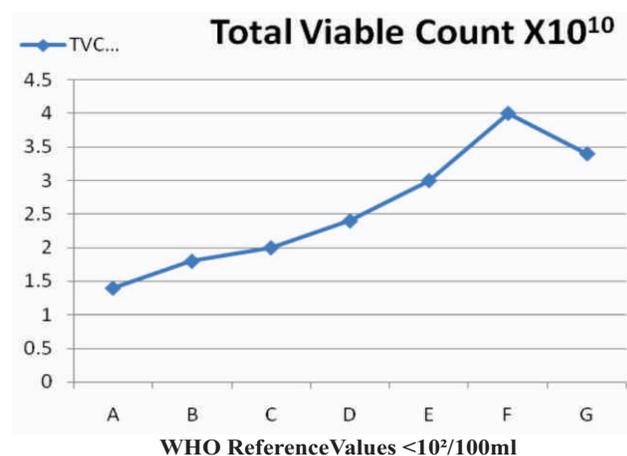
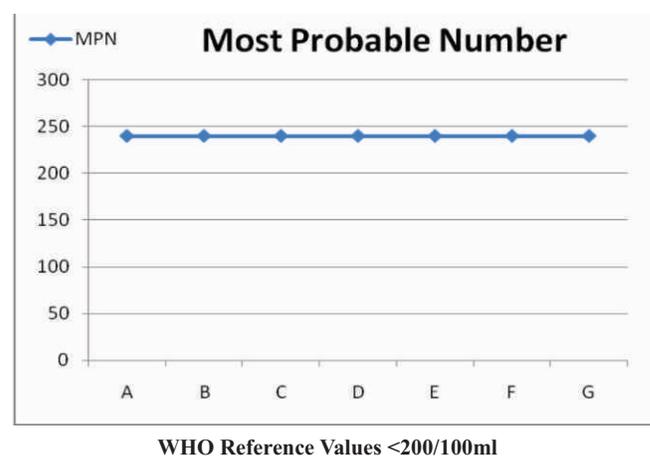
Figure I : Total Viable Count in Samples Collected Along The Length of Soan River**FIGURE II : Most Probable number count in samples collected along the length of Soan River**

Table number two gives chemical parameters of the samples collected along the length of Soan River. Mean TDS was 378 mg/dl with S.D. of ± 269 . Total Dissolved Solids in sample collected near Saihala was 185, 195 at Kaak Bridge both 225 before Bahria Town and 200 after Bahria Town, 465 after Soan Bridge. At Korang River and Nalla Lae it was 450 & 925 respectively.

Mean value for hardness was 277 mg/dl with a S.D. of ± 179 . Whereas hardness near Saihala & at Kaak Bridge both was 150, 225 before Bahria Town and 150 after Bahria Town. While in samples taken from Korang River and Nalla Lae the values were 285 & 650 respectively.

Calcium, Magnesium, Nitrate, Sulphate remained within permissible limits of WHO having mean \pm S.D. values of 70 ± 33.1 mg/dl, 24.5 ± 26.4 mg/dl, 2.4 ± 0.53 mg/dl, 41.3 ± 36.5 mg/dl respectively.

Chloride had mean value of 36.7 ± 18.6 S.D. It was 25 mg/dl in samples taken at Saihala, at Kaak Bridge both before and after Bahria Town. Whereas it was 37 mg/dl at Korang, 75 at Lae, 45 after Soan Bridge.

Figure one depicts Total Viable Count. Mean count value was $2.57 \times 10^2 \pm 0.93/100\text{ml}$.

Total viable counts were as follows: 1.4×10^2 near Saihala, 1.8×10^2 at Kaak Bridge, 2.0×10^2 before Bahria Town, 4.0×10^2 after Bahria Town and 3.4×10^2 after Soan Bridge. While for Korang River the count was 2.4×10^2 and for Nalla Lae was 3.0×10^2 .

Figure number two shows the count of Most Probable Number which remained constant in all the samples. It was higher than WHO reference values.

Discussion

Water quality and quantity are among our major environmental concerns in as availability of useable fresh water is declining fast⁹. In this study water quality of soan river was analyzed under three major parameters (physical, chemical and bacteriological) to determine the level of pollution. Every parameter carries its own importance and any significant variation in any of these parameters shows changes in the river water quality. Physical parameters have a very important impact on the quality of aquatic organism which adapt to these factors. Disturbance to these factors then affect the type and number of organisms which will survive to these new changing conditions. All the samples were turbid. Analysis of the turbidity levels in the samples showed progressive increase in turbidity levels downstream. Slight depression at Point G could be caused by dilution effect of two streams korang and lae which join river soan right before this point. In a study done by Farhan Iqbal on seasonal variation of physico-chemical characteristics of river Swan in 2004 found pH values between 8-9 touching the upper limit of favourable range, conductivity varied between 9 & 18 mv & turbidity varied between 0.02 -0.48 mg /liter which was with in permissible limit³. In another study conducted in Lahore turbidity level was less than 5 i.e. lies within favourable range⁹. In a study done by Agbogou on river Kubanni river in Nigeria found mean pH value Electrical conductivity TDS with in normal range but mean turbidity levels was 106. ±21 S.D¹⁰.

