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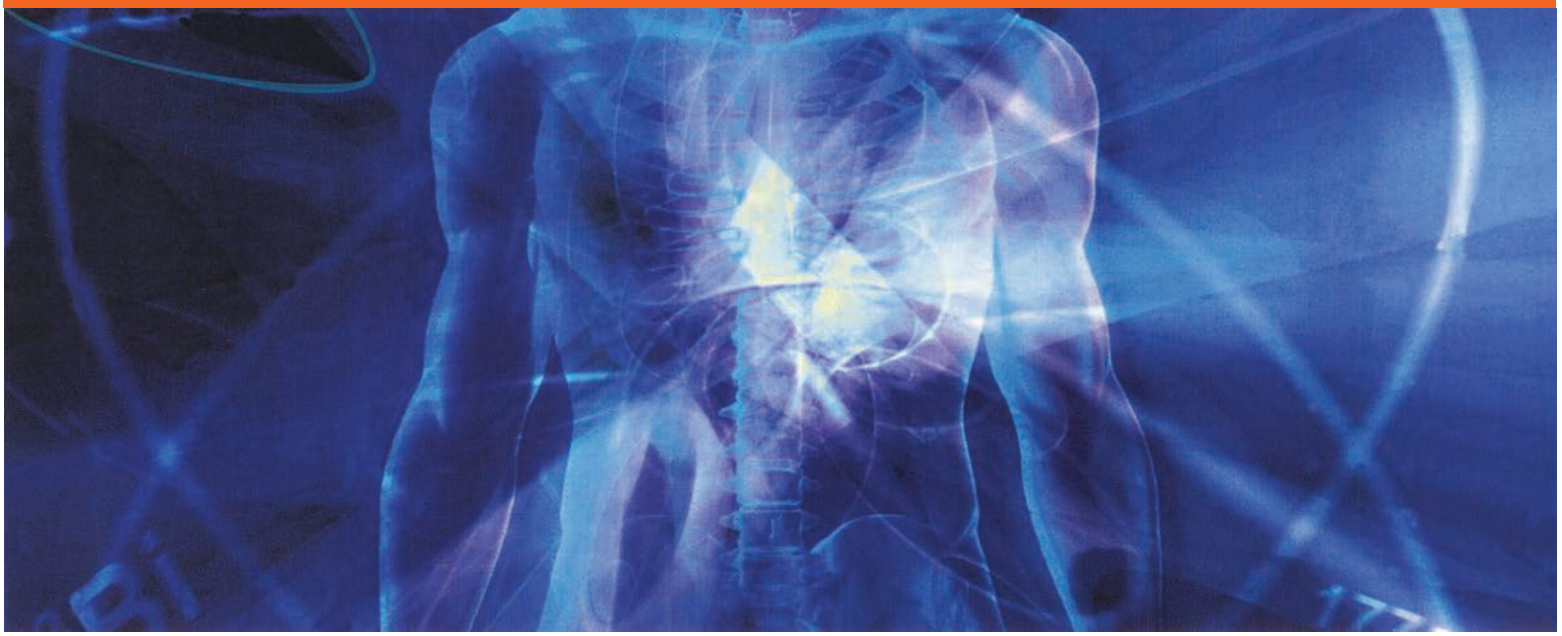

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EDITORIAL

Increasing Trend of Swimming and Water Sports in Pakistan Causing Ear Related Problems

Iqbal Hussain Udaipurwala

Swimming and other water sports are the important human activities to keep them physically fit and vigorous. Pakistan has a population of over 183 million[1] and millions of people are involved in swimming and other water sports activities in Pakistan. This trends is increasing tremendously in the recent past. There are many reasons for this increasing trend but following are the top most factors:

- Increasing urbanization.
- Increasing obesity and thus more people are involved in such activities.
- Increasing facilities for swimming and water sports.

At one end, these activities are very rewarding for their overall physical health but on the other hand it is causing higher incidence of different health related problems. There are many health risks related to the swimming and water sports such as the risk of drowning, trauma and injuries by microbiological, chemicals and physical agents. Among all these health related problems, ear is one of the body organ that is affected most. When a person's ear is exposed directly to water without protection, it can lead to many ear problems specially infections and trauma[2]. The standards relating to bathing water is a burning issue even in the developed world also. Many studies have shown that swimming in the fresh water or sea water that meet the current standard, may also lead to ear problems[3]. In Pakistan, many of the swimming pools and water sport parks do not follow the international standards. Secondly swimming and diving in river, lake, beach or sea is very common in our country. The public awareness about the ear protection during these water activities is also very inadequate in our region and most of them do not make use of these protective measures.

The external, middle and inner ear are all susceptible to it but some of the common ear problems related with swimming and water sports are:

- Otomycosis
- Diffuse otitis externa
- Exostosis
- Traumatic ear drum perforation
- Otitis media
- Sudden sensori-neural hearing loss and vertigo

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Otomycosis and diffuse otitis externa are considered as the most common ear problems associated with swimming and water sports. Cerumen has a pH of 4 to 5 and so it suppresses both bacterial and fungal growth in the external auditory canal. The lipid content of the cerumen protects the surface of the epithelial lining of external auditory canal and prevents maceration and breakdown of the epithelium. Aquatic sports, including swimming and surfing, because of their repeated exposure to water result in removal of cerumen and drying of the external auditory canal[4]. Introduction of extraneous moisture from the swimming increases maceration of the skin of the external auditory canal, encourages destruction of the protective barrier and creates condition favourable for bacterial and fungal growth. The risk of otitis externa is reported to be 5 times greater in swimmers as compared to non-swimmers[5].

90% of patients suffering from otomycosis had a history of water entering their ears, either during swimming or bathing[6]. The role of heat and humidity in the development of otomycosis has already been endorsed in the literature. Otomycosis is caused by some species of the saprophytic fungi, which abound in nature and/or form a part of the commensal flora of healthy external auditory canal. Aspergillu niger, A. flavus, A. fumigatus, Allescheria boydii, Scopulariopsis, Penicillium, Rhizopus and Absidia are the most common agents of otomycosis. Candida species, especially C. albicans is a part of human normal flora that causes otomycosis[7].

Exostosis is a common benign tumour of the bony part of the external auditory canal. Prolonged exposure to cold water in activities like swimming increases the risk of developing exostosis and also increases the severity of the existent condition[8,9]. Scuba diving, water skiing and other water sports are the leading cause for traumatic ear drum perforation and are considered as a major cause of non-explosive blast injury to the ear[10]. Persons with previous history of recurrent otitis media, scarred and thin ear drum and poor Eustachian tube functions are at increased risk of developing this condition. All types of water sports are not advisable for a person who has ear drum perforation with active discharge. Swimming with proper ear protection can be advised to patients who had undergone mastoidectomy or tympanoplasty operations. There is controversy whether to allow swimming with proper ear protection or not, in children who had undergone myringotomy with grommet insertion. Sudden sensori-neural hearing loss and vertigo can occur after diving because of the rupture of the round window or oval window[11].

Following are the simple advices to persons who are regularly engaged in different water activities to prevent these ear problems and avoid complications:

- Use proper protective devices like ear plugs and swimming caps during water activities.
- Swimming should be done only in clean water like properly chlorinated swimming pools and non-polluted beach, river and lake. Swimming in polluted water should be avoided strictly.
- Keep the ear canal dry as it decreases the incidence of infection in the ear canal.
- The ear canal can be dried with hair dryer after swimming.
- Ear canal drying with a cotton bud should be avoided as it causes trauma to the ear canal with breach in the protective barrier against infection.
- Diving should always be done very cautiously and with proper protective devices.
- Patients having tympanic membrane perforation with active ear discharge should refrain from all sort of water activities.
- Children with grommet or ventilation tube in place can enjoy surface swimming in properly chlorinated swimming pool with protective device but diving and deep swimming should be avoided.