High levels of turbidity in water bodies can adversely affect the growth of submerged aquatic plants by reducing the amount of light reaching lower depths hence affect the growth of species that are dependent on this light e.g. shell fish and some of fish. Fish gills ability to absorb oxygen dissolved in water is adversely affected by high levels of turbidity¹¹. Turbidity has inverse relationship with light penetration⁷.

High turbidity levels hinder penetration of light(UV rays), bacteria and viruses cling on to suspended particle and are prevented from UV and chlorination. Increase turbidity level thus causes gastrointestinal diseases as it hinders the disinfection process¹². Possible causes of turbidity and its increasing levels along the length of river are construction works or industry affluent discharge upstream¹³.

Hardness more than 15mg/liter is suitable for fish growth. Less than this level slows the fish growth. liming of water is then required to increase production of fish. Less than 5 mg/liter hardness causes death of fish⁷. The presence of Carbonates and Bicarbonates in water prevents dropping of water pH at level below 4.5 and rising more than 8. Extremes in pH can make a river inhospitable to life. Low pH is especially harmful to immature fish and insects. For diverse fish production The pH range is 6.5-9 where as for purpose of irrigation is 6.0-8.2. acid death point is 4.0, there is no reproduction at 4.0-5.0, growth becomes slow at 4.0-6.5, the point alkaline death is 11.0¹⁴.

Water's acidity can be increased by acid rain but is kept in check by the buffer limestone. pH levels remained within permissible limits in our study reason could be the presence of carbonates & bicarbonates in water.

Chloride ions levels hovered between 25 – 75mg/dl(25 mg/dl being the higher permissible limit) and were higher than permissible levels(at D, G & E) where Korang & Lae join soan river & 2 km after Soan bridge respectively. This due to construction of factories and residential colonies that throw their un treated waste (solid & liquid) in Lae, Koran & Soan river. Chloride ions comes through untreated sanitary & industrial water¹⁵. In the study conducted by Agbogou on river Kubanni river in Nigeria mean Chloride ions levels were found to be 29.02± 2.12.

Analysis of the total viable count & most probable number shows rise in the value from A to G while all values being above the normal permissible limit. MPN in study done in Lahore was > 180. In a study conducted on river Ganga samples were taken from five locations all were found positive for Coli form bacteria. An estimate of over 103 cells (presumed to be O157:H7) per ml of river water at each site suggested the presence of the bacteria in high numbers throughout the Ganges in Varanasi¹⁶.

Total viable count is a count of total number of organism of this Enterobacteriaceae family which may be present in the water. Out of these organisms of fecal origin are Escherichia, Klebsiella, Enterobacter, Citrobacter. Increased contents, of these, than the normal showed contamination of the water sources with fecal mater¹⁷ thermotolerant coliform count is an analogue for presence of E.coli in water. Direct testing for E.coli is difficult while that of termotolerant coliform is easy and it is done to indirectly monitor presence of E.coli in water¹⁷.

All the samples were found positive for thermotolerant coliforms.

It is estimated that 80% of communicable diseases in the world are waterborne¹⁸. During the last two decades, large volumes of effluents were discharged into surface water bodies from municipal, industrial and agriculture sources, causing pollution of both surface and ground waters⁹.

High pathogen levels result after sewage is discharged into river bodies without being treated adequately¹⁹. This can also be a result of a sewage plant that is designed for less than secondary treatment. In developed countries, older cities with aging infrastructure may have leaky sewage collection systems which can cause sanitary sewer overflows & discharge untreated sewage during rain storms²⁰. Patches of agricultural farm lands are also found along the length of Soan. Poorly management of livestock operations can also cause pathogenic discharges into river water. Bacteriological parameters purely impact human health. Major effects of the bad river quality include gastrointestinal diseases⁵ and damage to aquatic plants and organisms⁶.

Conclusion

Water samples taken from Soan river were found turbid. Possible causes of high turbidity is construction works that is going on along the length of river and industrial effluent that is discharged upstream. The high turbidity level adversely affects aquatic life by decreasing penetration of Ultra Violet light & also water chlorination process.

Chloride levels in water were higher than normal permissible values which indicates pollution of river water with untreated sanitary & industrial water. All the samples were found positive for coliform organisms which again is an indication of discharge of untreated sewage into Soan river water from housing colonies located along the length of river.

Recommendations

The parameters of water quality are the measures used to judge the water suitability for its designated uses and to further improve the existing condition. By proper management this water can be used for irrigation, recreation and after proper treatment for drinking purpose in twin cities that face chronic water shortage. Residential colonies & factories should be prohibited to throw untreated domestic, sewage & industrial waste in river water

through effective legislation. Low lying housing areas in the vicinity of the river could be protected from the effects of flooding by keeping the river bed clean instead of using it as a dumping ground for waste as is currently the practice of the City District Government.

It is therefore recommended that large scale water management organization should be established at governmental level to constantly monitor use and misuse of water bodies. River water analysis teams should be established which would keep all river water bodies under constant monitoring. Frequent sampling of river water should be done, each after a specific time interval to keep any disturbing phenomenon under check. Both new and old residential colonies should be under strict check for their ultimate waste disposal. Housing colonies and industrial estate should be given orders to build filtration plants on their waste water discharge system.

Lastly Public awareness on large scale should be done. People should be able to clearly understand the idea of limited amount of drinkable water resources on earth. They should know from where they get their household water from and to where their domestic waste is ultimately disposed.

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FACTORS INFLUENCING PAKISTANI PHYSICAL THERAPY STUDENT'S DECISIONS TO TRAIN ABROAD: EVALUATION OF A CONCEPTUAL FRAMEWORK

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ABSTRACT

Objective:

This descriptive cross-sectional survey was designed to evaluate a conceptual framework representing the factors which influence the intentions of physiotherapy students to go abroad for advanced training.

Methods:

A descriptive cross sectional structured pre-tested survey from July 2012 to December 2012 was done with the help of a questionnaire based on the conceptual framework about demographic and educational characteristics, influencing factors and intentions to train abroad from 200 final year students of Physical Therapy program. We assessed each of the factors for its frequency, distribution, and association with the intention to train abroad. Factors which represent possible influences were selected after doing extensively the literature review and discussions with a large number of young physiotherapy students. Questions were constructed using information from previous studies concerned with medical career choices and data was collected on a questionnaire given to physical therapy students in two major cities of Pakistan through purposive non probability technique during the months of July 2012 to December 2012. An informed consent form containing the details of study was filled by all students who wanted to participate in the study. Questionnaire was sent to students by hand and e-mail with guaranteed anonymity.

Result:

Most respondents (69.5%) preferred working in abroad as compared to Pakistan (30.5%). The highly considered factors (regarding practice in Pakistan or abroad) chosen by most of the final year physiotherapy students were applicable to respective individual personalities of the individuals (55.5%), international job opportunities (14%) and opportunities for further studies (13%). Attractive lifestyle (8%) and prestige (5.5%) were moderately influencing factors. Family influence e.g. doctor parents, family pressure, etc. (2%) and other factors (2%) were the least influential.

Conclusions:

Issues related to individual personalities, international job opportunities and opportunities for further studies are the main motivators for undergraduate final year Physical Therapy students to train abroad.

Keywords:

Physical Therapy Students, training abroad, physiotherapist immigration, Career choices

Introduction

As expectations and needs of health care systems are on a rapid rise all over the world therefore the need of improvement regarding human health resources is also increasing day by day¹. Many developed countries have overcome this problem

by providing jobs on attractive salaries mainly from developing and under developed countries, resulting in a bulk immigration of healthcare workers to developed world^{2,3}. This phenomenon is expected to do further damage with the projected healthcare worker's shortages in rapidly developing high income countries⁴ and with the plans to overcome these shortages through more international recruitment⁵. As the distribution of the medical workforce has been problematic for decades in most developed countries⁶, there is a

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shortage of young Physical Therapists(PT) as well in several specialties. Over the last few years, the PT profession, like other healthcare professions, has evolved dramatically usually in response to external conditions. Today a lot of debate is going on the newest professional entry-level degree in physical therapy, the Doctorate of Physical Therapy (DPT). As Physical therapists are needed to work in a variety of health care settings and they provide a major role or key element in the care of patients from a variety of specialties, adequate career advice is needed for physical therapy (PT) students. Therefore in this era of overall shortage of trained physiotherapists, it is important to know the needs and expectations of a young physical therapist which is essential for their future plans.

In a study done in Netherlands it has been seen that the enrolment of first-year students in PT schools has doubled in the past decade, because of an anticipated shortage of PT doctors⁷. There are several surveys available from rest of the developing world on this issue but mainly done on medical students. So far the subject studies on young physical therapist about their immigration and intention to train abroad are lacking in international literature. Therefore, so far this could be the first study in Pakistan on final year physical therapy students representing this issue. The main objective of the our study was to quantitatively assess the main motivators for Physical Therapy students in Pakistan to train abroad and to evaluate the proposed conceptual framework by assessing each of its factors for its frequency, distribution, and association with the intention to train abroad. This study examined emigration plans or intention of about 200 physical therapy students who were in their final year of training in their respective medical school.

Material & Methods

This study was conducted from July to December 2012 on 230 Final Year Physical Therapy Undergraduate Students as a descriptive cross sectional survey through purposive non probability sampling technique. Our target study participants were all physiotherapy students in Riphah College of Rehabilitation Sciences Rawalpindi, Rawalpindi Medical College (RMC), Margalla Institute of Health Sciences (MIHS), Superior University Lahore, School of Allied Health Sciences (SAHS) Lahore, ACE Institute of Health Sciences Lahore, Allama Iqbal College of Physiotherapy Lahore, FMH Institute of Allied Health Sciences Lahore, School Of Physiotherapy Mayo Hospital Lahore & Lahore Medical & Dental College Lahore. Out of