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REVIEW ARTICLE

Keep Away from Fluoride: A Toxin for Human Health

Kiran Fatima Mehboob[1], Tahira Hanif[2], Bushra Wakeel[3], Muhammad Asif[4]

ABSTRACT:
Fluoride is considered as safe when taken in permissible amount; in case of excessive consumption, it causes multiple ill effects on human body such as elevation of thyroid hormone. This literature review was carried out to evaluate the impact of fluoride on human health and then enlighten healthcare personnel including dentists and physicians whether consumption of fluoride is beneficial or harmful. Ample literature is available which revealed that there is only one advantage; to prevent tooth carries when fluoride is topically applied in permissible value, and there are more harmful effects of excessive fluoride ingestion on human health. An individual can have 1.5mg/L of fluoride by inhalation or ingestion from all resources, namely food, air, and environment to prevent dental decay. One can additionally use topical fluoride over the teeth so that there would not be the need of community water fluoridation which can lead to lethal health outcomes.
Keywords: Fluorine, , Flourosis, Hypothyroidism, Impact

INTRODUCTION:

Fluorine (F-) is highly reactive electronegative element, green to pale yellow in color and univalent gaseous halogen, present in a very less quantity in plants, air, water, salt, beverages and animals and it is the 13th most abundant element on earth. It comprises of 0.08% of earth crust[1]. In water medium fluorine is present in the form of fluoride; and is vital for the prevention of tooth decay and provides density to human bone[2, 3]. Fluorine is found in environment in the form of fluoride minerals composed of carbonate, calcium, sulphates[4], mainly found on volcanic belt from Turkey to China, including infertile region of Mexican border and USA, and another volcanic belt of Pacific region[5]. According to WHO, permissible amount of fluoride in human being is 1.5 mg/L to prevent tooth decay[1, 3].

Fluoride had been added in water from 1940s with the credence that ingested fluoride provides benefit for caries protection and prevents dental decay during tooth forming years. Recently dental community has recognized the fact that topical application of fluoride provides primary benefit as compared to ingestion of fluoride[6]. In water fluoridated areas, the estimated adult fluoride intake by food and water is between 1.2 and 2.2 mg/day (0.02-0.03 mg/kg) and food for young children is 0.04-0.07 mg/kg of body weight according to National Research Council 1993[7].When fluoride exceeds from permissible amount via diet; for example tea, meat, water, salt, tooth paste, dental products, cereals, fish, air, beverages, vegetables and fruits, canned food, chocolates, fluoride supplements and environment, then it has adverse effects on human body which include first and very important dental flourosis[3], osteoporosis, hypothyroidism[3,7]; and impairs normal functioning of bones, kidney, muscle, nerves and reproductive organs[3]. Multiple researches have revealed that excessive exposure of fluoride has a relationship with decreased mental ability and IQ level of children[3, 8].

Fluoride is present in all sources of water, in fresh water 0.01 to 0.3 ppm, in sea water 1.2-1.5 ppm[9]. Fluoride is extracted from soil in a very low quantity but plants which grow in acidic soil have exuberant fluoride levels, up to 100 ppm as in some of the tea plants[9,10]. According to WHO permissible limit of fluoride in Pakistan is 1.5ppm in drinking water and one of the studies conducted in 23 big cities of Pakistan supervised by National water quality Monitoring Program revealed that due to the effluents and industrial disposal, fluoride level reached to the toxic levels[11]. Another study revealed that in Lahore city, the content of fluoride in drinking water was within the safe limit as compared to adjacent areas like Mangamandi which had higher fluoride content and the number of reported cases of dental and skeletal flourosis among the natives were also high[12]. According to the Centre of disease Control (CDC), dental decay is related to the low level of fluoride in drinking water and to overcome this tooth decay water fluoridation is one of the developments on public health aspect[13, 14].

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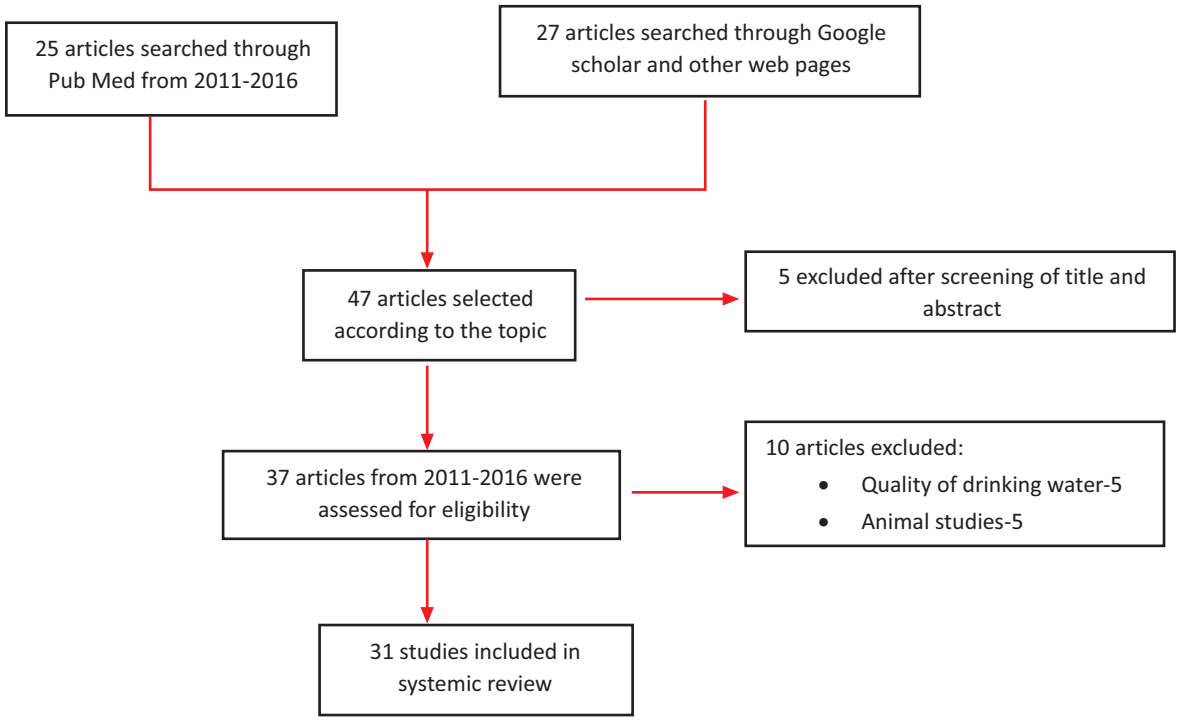
It is evident from literature that water fluoridation may induce high levels of fluoride in body along with different potential sources of fluoride from food and environment. It is imperative to review literature and gather authentic data from different researches conducted worldwide to help the physicians, dentists and health care personnel by providing them evidence based outcome when prescribing fluoride supplement to their patient and evaluate fluoride as a toxin instead of benefit for the human body. This was indeed the aim of this study.

METHODOLOGY:

The literature was reviewed and systemically searched from international search engines for example Medline and Google scholar. This literature search was carried out from 1st July 2016 till 30thSeptember 2016, and was limited from 2011 till 2016. The used key words were impact of fluoride on human health, effects of water fluoridation, impact of water fluoridation in Pakistan and causes of dental and skeletal flourosis. By exploring with these key words total 52 articles were retrieved and 31 articles were filtered by focusing on the topic (Table-1.) In additions to the mentioned topics, more articles were further explored from the references of the filtered articles to get more literature.

Table-1: Inclusion and exclusion flow chart of retrieved literature



LITERATURE REVIEW

Effect of Fluoride on Dental and Human skeleton:

Consumption of fluoride for the protection of dental decay is a very old practice. Water quantity of 1 ppm of fluoride can prevent the tooth decay and does not have negative impact on enamel strength[3,15]. Excessive consumption of fluoride in human body can cause flourosis. It is of two types; dental or skeletal. Dental flourosis also known as "mottled enamel", is hypo mineralization of enamel during the period of enamel development till the eruption of permanent dentition (1-6 years). If fluoride level reaches up to toxic level (1-4 ppm), it may cause brittleness and weakness in joints and can lead to fractures of hip and wrist joints due to the chronic exposure to excessive fluoride for long duration and less consumption of calcium[16]. According to National Research Council U.S; skeletal flourosis is prevalent in Asian subcontinent. The severe presentation is "crippling skeletal flourosis", which causes severe pain in joints, bone deformation, calcified ligaments and immobility. Major reason of dental flourosis is badly chosen dental products[17]. 70% of the searched articles revealed harmful effects of dental and skeletal flourosis in their study[3,6,18-23]. Skeletal flourosis leads to osteoarthritis, followed by stiffness of joints, sporadic pain, joint stiffness, osteosclerosis of vertebral column and pelvic girdle, restricted chest wall expansion and

slight calcification of ligaments[6,24-26].