230 students data of 200 students was available for analysis as some of students were lost in follow up after inclusion in the study. The inclusion criteria for the study were 9th, 10th semester final year Diploma in Physical Therapy (DPT) students. We developed questionnaire for the survey on basis of the results of previous quantitative and qualitative studies on this topic assessing the intentions and motives for students from various medical schools of Pakistan. The questionnaire was designed to inquire about the student's various demographic and educational characteristics, desire to train abroad, the suggested country of abroad training, and intention to return Pakistan after completing the training abroad. A informed consent form containing the details of study was filled by all the students who wanted to participate in the study along with the questionnaire was sent to students by hand and e-mail with guaranteed anonymity. We pilot tested the questionnaire with 10 physiotherapists who had recently graduated from various physiotherapy institutions. Anonymity was guaranteed to the participants of research. We used SPSS version 16 software for the analysis of data from participants.

Results

Of 230 eligible participants, 200 responded to the survey (response rate 86.96%). The mean age of the sample was 21.67 ± 3.45 with more than half 134(67%) being female while male students were only 66 (33%) and majority of total were single (72%). Most of the respondents (98%) were Muslims. Majority of students belonged to upper middle class (64.7%). Most of responders belong to the three main urban cities (82%) of Rawalpindi, Islamabad and Lahore. Most respondents (69.5%) preferred working in abroad as compared to Pakistan (30.5%).



Figure 1: The work preference of Physical Therapist in Pakistan and abroad

The most popular first-choice factors concerning practice in abroad chosen by majority of the final year physiotherapy students were pertinent to respective personalities of the individuals (55.5%), international job opportunities (14%) and opportunities for further studies (13%). Striking lifestyle (8%) and prestige (5.5%) were moderately influencing factors. Family influence e.g. doctor parents, family pressure, etc. (2%) and other factors (2%) were the least influential.

In the perspective of factors influencing practice in Pakistan or Abroad, momentous findings include the students' inclination, intercontinental job opportunities and opportunities for further studies as the prime focus for practice, respectively. Remarkable differences were also found between practice in Pakistan and abroad in frequent respects such as Prestige, family influence and attractive lifestyle. Prestige, family influence and attractive lifestyle were least rated in Pakistan as compared to abroad practice as shown in Table 1.

Responses to open ended questions in questionnaire revealed that increase bulk of patients available in Pakistan, exposure to a wide variety of cases and being close to family were the only reasons of training in Pakistan. Poor working environment (bullying attitudes of seniors, less positive feedback for good work rather no feedback), poor salary structure and long working hours or extra duties (private practice) were considered as some of the weaknesses in training in Pakistan. Better pay and working conditions and improvement in quality of training and research opportunities were the suggested changes by the respondents qualitatively

which would influence them to consider further training in Pakistan.

Discussion

Preferences regarding future career made by young medical students and doctors and factors influencing these preferences are very important for the health care authorities to plan the future developments in medical profession especially at times of oversupply or under supply of doctors⁸.

Results from our study demonstrated that most of final year physiotherapy students preferred working in some developed country as compared to Pakistan. In contrast to our survey, a study on Career Preference done on Final Year Medical Students of Ziauddin Medical University, most respondents preferred working in Pakistan as compared to overseas⁹. The core factors influencing practice in abroad were applicable to respective personalities of the individuals, international job opportunities and opportunities for further studies as the primary focus for practice, respectively¹⁰. The motivations of the 22% of young medical students who planned for migration to the United States, shown by the authors of an earlier study, were three major motivating factors: to have advanced specialty training, to earn more money, and to obtain better employment opportunities which are less available in their home countries¹¹. Attractive lifestyle and prestige were moderately influencing factors. Family influence e.g. doctor parents, family pressure, etc. and other factors were also the least influential.

The global shortage is expected to become

Table 1: Practice in Pakistan or Abroad vs. Factors Influencing Practice in Pakistan Or Abroad

Practice	Factors Influencing Practice in Pakistan Or Abroad							Total
	Personal Interest	Family Influence	Prestige	International Job Opportunities	Attractive Lifestyle	Opportunities For Further Studies	Others	
In Pakistan	29	0	0	12	6	12	2	61
Practice Abroad	82	4	11	16	10	14	2	139
Total	111	4	11	28	16	26	4	200
P-value	0.102	0.781	0.382	0.014	0.235	0.136	0.975	

exacerbated because of increased demand for health professionals than their supply¹². This shortage of health workers is affecting many countries around the world. In a study done by Aiken et al¹³, it was seen that by the year 2011, the shortfall in the United States, the UK, Ireland, Canada, Australia and New Zealand calculated by each country's health-workforce-planning agency will be expected to over 300,000 nurses. Even in the countries like Philippines, where much more trained nurses are produced than required for the country's needs, the effect of migration of nurses is so strong that a domestic shortage is being expected¹⁴. In other underdeveloped countries, including sub-Saharan Africa, migration of health care workers is placing increasing pressure on fragile health care systems that are already overburdened as nurse-to-patient ratios are sometimes as low as 10 per 100,000, compared to the developed countries like UK, where the nurse-to-patient ratio is 847 per 100,000¹⁵.