Effect of Fluoride on Cognitive Impairment and IQ level of Children:

Multiple studies were carried out to examine association between excessive fluoride and IQ. Community water fluoridated areas showed no association between fluoride and IQ. In fluoride belt countries, association was found between IQ and neurological effects with excessive fluoride from 1.5 ppm to as high as 10.3 ppm. Human studies conducted in Mexico, Iran, India, and China revealed causal association between excessive fluoride ingestion and IQ level of children and developmental neurotoxicity even after controlling different elements like lead and arsenic; iron and iodine were also present in water[6,18,19, 26-29]. Lower socio-economic status and malnutrition also lead to lower IQ and neurological problems in children[3,28].

Effect of Fluoride on neurological system:

According to a study in 2011; toxic level of fluoride in human body can affect the central nervous system and interfere with the normal functioning of neurons, this is mostly reported near the areas of fluoride belt and the population which are more exposed to industrial waste and chemicals depending upon the age, dose exposure and time[6,30]. Multiple studies conducted worldwide revealed that behavioural problems in neonates are also caused by accumulation of fluoride in fetal brain leading to its damage[6]. Another study conducted in China disclosed that augmented level of fluoride in drinking water is stumble upon neurotoxicity during development[31].

Effect of Fluoride on Endocrine System:

When the concentration of fluoride reaches from 100-200 ppm in human body; it increases the TSH level and ultimately diminishes the production of T3 & T4 and sensitizes thyroid gland as fluorine has the antagonist property towards iodine[3]. In early era of 20th century, administration of fluoride was an effective measure to suppress thyroid function and to treat hyperthyroidism[6].

Effect of Fluoride on Insulin:

In diabetic patients, increased level of fluoride from water and other sources can cause insulin resistance by increased hepatic glycogenolysis. Fluorides have an important role in stifling insulin secretion from islets of Langerhans and ultimately make obstruction in the process of glycolysis and raise blood glucose level[3].

Perinatal deaths and birth defects:

According to the study conducted in UK, 15% more perinatal deaths and 30% more cases of Down's syndrome were reported in fluoridated areas as compared to non-fluoridated areas. Water fluoridation was prohibited after this correlation was evidenced in Chile[6].

Oncological Effect of Fluoride:

Research in national Toxicology Program revealed that fluoride is a mutagen and causes genetic damage[6]. According to the study conducted in Japan, fluoride can not only cause genetic damage, but it has the ability to transform healthy cells into cancerous cells. Excessive fluoride deposits in bone changes the composition of bone mineralization, serum activity of alkaline phosphate increases, and increased osteoblastic proliferation can lead to osteosarcoma. A number of ecological studies were conducted to find association between osteosarcoma and excessive fluoride. An estimated 15 cases per year of osteosarcoma were diagnosed affecting all age groups in Ireland[3,6,32]. Another study confirmed the link between uterine cancer and excessive fluoride[6].

Effect of Fluoride on Gastrointestinal Tract:

Excessive fluoride ingestion within a short period of time can affect stomach by first damaging the mucosa of gastroduodenal junction, causing nausea, bloody diarrhoea and vomiting, and abdominal pain suggesting acute poisoning. These are early warning signs of flourosis[6]. Within two to four hours of excess fluoride ingestion, symptoms progress to shallow breathing, hypocalcaemia, hyperkalaemia, cyanosis and ultimately death[3,33]. From the reviewed articles 50% showed evidence of acute toxicity. Children under 4 years of age (1990-1994) experienced gastrointestinal distress due to the ingestion of fluoridated tooth paste and developed acute toxicity of fluoride[6,21,34].

Effect of Fluoride on Cardiovascular System:

Excessive fluoride, more than 2 ppm may cause decrease in aortic elasticity, oxidative stress, atherosclerosis, coronary cell damage, myocardial calcification and vascular stiffness causing high blood pressure and cardiac dysfunction. It is difficult to find association between excessive fluoride and cardiovascular disease, but a study conducted in China and two studies in Iran suggested more prevalence of high blood pressure in high fluoridated area[3,24].

Alzheimer's disease and Fluoride:

As stated by comparative epidemiological study that there is one-fifth prevalence of Alzheimer's disease in highly fluoridated areas as compared to low fluoridated areas[35]. A lot of more work needs to be done in this area to find out the causal relationship between Alzheimer's disease and excessive fluoride ingestion.

Effect of Fluoride on Iodine deficiency, hypothyroidism and depression:

Excessive amount of fluoride in the body leads to the decreased production of T3/T4 causing hypothyroidism. Iodine deficiency is the basic cause of hypothyroidism, which is one of the many predisposing factors of depression. It is most commonly found in Northern areas of Pakistan and other developing countries. Some researchers have declared that at specific level, fluoride can replace iodine as it is antagonist of iodine and leads to iodine deficiency in patients which in turn causes depression[3,7,8,12,36]. Worldwide, hypothyroidism made an alarming health situation mainly due to iodine deficiency and excessive fluoride[36,37].

By reviewing the literature, it can be stated that there is only one advantage of fluoride; which is prevention of tooth decay when consumed in permissible amount and applied topically, otherwise there is more negative impact of excessive fluoride in human body. Community water fluoridation had been carried out since 1940s as advancement in public health sector to provide fluoride in community water supply. According to the British government, water should be fluoridated at 1 ppm and along with other resources of fluorides; it exceeds permissible value when it reaches the human body leading to its negative impact[6, 38,39].

Public Health Services in US have revised the quantity of fluoride in community water supply, which was admissible since 1962, and recommended to add 0.7 ppm or milligrams/litre (mg/L) of fluoride in May 2015 in community water fluoridation, so it could balance the need of cavity protection and limit its harmful effects[40].

In Pakistan, the concentration of fluoride content is beyond the permissible limit, from 1.6-25mg/L according to the study conducted in 16 major cities of Pakistan over 747 surface water samples[37].

This is the point of rethinking, and appraising that is it necessary to fluoridate water for the prevention of dental caries as there are many other food and natural resources of fluoride intake. Accumulative ratio of fluoride has negative impact on human body. In Pakistan, more researches should be conducted to explore the excessive consumption of fluoride and its impact on human health and also review the content of fluoride in drinking water.

CONCLUSION:

Fluoride is present naturally in our environment. There is only one benefit and more risks to the general health. We should focus on benefit versus risk ratio while planning any public health approach. An individual can have 1-1.5 ppm of fluoride from all resources namely food, air, and environment and can prevent the dental decay. Additional fluoride should be used as topical application, so that there would not be the need of community water fluoridation which can lead to major lethal health outcomes.

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ORIGINAL ARTICLE

Knowledge of Depressive Illness among Non- Psychiatrist Doctors

Raja Muhammad Shoaib[1], Tallat Najeeb[2], Tehreem Fatima Muzaffer[3]

ABSTRACT:
Objective: To ascertain the knowledge of non-psychiatrist doctors to suspect and diagnose Depressive Illness presenting to them in garb of physical or somatic symptoms.
Methodology: This Descriptive cross sectional study was conducted at Social Security hospital in one year, from January 2016- January 2017. A simple questionnaire was developed, asking three basic diagnostic symptoms of depressive illness and the duration of illness needed for its diagnosis. Non-psychiatrist doctors from a tertiary care hospital were given five minutes to complete it in front of the research officer.
Results: Three out of forty seven responding doctors knew about the three basic symptoms of depression with the required duration for diagnosis.
Conclusions: A vast majority of the practising doctors or general practitioners are unaware of the characteristic features of Depressive Illness. Therefore, non-psychiatrist doctors are unable to suspect or diagnose Depressive illness.
Keywords: Depressive illness, Knowledge, General practitioners, Symptoms

INTRODUCTION: Depression is a common mental disorder; 350 million people suffer from it globally[1]. Depressive illness is one of the leading causes of disability and more so in the low and middle-income countries. Pakistan falls in this category and the incidence and prevalence of Depression has increased substantially in Pakistan for a variety of other reasons, however, no exact figures are available. It can lead to death by suicide. However effective treatments are available[1]. Women are affected more than men. No age group is protected against depression. Depression can co-exist with physical illnesses, which can also be a cause of Depression[2,3]. Depression can also disrupt the course and outcome of many physical illnesses like Diabetes Mellitus. Similarly treatments for physical illnesses can produce symptoms of depression[2-8].

Global burden of disease study reveals that in 1990, Depression accounted for 3.7% of the burden which went up to 4.4% in the year 2000. As of now Depressive illness is among the top ten causes of disability worldwide[9]. Years lived with disability (YLDs) are estimated by weighing the prevalence of different conditions based on severity. It has been noted in different parts of the world that rates of YLDs are declining much more slowly than the mortality rates, thereby the transition to non-fatal outcomes as dominant source of burden of disease is occurring rapidly[10]. The top five leading causes of YLDs in Pakistan include major depressive disorder as number one[11].