Therefore in general, the reasons for migration are predominantly to countries with better living standards, attractive salaries and healthy work conditions¹⁶. Similarly the working condition of Postgraduate physiotherapy students in Pakistan is also very poor. Availability of few training positions for number of graduating young DPT students means many people work without pay to gain required experience for examinations. Similarly working conditions in many post graduate Institutes in this field in Pakistan are so poor that students have no other choice. Therefore students intend to migrate not only for monetary gains but also to escape the hierarchical system which is in place in majority of Institutions of our country¹⁷. The complex issue of migration of medical graduates does not have a ready made solution. All the stake holders of the developing countries need to focus and take some bold steps to prevent or decrease unwanted migration of bright students. Partnerships between Institutions in developed and developing countries are needed to encourage young physiotherapists to return to work in their own country¹⁸. Review of pay structure, improvement in quality of training in Pakistan and making working environment more conducive to post graduate trainees are some of the steps which may help in preventing extensive physiotherapist's migration. In terms of limitations our study had a small sample size and involved only a few institutions from Pakistan only. Therefore results may not be generalizable however we hope that our study has yielded insights into factors responsible for

physiotherapist's migration from Pakistan. The main strengths of our study included a very good response rate as well as being the only study from Pakistan which along with respondents' plans to train abroad also assessed their post-training migration intentions.

Conclusion

Our final year physiotherapy students preferences were inclined towards working abroad as compared to Pakistan and the influencing factors were individual personalities, international job prospects, opportunities for advance studies and attractive standard of living and prestige.

Recommendations

So far the current studies suggest that some long-term solution to the problems of migration and shortage of health care workers can partly be overcome by improving the work conditions, standard of living and opportunities for advance studies keeping in view the financial aids and not through policies that do not work towards solving this underlying problem.

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ROLE OF TEACHING ETHICS IN MEDICAL CURRICULUM

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ABSTRACT

Many professional organizations and universities have so far identified that teaching medical ethics is very crucial component of curriculum for undergraduate medical students but still there are a number of various obstacles against medical ethics education during graduation. Internet search was done extensively on Pubmed, Google scholar and Medline on various papers in respect to teaching and impact of teaching bioethics to medical students. This review gives an idea about the current concepts, problems and objectives of including medical ethics teaching in curriculum. New trends both locally and internationally which are being implemented that potentially influence medical professionalism are also discussed. This review strengthens the concept that there is an urgent need to provide or revise medical ethics education to undergraduates during teaching in medical schools as current teaching on medical professionalism is not meeting the need. Therefore well-constructed courses are required to fulfill the current standards and medical teachers must be trained properly about the current concepts in medical ethics education so that our medical schools are equipped with better professionals.

Introduction

Medical ethics education for undergraduate medical students is still a neglected area in our current curriculum¹. So far health care authorities and teachers have started realizing the need of inclusion of knowledge of medical ethics in curriculum and its practical application in one of the essential components of medical professionalism². Despite recent awareness, there is strong evidence to suggest that teaching medical ethics is still lacking or waiting to be included in many medical colleges in a well-defined and organized way according to current need³. There are a lot of well identified barriers to provide ethics education, such as shortage of time, designing proper teaching schedules to include ethics education, problems of continuity, negative attitude of medical students and lack of trained faculty⁴. Available guidelines can guide us only about the basic outline and need of a curriculum in ethics. Medical educators involved in designing a curriculum in medical ethics, must pay attention on constructing appropriate aims and objectives, content of curriculum, various teaching modalities used along with assessment of their utility and relevant outcome measures⁵. We searched the literature extensively on various search engines and studied almost 50 papers and

reviews to look at the need, methodology of teaching and outcome of teaching ethics in various parts of the world. We found that the value of teaching ethics to undergraduates is now increasingly being recognized and provides one of very important pillar to define future direction of medical education in medical schools but before making any conclusion we must answer a few questions.

Is There Any Strong Clinical Relevance Of Teaching Medical Ethics In Curriculum?

Bioethics as a discipline is standing on four basic pillars of philosophical principles, autonomy, beneficence, non-maleficence and justice. On the basis of these four principles, various guidelines, moral values and professional codes of conduct are devised. These principles also help in many situations where medical profession has to face law such as some professional misconduct or negligence. Because of these poorly defined and translated principles, various ethical dilemmas may arise in daily medical practice and can drastically affect medical professionalism from common dynamics of the doctor-patient relationship to more broad problems in defining health policies⁶. Over the last few decades medical profession has to face increasingly cases of ethical dilemmas and moral conflicts in both medical care and clinical research due to increased demand of good doctor-patient relationship, increased availability of modern medical technology and due to more influence of

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legal factors on health care⁷. For these reasons, doctors are now required to be equipped with a minimum essential knowledge of bioethics and skills to deal with various ethical dilemmas in clinical practice⁸. To some extent medical ethics is now being taught in medical schools of many countries. But unfortunately so far, knowledge about medical ethics gained in medical schools by undergraduates is variable in content, quality, and consistency resulting in poor competency of our graduates to deal with common ethical dilemmas⁹. So it is becoming very important to provide ethics education on a regular basis to our doctors even beyond medical schools.