It is essential to detect and treat depression well in time. This is only possible when symptoms of depression in the patients are detected early, whether it is in a general practice or any non-psychiatrist specialist clinic. Many of the patients present intentionally or unintentionally to non-psychiatrist doctors or specialists. An effort was made to determine if these non-psychiatrist doctors can diagnose 'Depressive Illness'.

This study was conducted to ascertain the non-psychiatrist doctors' knowledge about three characteristic diagnostic features of Depressive illness. These include; low mood, low interest and low energy. The Social Security hospital was selected because of a number of reasons. It is a teaching hospital, with large number of doctors of different seniorities, representing all fields of medicine; including administrators, general practitioners, consultants and teaching faculty as well.

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METHODOLOGY:

This cross sectional study was conducted at Social Security hospital from January 2016 to January 2017 after approval from institute ethical review committee. A simple questionnaire was developed. All the doctors available in the hospital were interviewed. Of the available doctors, all who were willing to complete the questionnaire were included. The questionnaire asked to list the three diagnostic symptoms of depression, and how long did they have to be present to label the patient

as a case of Depressive Illness. The questionnaire also included the demographic data of the respondents like the age, gender, year of graduation, period of clinical experience (less than 1 year, 1-5 years or more than 5 years) and status in medical hierarchy, like general practitioner, consultant, administrative post or a faculty member (Table-1). Five minutes were given to complete the questionnaire in the presence of the research officer. The completed questionnaires were placed in a closed box so as to guard against identification. Frequency was determined by calculating percentages.

RESULTS:

Questionnaire was given to 47 doctors. Among them, 24 were females and 23 were male. Age ranged from 30- 64 years. Average age was 47 years. Out of 47, 17 doctors had done MBBS only and were working as General practitioners. Twenty participants were members of teaching faculty, six were specialist or consultants and 4 doctors were from administration. Practical experience of 30 doctors was more than 5 years, 9 doctors had practised from 1-5 years and 8 doctors had experience less than 1 year.

It was an eye-opener to learn that only three out of 47 doctors knew the three diagnostic features of depressive illness. Three out of forty seven gave a correct answer. Other participants gave vague and non-specific answers; they were not sure of the symptoms, as well as duration required for the diagnosis. There was one male and two female doctors who gave correct answers (Table-1). The male doctor was a consultant who had done MRCP with more than 5 years of clinical experience and the other two doctors were fresh MBBS graduates, with less than one year of clinical experience.

Table-1: Demographic Data of study participants& awareness about symptoms of Depression

Variables	Categories	Number (47)	%
Age	25-30	10	21
	31-40	18	38
	41-50	9	19
	More than 50	10	21
Gender	Male	23	49
	Female	24	51
Education	Graduate	23	49
	Post graduate	24	51
Clinical experience	<1yr	6	28
	1-5yrs	9	19
	>5yrs	32	68
Awareness about depressive illness	Yes	3	6.3
	No	44	93.6

DISCUSSION:

This was a very significant finding in the present study that only three out of forty seven doctors (6.38%) knew about the characteristic symptoms of depressive illness, i.e., 93.6% of study subjects were not aware about the diagnostic criteria of depression. This finding was similar to another study[12] in which 91.3% of doctors had inadequate knowledge about diagnostic criteria of depression. It is thus natural to expect that they were not able to identify cases of depression who presented to them with diverse complaints[13]. Other studies have shown that both physicians and surgeons were equally reluctant to refer the patients to Psychiatrist for varying reasons even when they identified the symptoms of depression and considered this diagnosis[8]. Consequently the patients of depressive illness remain untreated. They continue to suffer despite receiving treatment for physical symptoms to which they do not respond. The medical services remain burdened with such patients who could have been helped if diagnosed and treated properly. It is ironic to note that the term depression is used quite often even by the doctors who, most often than not, do not know which symptoms constitute depressive illness. However, it is pertinent to bear in mind, the fact that this study was conducted on the doctors from just one institution. It would have been even more significant if

other institutions, preferably in other cities or organizations were also included.

These findings could have been due to one of the reason; lesser emphasis on teaching Psychiatry at undergraduate level; absence of efforts or lack of opportunities towards continuing medical education; refusal to accept the importance of Psychiatric disorders[14,15]. Another reason could be the stigma associated with Psychiatric/ depressive disorders; whereby clinicians do not bring up the possibility of Psychiatric symptoms or need for psychiatric treatment[16]. They do not want to offend their patients. At times physicians exhibit demeaning attitude/ behaviour towards patients with symptoms showing some type of psychiatric illness[17].

Psychiatry education at undergraduate and post-graduate level positively influences the attitudes of medical students and doctors towards mental illness and Psychiatry[18,19]. It has been stressed that time spent in the lectures should be decreased, and that spent in clinical practice should be enhanced. Psychiatry training must focus on augmenting student centered group dynamic experiences. Teaching needs to be concentrated on issues helpful for general practitioners and non-psychiatrists. The subject of medical ethics should be included in undergraduate curriculum, resulting in development of more humanistic approach of medical students[20]. The medical curriculum needs to address the topics related to child and adolescent psychiatry as well[21].

Non-Psychiatrist doctors training programs should be developed locally with their input as to what they need and would find useful[22,23]. Their training in Psychotherapeutic techniques has also been found helpful by non-psychiatrist doctors in their handling of Psychiatric patients[24,25].

CONCLUSION:

Non-Psychiatrist doctors are poorly informed about diagnostic symptoms of depression. Thereby most cases of depressive illness go undiagnosed and untreated, thus adding to the already heavy burden of patients in the general and other out patient departments. This finding will help us develop a strategy to educate and train the doctors.

RECOMMENDATIONS:

Psychiatry should be taught as an independent subject at undergraduate level.

Non-Psychiatrist doctors, general practitioners, and specialists, should be offered opportunities to learn about Psychiatric disorders in general, and depressive illness in particular.

Public awareness campaigns should be launched in order to educate the public about the nature of Psychiatric illnesses thereby mitigating the stigma associated with mental illnesses.

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ORIGINAL ARTICLE

Knowledge of Dengue Fever among Health Care Professional in large hospitals of Makkah al Mukarramah

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ABSTRACT:

Objective: To assess the knowledge of dengue fever among health care professional in three large hospital of Makkah-al-Mukarramah, Saudi Arabia.

Methodology: The design of this study was cross sectional and sample size was 188. The sample size was calculated by using epi-info software, keeping level of confidence as 95% and level of significance as 5%. One hundred and eighty eight health care staff including physician, nurses, paramedics and other office employees were interviewed about the knowledge of dengue fever and its prevention. Collected data was analyzed by SPSS version 20.

Results: It has been found that among health care professional, physicians have good knowledge of type of vector (p=0.002) but there was lack of knowledge of timing of vector bite, diagnostic criteria and preventive measures by all the participants.

Conclusion: The results of the study have demonstrated that although physicians have sound knowledge about the pathogenesis of the disease, they have deficient information about diagnosis and preventive measures, which is common to all health care professionals. However, there is need for one large scale study among health care staff for the assessment of knowledge regarding dengue and its preventive measures.

Keywords: Dengue, Fever, Health care professional, Hospital, Makkah al Mukarramah

INTRODUCTION:

Dengue is a viral disease, which is transmitted by mosquito and has quickly dispersed in all parts of the world in recent years. The vector involved is female mosquito, primarily of the species *Aedes aegypti* and, to a lesser degree, *Aedes albopictus*. Some other infections like chikungunya, yellow fever and Zika are also transmitted by the same mosquito[1]. Four distinct serotypes of dengue virus have been identified, belonging to the family Flaviviridae and genus Flavivirus. They are known as: DENV-1, DENV-2, DENV-3, and DENV-4. If a person is infected by any one of the serotype, lifelong immunity develops only to that specific serotype. These serotypes have been individually found to cause dengue epidemics associated with serious complications[2,3]. Subsequent infections by other serotypes (second attack by another serotype) increase the risk of developing severe form of dengue .

Today about 2.5 billion people, making up about 40% of the world's population, live in areas with a danger of dengue spread[4]. The different types of the dengue virus transmit to the humans through the bite of infected Aedes mosquitoes, primarily Aedes aegypti. These mosquitoes lay their eggs in water-filled containers in the house and patio and rain-filled cavities in tree, bamboo inter-nodes, leaf axil of plant, large discarded containers etc. Dengue is endemic in at least 100 countries in Asia, Africa, Pacific, America, Caribbean[4]. World Health Organization (WHO) determined that yearly 50 to 100 million infections of Dengue occur, including 500,000 cases of Dengue haemorrhagic fever (DHF) and 22,000 deaths, largely among children[4]. Situation in Saudi Arabia is alarming; there is significant rise of dengue cases, especially in the cities of Jeddah and Makkah[5,6]. In 2006, 1300 confirmed cases were reported while this figure rose to 4500 cases in 2013[5]. Symptoms of infection usually begin 4-7 days after the mosquito bite and typically last 3-10 days[4]. Aedes aegypti bites occur mainly during the day[7], and is most active for roughly two hours after sunrise and before sunset[7].

Dengue fever is commonly a self-limiting illness. No specific antiviral treatment is currently available for it[8]. First infection usually gives lifelong immunity, but second infection may occur with another strain, and if it happens may be more severe than previous one. Patients with dengue usually live in a locality with

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abundant mosquitoes, or give a history of recent travel to a region where the disease is prevalent. There is sudden onset of fever with chills, severe (termed break bone) aching of the head, back, and extremities, facial flushing and erythematous mottling of the skin. Duration of fever is 2-7 days and may reach up to 41°C[9]. Minimal criteria for the diagnosis of dengue haemorrhagic fever, according to WHO, are as follows; fever, haemorrhagic manifestations (e.g. haemoconcentration, thrombocytopenia, positive tourniquet test), circulatory failure, such as signs of increased vascular permeability (e.g.hypoproteinemia, effusions), and hepatomegaly[10].

As discussed earlier, no specific treatment or vaccine is available for this disease, so focus should be on prevention to reduce the burden of disease. There are lot of methods available to prevent mosquito bite, but larval phase of mosquitoes should be targeted by the use of larvicides and destroying larvae habitats[11,12]. Knowledge of preventive measures and basic information about dengue is important for health care professionals to control the vector and thus prevent the disease. With this background, this study was undertaken to assess knowledge of dengue fever among health care professional in three large hospital of Makkah-al-Mukarramah, Saudi Arabia.

METHODOLOGY:

Setting: This study was conducted among the staff of King Faisal Hospital, King Abdulaziz hospital and Alnoor specialist hospital of Makkah-al-Mukarrama. There were more than one thousand staff members working in these hospitals. Those who had been interviewed, were health care professionals including doctors, nurses, paramedical staff and non-medical staff working in other departments e.g. office clerks.

Design of study: It was a cross sectional study. The estimated sample size was 188, which was calculated by using epi-info software, keeping level of confidence as 95% and level of significance as 5%, considering the prevalence of knowledge about dengue fever among health care professional as 86% in Kingdom of Saudi Arabia, and the risk of refusal by participants was 10%[13]. All employees were interviewed by principal investigator and co-investigators. Data was gathered on pre-designed proforma, adopted from Lee et al 2011[14].

Time and Duration: Data was collected over the period of six month, from 1st January 2014 till 30th June 2014.

Sampling technique: Convenient sampling technique was used for enrolment of study subjects.

Analysis: Data was analyzed by SPSS software version 20.

RESULTS:

Among 188 healthcare staff who were interviewed, the frequency of distribution was 96 physicians (51.1%), 60 nurses (31.9%), 15 paramedics (8.0%), 12 consultants (6.4%) and other 5 office employees (2.7%). Among all staff members, 72 (38.3%) had post-graduation. 95 participants (50.5%) had more than 4 years of experience. Male to female ratio was 58:42. (Table-1)

Table-1: Frequency distribution of demographic variables of study population

Variables	Categories	Number	%
Gender	Male	109	58
	Female	79	42
Education	Diploma	50	26.6
	Graduate	66	35.1
	Post graduate	72	38.3
Hospitals	King Faisal Hospital	61	32.5
	Al Noor Hospital	63	33.5
	King Abdullah Hospital	45	23.9
	Others	19	10.1
Experience	Less than 1 year	12	6.4
	1-2 years	46	24.5
	3-4 years	35	18.6
	More than 4 years	95	50.5
	Physician	96	51.0
Type of employee	Paramedic	15	8.0
	Nurse	60	31.9
	Consultant	12	6.4
	Others	5	2.7

Out of study participants, 184 (97.9%) were aware about the dengue fever while 4 didn't give answer to this question. 165 (87.5%) answered correctly about the etiological agent. Interestingly 168 participants (89.4%) had correct information about the vector, but only 128 (68.1%) had correct information about the species of mosquito responsible for spread of dengue (Table 2).

Table-2: Distribution of knowledge about dengue fever and the causative organism

Characteristics	Correct Number (Percent)	Incorrect Number (Percent)
Knowledge about organism responsible for dengue	165 (87.8)	23 (12.2)
Knowledge about vector of dengue	168 (89.4)	20 (10.6)
Knowledge about species of dengue	128 (68.1)	60 (31.9)
Knowledge about types of agents of dengue	50 (26.6)	138 (73.4)
Knowledge about habitat of vector of dengue	79 (42.0)	109 (58.0)
Knowledge about mode of transmission of dengue	178 (94.7)	10 (5.3)
Knowledge about time of bite of mosquito	11 (5.9)	177 (94.1)
Knowledge about preventive measures of dengue	85 (45.2)	103 (54.8)
Knowledge about which attack is more dangerous	76 (40.4)	112 (59.6)
Knowledge about basis of diagnosis (WHO Criteria)	49 (26.1)	139 (73.9)
Knowledge about Future of dengue	33 (17.6)	155 (82.4)
Knowledge about diagnostic sign and symptom of dengue	3 (1.6)	185 (98.4)

Among the 96 physicians who participated in the study, 88 knew about the organism, 87 (91%) chose mosquito as vector, but only 75 (78%) were aware about the correct species. 45 (47%) physicians selected fresh water as habitat (Table 3). Each question for the knowledge was given a score of 10 and as there were 12 questions, the maximum possible score was 120. Over all knowledge score was 56±10.2. After analyzing the data, it was found that among health care providers, physicians had better knowledge about type of species of vector, mode of transmission, time of bite, severity of attack, and features of dengue. For rest of the variables, significant difference was not seen between the physicians and other health care workers (Table 3).

Table-3: Comparison of knowledge between physicians and other health care providers about dengue fever

Category	Type of profession Physicians		Others		Chi Square Value	P value <
	Correct Number (%)	Incorrect Number (%)	Correct Number (%)	Incorrect Number (%)		
Name of organism responsible for disease	88 (91.7)	8 (8.3)	77(83.7)	15 (16.3)	2.78	0.061
Name of vector	87(90.6)	9(9.4)	81(88)	11(12)	0.33	0.368
Knowledge of type of species of vectors	75(78.1)	21(21.9)	53(57.6)	39(42.4)	9.10	0.002**
Habitat of vector	45(46.9)	51(53.1)	34(37)	58(63)	1.90	0.109
Mode of transmission	95(99)	1(1)	83(90.2)	9(9.8)	7.13	0.008**
Type of vector	29(30.2)	67(69.8)	21(22.8)	71(77.2)	1.32	0.164
Time of bite	9(9.4)	87(91.7)	2(2.2)	90(97.8)	4.42	0.034*
Preventive measures for dengue	39(40.6)	57(59.4)	46(50)	46(50)	1.67	0.126
Knowledge of diagnostic criteria	20(20.8)	76(79.2)	29(31.5)	63(68.5)	2.78	0.066
Severity of attack	47(49)	49(51)	29(31.5)	63(68.5)	5.90	0.011*
Knowledge about features of dengue	25(26)	71(74)	8(8.7)	84(91.3)	9.76	0.001**
Knowledge of diagnostic symptoms	1(1)	95(99)	2(2.2)	90(97.8)	0.38	0.484

*Significant difference
** Highly significant difference

DISCUSSION:

Adequate training of health care professionals is crucial for reducing infection incidence through patient education. Primary care physicians and nurses serve as the first-line health care providers. They are the ones concerned with not only the diagnosis and treatment, but also notification of dengue virus infection. Knowledge, attitude, and practice (KAP) among primary healthcare professionals (HCPs) regarding dengue infection may help in controlling the risk factors and improve the results of dengue control. In a study conducted in Saudi Arabia in 2015, knowledge of dengue was excellent among primary care physicians which was close to our study, but this study did not describe the knowledge among other health care workers[15]. Overall score of physicians (66.2±11.4), was better than what was conducted in major cities of Pakistan (62.5±14.37)[16]. Knowledge of our physicians were similar to study conducted in Singapore in 2011[14] but less than what was conducted in Taiwan in 2013, (74.4%)[17]which could possibly be due to higher literacy rate in the country[18].