There may be a number of ethical issues that can cause physicians difficulty in clinical practice and can lead to errors in physician's judgment in various aspects such as confidentiality, taking informed consent, end-of-life care and breaking bad news in difficult situations¹⁰. A physician may get struck in some ethical dilemma like taking consent for some difficult medical procedures (for example abortion after failure of contraception). An understanding of ethical issues is also needed in distributive justice, health resource allocation and reshaping health care system according to our own values and tradition. There are a number of studies which show that teaching medical ethics can result in improvement in physician confidence, knowledge, ethical analysis skills and patient satisfaction¹¹.

How To Achieve The Goal and Outcome of Achievement

So far the methodological studies which can assess the effects of medical ethics education on patient satisfaction and health outcomes are lacking in literature. Formal curricula in various medical schools for graduates have resulted in a significant improvements in achieving the target to some extent but it should be implemented from gross root level of teaching to undergraduates. In a study done on house officers where a curriculum in medical ethics were designed and implanted during their stay in hospital, there was improvements in knowledge, confidence, ethical recognition and decision making ability was sustained for over 2 years¹². In another study inclusion of ethics course in training resulted in a significant change in attitude with an increased proportion of young doctors demanding even improvements in the ethics curriculum¹³. Case-based, small-group discussions were the preferred pedagogical method although ethics ward rounds and role modeling by faculty

was also interesting modality recognized by learners¹⁴. Studies done on practicing physicians who had completed some training or course on medical ethics have also shown that there is an increased awareness and understanding of various bioethical issues and better management of patients during clinical dilemmas¹⁵. More well defined courses and modalities including faculty training are needed in medical ethics education to improve the understanding of subject¹⁶. Studies strongly recommend that the goals of medical ethics education as desired by professional organizations and society are not difficult to attain and that achievement of these aims is valued by residents and physicians¹⁷.

Conclusions

In conclusion it can be an expectation that teaching medical ethics in curricula in our medical schools will produce better young doctors who will be good managers of health care resources, advocate for patients and may be leaders for organizational change. Ethical issues are being faced commonly by residents and physicians and they may experience difficulty in understanding and managing these dilemmas. Teaching professionalism alone cannot address this broad range of needs. Therefore well-constructed courses in medical ethics for undergraduates and young doctors are needed to provide an array of competencies in dealing with ethical dilemmas. This new direction required in making good health professionals needs scholarly debate, dissemination of pedagogical materials, research and publications in this subject.

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OPTIC NERVE GLIOMA WITH CONCURRENT RHEGMATOGENOUS RETINAL DETACHMENT IN NEUROFIBROMATOSIS TYPE 1

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ABSTRACT

Optic nerve glioma is an uncommon tumour of the glial astrocytes occurring along the anterior visual pathways and it mainly involves children. Its association with Neurofibromatosis Type 1 is frequent and may be bilateral. Intra-orbital optic nerve gliomas present with visual loss and proptosis. We describe a boy with bilateral asymmetrical optic nerve glioma with no symptoms in the right eye but left sided proptosis with concurrent rhegmatogenous retinal detachment due to a dialysis which we subsequently diagnosed as a case of Neurofibromatosis type 1.

Keywords:

Optic glioma, Neurofibromatosis type 1, Rhegmatogenous retinal detachment, Dialysis

Introduction

Optic nerve gliomas are relatively rare tumors, representing 1.5-3.5% of all orbital tumors 66 % of intrinsic optic nerve tumors and 5% of all childhood gliomas^{1,2}. These may affect the intraorbital optic nerve (55%) or involve the chiasm and anterior visual pathways, hypothalamus or the third ventricle. Mostly benign, malignant gliomas are very rare. There is no predilection for gender or race. The association with Neurofibromatosis type 1 (NF-1) being so frequent that it forms part of the seven diagnostic criteria. Rarely it is associated with Neurofibromatosis type 2. Usually unilateral bilateral occurrence is frequent in NF-1.

We present a case of bilateral optic glioma in a 9 year old boy with Neurofibromatosis type 1 who also had left sided rhegmatogenous retinal detachment with a dialysis. Although this retinal detachment appears to be a separate entity, an eye with optic nerve glioma along with rhegmatogenous retinal detachment has not been reported so far.

Case Report

A 9 year old boy presented to our OPD with gradual protrusion of the left eyeball along with sudden loss of vision first noticed 4 years ago. He also complained of intermittent mild left ocular pain. He

did not have any other ocular problem. Past medical, surgical and family history seemed not to reveal any prior disease.

On ocular examination, visual acuity was 6/6 OD and NPL (No perception of light) OS. Colour vision was normal OD. There was moderate left axial antero-medial proptosis with medial dystopia [Figures 1,2] on Hertel exophthalmometry with readings of 16 mm OD and 21 mm OS respectively. The globe was non-tender, resistance to retropulsion was positive, periorbital sensations were intact and the proptosis did not increase with the Valsalva maneuver. Bruit was absent. There was no lymph node enlargement. Extra-ocular movements were normal except for an abduction deficit of the left eye of -2.