Our result depicted that only 89% health care workers had knowledge about the types of vector, with similar result in study conducted in Pakistan[19], lower rates (58%) were reported in a study conducted in interior Sindh because of poor literacy rate in the region[20]. Similar results were observed in Punjab, Pakistan in 2012[21] and in Jamaica in 2010[22].

Effective vector control measure are critical for achieving and sustaining reduction of morbidity attributable to dengue, only 45% of the respondent knew about the correct preventive measures in our study. Our result are similar to studies conducted in interior Sindh[20] and Jeddah[23].

Surprisingly only 5.9% study participants had correct information about the timing of vector bite. Our results are much lower than reported in interior Sindh and

Jeddah[20,23]. The knowledge of the symptoms in our study correlated with the results of previous studies[20,24-26]. This deficiency of knowledge results in delayed consultations with a health care facility.

CONCLUSION:

Although this study was conducted at a small scale, but it is evident from the results that there is insufficient knowledge among health care workers about the dengue and its preventive measures.

RECOMMENDATIONS:

On the basis of results from this study, we strongly recommend the need for one large scale study among health care staff about the dengue and its preventive measures. We also recommend that health care authorities should take step for making health awareness program like seminar, teaching activities and workshops for health care professional in order to develop a dengue free world.

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ORIGINAL ARTICLE

The Need for Medical Rehabilitation during Floods: A Cross-Sectional Survey of Physicians from Pakistan Armed Forces

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ABSTRACT:

Objective: To analyze the spectrum of medical issues during floods and to document the needs for medical rehabilitation expertise during floods in Pakistan.

Methodology: A questionnaire based cross sectional survey was designed. Medical officers from Pakistan Army who provided services in the flood affected areas of Pakistan during 2010-14 were selected. Data recorded included the area, time since flood, number and types of patients seen per day, medical issues encountered and trauma cases seen. We also inquired about the need for rehabilitation medicine physicians during floods and if any rehabilitation interventions were needed or offered during rescue operations. Data was analyzed using SPSS version 20.

Results: Forty self-administered questionnaires were distributed among physicians who had recently returned after performing duties in the flood hit areas. The response rate was 70% (28). All the respondents were medical officers from Army Medical Corps. There were 15 males and 13 female respondents with an average of 1 year experience. They had reached the flood affected areas1-4 weeks post-floods and spent an average of 30 days in those areas. Majority of the doctors were in Rahimyar khan and surrounding areas. Average number of patients attended was 147 patients/physician/day. Gastrointestinal diseases, skin infections and conjunctivitis were the commonest issues seen, followed by respiratory illness and minor trauma (bruises and lacerations). Only one case each of head injury and fracture were reported. None of the respondents considered early rehabilitation intervention mandatory in acute flood situation, however, weekly visits of medical, surgical, skin and eye specialist, gynaecologist and psychiatrist were recommended.

Conclusion: Frequent medical consultations in floods involve gastrointestinal disorders, skin diseases, conjunctivitis and respiratory illnesses. General duty doctors trained in common flood related ailments are sufficient. However weekly visits by consultants is recommended. No specialized rehabilitation and other services are required in initial days of floods.

Keywords: Floods, Disaster, Rehabilitation, Survey, Opinion, Need assessment, Pakistan, Relief services

INTRODUCTION:

Floods are common worldwide and constitute 40 percent of all global natural disasters[1], resulting in half of the total deaths due to all natural disasters combined[2,3]. Major floods result in displacement of a large number of people and high death rate. Asia has been the most affected among other continents in terms of morbidity and mortality[4,5]. Pakistan is located in South Asia and frequently affected by major floods, mainly due to the summer weather system. Floods mostly occur from July to September when the rainfall adds water to the melting glaciers in the north. Floods usually affect Sindh and Punjab[6,7]. The 2010 floods were one of the worst flood in the history of Pakistan. It affected 79 districts out of total 124 districts in the country resulting in massive damage to life, property, crops and houses. Approximately 20.2 million people were affected and 2 million houses were damaged or destroyed[7]. National disaster management authority (NDMA), reported 1,985 deaths and an estimated loss of 10 billion US dollars[8,9]. Flash floods are always a surprise but the people living in susceptible areas need to be vigilant[10]. River floods on the other hand are not much of surprise especially for people living downstream. People know well in advance that the flood would be coming so at least human life loss could have been easily prevented if not the property. Here comes the role of the governments to inform and arrange emergency evacuation of the people to safe places so lives can be saved [9,11].

Deaths, injuries and illnesses after the floods are not only related to the flood itself, but also relate to prevailing socioeconomic and health conditions of the people living there. The medical conditions resulting from floods can be classified into immediate, intermediate and long term[12,13]. The immediate consequences are death due to drowning. Other consequences are injuries, skin diseases, conjunctivitis, gastrointestinal and respiratory conditions. The injuries occur due to direct impact as well as during the evacuation and clean up process. The intermediate effects include communicable diseases, infections, and complications of injuries, psychological stress and poor nutrition[14,15]. Long term medical conditions include chronic diseases, malnutrition, mental health and chronic disabilities. Long term effects are more profound on the elderly and the disabled.

The indirect impact of the floods include damage to the infrastructure including health, water and shelter and acute and long term food shortage[7]. Traditionally medical

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response to flood includes medical teams of doctors and paramedic staff trained in handling the basic flood related ailments and trauma management. In the recent years, there has been an increased emphasis on providing early multi-disciplinary rehabilitation services to victims of natural disasters like earthquakes and tsunamis[16]. The need for specialized health services including rehabilitation in the early and late phase of floods has not been researched.

The objective of this study was to analyze the spectrum of medical issues during floods and to document perspectives of the service providers for the need for medical rehabilitation expertise during floods

METHODOLOGY:

A questionnaire based study was planned. Permission of ethical review committee was obtained. Forty questionnaires were sent to the doctors who had provided services in the flood hit areas from 2010-2014. Respondents were sampled by convenience. Response rate was 70%. One form was rejected on technical grounds. The questionnaire was pilot tested. The questionnaire had three parts. First part was the demographic data including name, age, gender, work experience and area of flood visited. Second part included arrival day at flood hit area, number of days spent, number of patients seen per day and the type of ailments and injuries seen. Last part was a series of open ended questions on the requirement of specialist doctors including rehabilitation medicine physicians after the floods and suggestions for improvement in medical response to floods. SPSS version 20 was used for data analysis. Frequencies as percentages were calculated for descriptive statistics, and mean and range were calculated for numeric data.

RESULTS:

Out of 28 respondents, 15 were males and 13 were females. The mean age of respondents was 24 years. All of the respondents were general duty medical officers. Forty percent arrived at the flood hit area within one week, while the remaining within 30 days. Each individual spent an average of 34 days in the flood hit area. Average patients seen per day were 147. Majority of the doctors were in Rahimyar khan and surrounding areas; other areas included Muzaffargarh, Rojhan, Dera Ghazi khan, Sukkur, Shikarpur, Nowshehra and Charsadda. Gastrointestinal illnesses were the most common, followed by skin diseases and conjunctivitis (Table-1). Only seven cases of trauma were seen, five minor cases including three with lacerations and two with sprain and strain. Two patients had head injury and two had fracture of the long bone.

Table-1: Frequency of diseases in flood affected areas

DISEASE	FREQUENCY	PERCENT%
GASTROINTESTINAL	10	35.7%
SKIN	8	28.56%
CONJUCTIVITIS	6	21.4%
RESPIRATORY	3	10.7%
OTHER DISEASES	1	3.6%

Majority (24) of the doctors considered a general duty medical officer sufficient to handle flood related ailments but 50% of the respondents recommended weekly/fortnightly visits by medical specialists, surgeons, paediatricians, and skin specialists. None of the respondents considered that early rehabilitation intervention is needed in floods.The major suggestions given by the doctors to improve services included planned deployment, improving and mobilizing existing medical setups, human resource justification, training of paramedic staff and medical officers, coordination between government and non-governmental organizations (NGOs), psychological stress management, hygiene and immediate rescue operations.