Figure 1: Left sided Antero-Medial Proptosis with Medial Dystopia (Primary position)



Figure 2: The left proptosis viewed from behind

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Figure 3: A Slit lamp photograph showing Lisch nodules on the inferior iris



Figure 4: Fundus photograph of the right eye reveals a normal healthy pink optic disc and retina

Anterior segment examination revealed Lisch nodules [Figure 3] bilaterally on the irides, along with a marked left side relative afferent pupillary defect (RAPD). Intraocular pressures were bilaterally normal. The right fundus was normal [Figure 4]. The left fundus revealed complete optic atrophy [Figure 5] normal macula, an infero-temporal, localized rhegmatogenous retinal detachment extending from 4 o'clock to 6,30 o'clock, with a corresponding dialysis [Figure 6] and scattered areas of white-without-pressure circumferentially.

Considering the possibility of Neurofibromatosis type 1 (NF-1) we examined him systemically and found café au lait macules and axillary freckling on

his skin. Examination of his mother and sister revealed them to have NF-1 as well.

Magnetic resonance imaging (MRI) of the brain and orbits was done with contrast which showed a left sided well-defined heterogeneous enhancing fusiform optic nerve enlargement with solid and cystic components 3.6 x 2.7 x 2.0 cm (AP x T x CC) in size, isointense to grey matter on T1WS mildly hypointense on T2WS with moderate to marked enhancement of the solid component on post-Gadolinium T1WS, which confirmed our suspicion of a left optic nerve glioma [Figures 7, 8, 9]. The intracranial portion of the left optic nerve was uninvolved. To our surprise the right optic nerve was thickened 9 mm (transverse section) along with kinking of the retrobulbar portion thus indicating bilateral optic nerve gliomas. Ill-defined areas of abnormal signal intensity were noted in the deep white matter, globus pallidum, internal capsule, thalamus and midbrain further confirming the diagnosis of NF-1.

Since the patient's right eye was normal with no signs of optic nerve dysfunction whatsoever and the

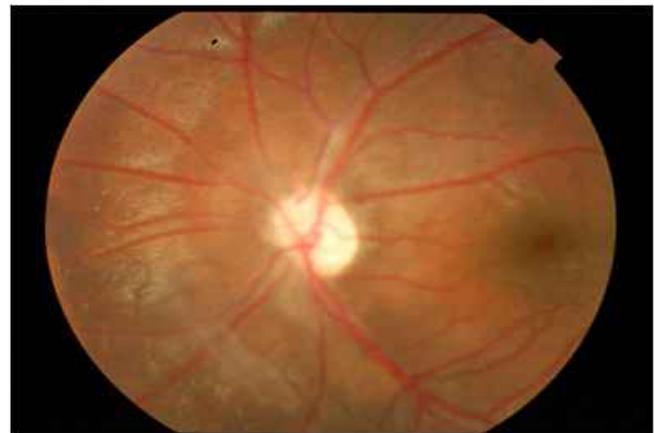


Figure 5: Fundus photograph of the left eye showing optic atrophy (chalky, pale disc)



Figure 6: Fundus photograph of the left eye in down gaze revealing the infero-temporal retinal detachment and a dialysis

left eye having no vision with the glioma not having any intracranial extension seeming benign with no signs of being malignant the retinal detachment old and localized we decided not to intervene. The patient is on follow up keeping in mind the possibility of radiotherapy if enlargement of the right sided glioma occurs or signs of optic nerve dysfunction appear.

Discussion

Optic nerve gliomas are uncommon frequently benign neoplasms, predominantly occurring in children in the first two decades of life 65% occurring in the first decade and 90% present before 20 years of age. Malignant gliomas are very rare occurring in middle age and associated with early mortality. Intraorbital optic nerve involvement is most frequent accounting for 47% of the cases. The second most common involvement (26%) is of the orbital and intracranial portion of the optic nerve. Thirdly (12%) intracranial and optic chiasm involvement, and lastly (5%) sole chiasmatic gliomas^{2,3}.

The common presenting features are gradual, painless, proptosis which is usually unilateral and axial with visual loss. Other ocular features are a relative afferent pupillary defect (RAPD), dyschromatopsia, visual field defects. The optic disc may be normal, swollen (1/3rd cases) or atrophic and may manifest opticociliary shunt vessels. Extraocular motility disturbance, strabismus, nystagmus and central retinal vein occlusion may occur. The features may vary depending on the location of the tumor. Benign gliomas confined to the optic nerve alone have a poor visual prognosis but a long term survival is expected. An association with myopia and anisometropia was reported by Campomanes⁴ et al in 2012. However rhegmatogenous retinal detachment in an eye with optic nerve glioma has not been reported so far. Tumors invading the chiasm may result in raised intracranial pressure, signs of hypothalamic and pituitary dysfunction like precocious puberty, diabetes insipidus, and panhypopituitarism. Invasion of the chiasm, hypothalamus, third ventricle or midbrain proves fatal. Malignant gliomas present with painful, rapid visual loss, optic nerve dysfunction, bilateral blindness in 6-8 weeks and death within 6-9 months of diagnosis^{1,5}.

Optic nerve gliomas are grossly fusiform intradural neoplasms. Histopathology reveals juvenile pilocytic (hair-like) astrocytomas with arachnoid

hyperplasia, mucosubstance and “Rosenthal fibers”. Isolated gliomas do not invade the dura and expand within the nerve. Gliomas occurring in Neurofibromatosis often invade the subarachnoid space.

Neurofibromatosis type I^{12,3} (von Recklinghausen's disease) is a phakomatosis affecting about 1 in 3500-4000 people. It is autosomal dominant with



Figure 7: Sagittal Gadolinium enhanced T1-weighted MRI showing the fusiform, retrobulbar heterogeneous mass typical of an optic glioma with a larger solid (hyperintense) component and a smaller cystic (hypointense)

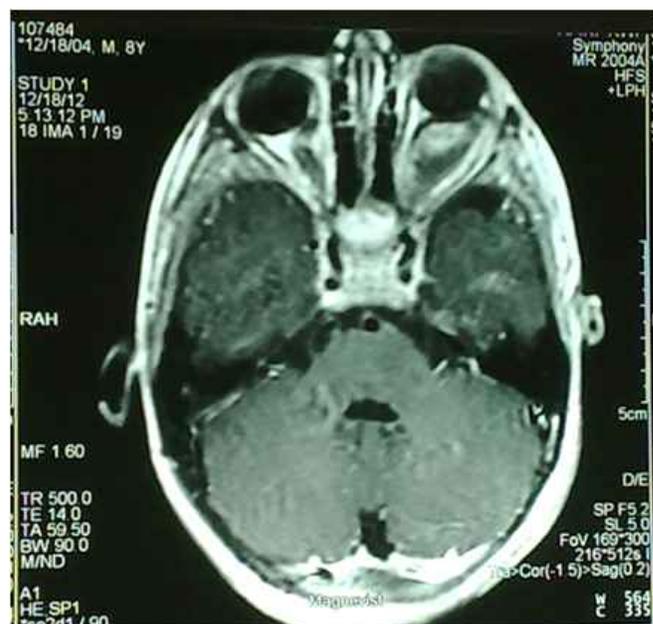


Figure 8: Axial T1-weighted MRI showing the kinking of the right optic nerve and the fusiform left optic glioma.

incomplete penetrance with the gene localized to chromosome 17q11. It is characterized by neurofibromas, café au lait spots, axillary or inguinal freckling, Lisch nodules on the iris, optic nerve gliomas, bone dysplasia and solid neoplasms of the central nervous system.

Imaging is considered essential in their diagnosis. B-scan shows widening of the optic nerve shadow. CT and MRI shows well-outlined enlargement of the nerve, usually fusiform but may be rounded or multi-lobulated. Kinking or tortuosity of the nerve may be seen. Gadolinium enhanced MRI is more accurate in depicting the presence, extent, intracranial involvement and differentiating between simulating lesions.

Treatment of these tumors remains largely controversial^{1,2,3,6} and the treatment plan needs to be meticulously constituted for each individual case based on tumor growth characteristics, intracranial invasion, vision of the involved and uninvolved eye, neurological or systemic disease and previous therapy. Isolated gliomas confined to the orbit with good vision, may simply be observed with serial visual field testing. CT and/or MRI done every 6-12 months to detect growth or intracranial invasion. Surgery via a craniotomy and superior orbitotomy is indicated for excessive proptosis with loss of useful vision, documented growth or intracranial extension. Tumors beyond excision (chiasm or tract involvement) need radiotherapy^{7,8} initially. Post-operative adjunctive radiotherapy is needed with surgical debulking for extensive tumors involving the chiasm or optic tract or if growth is documented. Multi-agent chemotherapy maybe useful in chiasmatic/hypothalamic involvement. Studies⁹ have revealed that vision may deteriorate in the worse eye and may remain stable in the better eye regardless of treatment instituted or the presence of Neurofibromatosis. Anterior visual pathway gliomas need treatment only if clear evidence of progression exists^{10,11}. Careful monitoring¹² of such patients for a long period is essential to prevent grave consequences that may occur.

The patient reported is unique in that he had bilateral optic gliomas with co-existing rhegmatogenous retinal detachment with a dialysis in the left eye which although appears to be a separate entity but has never been reported in literature to our knowledge. The gliomas being intraorbital with no evidence of intracranial extension the right eye asymptomatic, and the left glioma causing total visual loss and the retinal

detachment being long standing and localized. We decided not to intervene with any treatment. Radiotherapy causes considerable morbidity in children so we decided against it. The patient will be followed up meticulously to detect growth which if presence, we will chalk out an appropriate plan beneficial for the patient.



Figure 9: Axial T2-weighted MRI showing the right thickened optic nerve and the left glioma with the solid (hypointense) and cystic (hyperintense) areas

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Abstracts of original article, comprising of upto 250 words, should be in structured format with following sub-headings.

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