DISCUSSION:

Flood not only leads to mortality and morbidity but also causes significant damage to property, livestock and infrastructure. The area affected in 2010 Pakistan flood was equal to the size of England[8,17]. In the present study, majority of respondents were from Armed forces and were recent graduates performing house job duties when deputed for flood relief activities. They spent on an average 35 days in flood hit areas from Nowshehra in the north till Muzaffargarh, Rahimyarkhan, Rajanpur, Rojhan, Shikarpur and Sukkur in the south. The average number of patients attended by each doctor was 147 which revealed the need for medical care after floods. Most of the common medical conditions seen by the

doctors included gastrointestinal illnesses like diarrhoea and vomiting and dehydration, followed by skin diseases and conjunctivitis. Other health problems included respiratory conditions and musculoskeletal conditions. These findings were similar to World health organization (WHO) report on 2010 floods that,"Between August and September 2010, 6.2 million consultations for gastroenteritis, respiratory infections, malaria and dermatological conditions were reported to WHO from 50 out of 64 affected districts"[18]. That is a huge number to be catered for and indicates the priorities of health teams in flood affected area to focus on hygiene, clean drinking water and food, and readiness to treat such cases on a massive scale[19]. The risk for water borne and vector borne diseases remain high and must be kept in mind especially malaria, dengue, measles and cholera. According to WHO majority of the reported cases of polio from Pakistan in 2010 were from the flood affected regions[20].

Another concern in flood related issues is trauma. In the initial phase it can be due to direct impact and falls. There can be penetrating and puncture trauma due to glass and other sharp pointing debris in the mud. Falls due to slipping is another cause for injury. Affected population at times has to travel many miles on foot without any rest with their precious belongings and old age family members and people crammed in tight spaces for hours during evacuation. This can lead to body aches and pains, backaches, leg/foot pains and swellings. In the later stage when people return to their homes for cleanup and repair, all the factors mentioned above can contribute to injury; in addition falling debris from damaged homes and electrocution can be contributory factors[13,21]. Fortunately there were very few major trauma cases in our study that included fractures and head injury but no spinal cord injuries. Minor trauma like sprains, strains and lacerations were also very few. There were only two cases of fracture and head injury. The common trauma cases in floods reported in international literature include, fracture, head injury and spinal cord injury; falls, road traffic accidents, contusions, bruises, sprains, strains, swollen legs and feet, lacerations, cuts, electrical injuries, burns, puncture wounds and others[22]. The reason can be exclusion in data form regarding body aches, back and neck pains etc. These findings were similar to a study from Vietnam where there were only 15 cases of injuries from rural areas and 12 cases from urban areas of Hanoi[23]. In 1993 Golaz et al reported 246 cases of trauma in Missouri floods that included 35% sprains and strains, 24.4 % lacerations, 11% abrasions and other injuries each, 8.5 % puncture wounds and six cases of animal bites, 4 cases of burns and 3 cases of electrocution injuries[24].

Rehabilitation physicians specialized in impairments and disability management and dealing with musculoskeletal issues and rehabilitation of the major trauma can be of great help to the affected population. In our study majority of the respondents (94%) did not see any role of rehabilitation physicians in the acute flood situations and considered a trained general duty medical officer sufficient to handle the situation. Bloodworth et al[25] in their study on Physical medicine and rehabilitation(PMR) conditions in Astrodome clinic after Hurricane Katrina that led to secondary flooding, found 289 different PMR conditions in 239 patients. The commonest included swollen feet and legs, leg pain and cramps, headache, neck and back pain. The possible reasons for the difference from our study can be that they had different aims and objectives than our study. They aimed at documenting the different PMR conditions in Hurricane Katrina. Our aim was to determine from the experience of physicians if, Rehabilitation Medicine is required in the initial phase of floods or not. Their study was conducted by expert Rehabilitation physicians who could easily determine these different conditions in the patients they checked. None of the respondents in our study was a trained Rehabilitation physician and might have missed these conditions. All patients in their study were concentrated at one place in the Super Dome. While the patients attended by our respondents were spread over a large area and might not have even reported these musculoskeletal issues.

In addition, identification and evacuation of already disabled population from the flood hit area should be a priority and concern as they are more prone to trauma, complications and morbidity. In the post flood rehabilitation phase, there can be a need for assistive devices for disabled population who have lost it to floods and it could be a great service. Provision of wheel chairs, canes, crutches, walkers and other assistive devices for activities of daily living should be catered for in flood hit areas[13].

Regarding requirement of other consultants, respondents were of the opinion that no other specialized consultants were required full time in managing flood related conditions but they recommended weekly visit by consultants like medical specialist, surgeon, and other specialists providing consultation to the patients in their respective area. Majority of the respondents mentioned the role of psychiatrist and psychologist in the flood hit areas as they reported a large number of patients having anxiety and post-traumatic stress disorders and sleep disturbances and required counselling, reassurance and treatment in certain cases[24]. This highlights the importance of psychological assistance in the post flood scenario which is usually ignored

CONCLUSION:

Gastrointestinal and skin diseases, conjunctivitis and respiratory illnesses are most frequent in floods. No

specialized rehabilitation and other services are required in initial days after floods. General duty doctors trained in common flood related ailments are sufficient, however weekly visits by consultants is recommended. Psychological stress and post-traumatic stress disorder need to be addressed among patients.

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ORIGINAL ARTICLE

Restorative Effect of L-Arginine on Gross Morphology and Adrenal Weight in Streptozotocin Induced Diabetic Rats

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ABSTRACT:

Objective: To observe the restorative effect of L-arginine on body weight and weight of adrenal glands in streptozotocin (STZ) induced diabetic rats.

Methodology: This experimental study was undertaken at the Department of Anatomy, Basic Medical Sciences Institute (BMSI), Jinnah Post graduate Medical Centre (JPMC), Karachi. Fifty healthy albino rats were equally divided into five groups. Group-A was taken as control. Group-B was treated with STZ. Group-C was given STZ with insulin. Group-D received STZ with L-arginine and Group-E was administered STZ along with both L-arginine and insulin. After the confirmation of diabetes by STZ, treatment was continued for a period of 6 weeks. The animals were sacrificed at the end of 6 weeks. At the start and end of the study period mean body weight of animals was calculated. Effect of L-arginine was observed on body weight of animals and weight of adrenal glands and compared with insulin.

Results: The decrease in mean body weight of animals due to STZ was less significant when L-arginine and insulin were added to the therapy. Whereas the increase in adrenal glands weight was also less marked on administering L-arginine and insulin.

Conclusion: L-arginine has restorative effect on gross morphology and weight of adrenal glands which is comparable to insulin.

Keywords: L-arginine, Adrenal glands, Streptozotocin, Restorative

INTRODUCTION:

L-arginine is one of the 20 most common natural amino acids, also considered as a semi-essential amino acid[1]. In general, there is no need to take arginine supplements as human body usually produces it in sufficient amount[2,3]. However, Individuals having in sufficient nutrition or certain physical illnesses may be recommended to increase arginine intake by taking food rich in l-arginine. Food sources include cottage cheese, milk, yogurt, protein drinks, beef, chicken and sea foods. Plant sources include wheat, cashew, almond, coconut, walnut, pumpkin and water melon[3]. L-arginine is involved in synthesis of Nitric oxide (NO) by the enzyme NO synthase (NOS) which is important in regulation of a wide variety of biological functions[4]. A lot of activities of arginine are reported in literature. Its role is important in reducing the healing time of injuries mainly bone, and quickens repair time of damaged tissue.[5] It has a novel role in the management of diabetes and obesity by reducing the mass of adipose tissues and promoting the body weight loss in zucker diabetic rats[6]. It decreases the risk of atherosclerosis by preventing endothelial dysfunction and reducing blood pressure, and effects early ß-cell maturation and lymphoid organ development[7].

Streptozotocin (STZ) was found to be selectively toxic to the ß-cells of pancreatic islets in mid-1960. This suggested its use as diabetes-inducing agent in animals[8]. Rakieten et al were the first to report its diabetogenic activity in rats, mice, hamsters, monkeys and dogs[9]. It has been used in patients with irresectable hormone secreting pancreatic islet cell carcinoma, in whom STZ not only reduced tumor size, but also decreased symptoms of hypoglycemia due to excessive insulin secretion by insulinomas[10].

STZ affects the DNA of pancreatic ß-cells and activates various pathways that involves protein kinase C poly (ADP ribose) polymerase and NADPH oxidase activation, with production of reactive oxygen species and advanced glycation[11]. Hyperglycemia produced by STZ generates oxidative stress leading to activation of hypothalamopituitary (HPA) axis resulting in activation of corticotropin releasing hormone (CRH) and adrenocorticotropic hormone (ACTH) secreting cells

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in STZ induced diabetic rats[12].

This study was specifically planned to observe the role of L-arginine on gross morphology and weight of adrenal glands in STZ induced diabetic rats and associate it with simultaneous administration of insulin with streptozotocin.

METHODOLOGY:

This experimental study was undertaken at the Department of Anatomy, BMSI, JPMC, Karachi for 06 weeks from February to March 2010. Fifty healthy male albino rats, weighing from 250-320gram, 90-120 days old were taken for the study.

Rats were randomly distributed into five groups comprising of 10 rats each. Group-A was taken as control and was given only normal saline. On the first day of experiment study, Group-B was given STZ (Sigma Aldrich, USA) in a dose of 37 mg/kg dissolved in 1 ml of citrate buffer at 4 pH intraperitoneally[13]. Group-C was administered STZ in the same dose as in group B along with insulin 70/30 (Eli Lily, USA) once daily subcutaneously (1 unit/100g body weight) three days after the administration of STZ[14]. Group-D received same dose of STZ along with L-arginine as Arginine GNC, USA 0.3mg/g body weight in drinking wate[15]. Group-E was given the same doses of STZ and arginine, and insulin three days after the administration of STZ as in other corresponding groups.

The experimental animals were observed preceding the beginning of study for a week, for the assessment of their well-being. Food and water were available to them as per requirement. STZ was prepared freshly. Animals were fasted overnight before injecting STZ and were given 5% glucose in drinking water for the first three days. Tail vein was selected for collection of blood sample. For the confirmation of diabetes, Accu-check Active one touch Glucometer was used (Roche Diagnostics, USA). Treatment was started in all groups which were continued for six weeks. The weight of rats was checked again at the end of experimental period and they were sacrificed by using ether anaesthesia. Sartorius balance was used to calculate the absolute weight of each adrenal gland and its relative weight was calculated[16]. Statistical analysis was done using SPSS version 20 through Microsoft excel**.** The statistical significance of differences of results between groups was evaluated using student's t test, and considered statistically significant if P-value ≤ 0.05.

RESULTS:

The appearance of adrenal gland regarding color, size, shape, surface and contour was observed. It was found to be similar to control group. A in groups C, D and E. Some changes like darker color, increased size and slight irregular surface was observed in STZ treated group B animals, however haemorrhage was not seen; indicating toxic effect of STZ on morphology of adrenal gland. The appearance of adrenal gland in group C and D given insulin and arginine respectively along with STZ indicated their restorative effect on morphology of adrenal gland.

The study showed highly significant decrease in mean body weight of STZ -treated group B animals in comparison to control group A animals. However, reduction became less significant when insulin and arginine were also administered along with STZ in group C and D animals respectively. When the mean body weight of group C, D, and E animals were compared to group B animals, there was highly significant increase suggesting restorative effect of insulin and arginine on mean body weight of animals (Table-1).

Table -1: Variations in Mean Body Weight between Different Groups of Albino Rats

Groups	Treatment Given	Body weight at start of study(gram)	Body weight at the time of sacrifice (gram)
A	Control	295.3±-1.327	308.93±235
B	STZ treated	269.0±107	217.5±1.341**
C	STZ + insulin	303.8±1.237	296.8±397*
D	STZ+ L-arginine	298.7±1.236	270.3±1.345*
E	STZ+Insulin+L-arginine	305.4±1.324	308.90±1.345*

Significant difference* Highly significant difference**

The absolute weight of both adrenal glands was recorded in different groups at the time of sacrifice. The results have revealed that there was a highly significant increase in absolute weight of adrenal glands of STZ treated group-B animals in comparison to control. When insulin and L-arginine treated groups were compared to group B animals, there was significant decreased absolute adrenal weight in group C and D animals, whereas highly significant decrease was observed in group-E animals which was comparable to control group-A (Table-2).

Table-2: Variations in Absolute Adrenal Gland Weight between Different Groups of Albino Rats

Groups	Absolute weight of Right adrenal gland	Absolute weight of Left adrenal gland
A	38.84±0.16	39.16±0.82
B	72.24±1.74**	73.39±1.03**
C	69.25±1.26*	69.99±10.2*
D	53.41±0.62*	54.45±0.76*
E	26.91±0.90**	27.21±0.32**

Significant difference* Highly significant difference**

The study showed a highly significant increase in relative weight of both right and left adrenal glands in STZ treated group-B animals as compared to control group-A, when calculated with the help of body weight and absolute adrenal weight of animals. When the relative adrenal gland weight (both) of insulin receiving group-C animals was compared to group-B, there was significant decrease, which was more marked in group-D animals having L-arginine. A highly significant decrease was observed in relative adrenal weight in group-E, treated with STZ along with both insulin and L-arginine in comparison to group B animals, which was similar to control group A. All these results suggested significant restoration by insulin and arginine (Table-3).

Table-3: Effects of L-Arginine on Relative Adrenal Gland Weight

Groups	Relative weight of Right adrenal gland	Relative weight of Left adrenal gland
A	12.57±0.89	12.98±0.82
B	33.18±0.82**	34.180.67**
C	23.33±0.47*	23.43±0.42*
D	18.158±0.42*	18.58±0.42*
E	8.811±0.52**	8.811±0.52**

Significant difference* Highly significant difference**

DISCUSSION:

In this study, diabetes in animals was generated by using STZ. Diabetogenic effect of streptozotocin is the direct effect of permanent loss of pancreatic ß-cells causing degranulation and loss of capability to secrete insulin.The probable mechanism for the ability of STZ to specifically damage pancreatic ß-cells is its ability to be transported by GLUT2 (Glucose transport protein) inside the ß-cells. STZ is similar enough to glucose to be transported via these proteins but it is not recognized by other glucose transporters. This explains its relative toxicity to ß-cells, since these cells have relatively high levels of GLUT2[17].

Adrenal gland is an essential stress responsive organ that is part of both HPA-axis and sympatho-adreno-medullary system[18]. It is also the most common endocrine organ associated with chemically induced lesions[19]. STZ causes morphological and microvascular changes in the adrenal gland[20].In this study, L-arginine and insulin were used for the morphological protection of adrenal gland affected by STZ-induced diabetes.

This study demonstrated highly significant decrease in mean body weight of STZ- treated group B animals as compared to control group. Howarth et al[21] reported marked increase in blood glucose levels in STZ-induced diabetic rats with a marked reduction in the mean body

weight. The decrease in body weight was less significant when insulin and arginine were added with STZ in group C and D animals suggesting restorative effect of insulin and arginine, as arginine improves peripheral and hepatic insulin sensitivity effected by diabetes[22].

The absolute and relative weights of both adrenal glands were considerably increased in group B animals. Another study[15] also demonstrated increase in organ weight in proportion to mean body weight in STZ-treated animals when compared with control animals despite the fact that the mean body weight of all the animals in STZ-treated group was decreased. Hyperglycemia as a result of STZ-induced diabetes stimulates the stress system specially the HPA-Axis and generates reactive oxygen species (ROS) which are responsible to cause stress. ROS induced stress causes increased secretion of ACTH and corticosterone leading to hyperplasia and hypertrophy of adrenal gland[14]. The increase in weight of adrenal glands is most likely due to their hypertrophy.

STZ causes adrenal toxicity by accumulating excess lipids in cells resulting in secretion of excess steroid precursors[23]. It causes atrophy of parenchymal cells in zona glomerulosa resulting in decreased aldosterone synthesis, while it causes hypertrophy of cells in zona fasciculata and increases plasma corticosterone secretion[24].

In present study, the increase in absolute and relative weight of adrenal glands was less marked when L-arginine and insulin were added to the therapy. L-arginine has a key role for the synthesis of NO (Nitric oxide) and it has direct antioxidant activity[25]. It is reported that endogenously generated NO is involved in the modulation of corticosterone production[24]. Another study also reported that insulin treatment not only normalizes blood glucose levels but also ACTH and corticosterone secretion[26]. These findings support the recuperative effect of L-arginine and insulin.

CONCLUSION:

The present study concluded that L-arginine has restorative effect on gross morphology and weight of adrenal glands which is comparable to insulin. However, experiments on large number of animals should be conducted to reach at a definite conclusion.

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ORIGINAL ARTICLE

Awareness about the Hazards of Repeatedly Heated Cooking Oil

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ABSTRACT:
Objective: To measure the hazardous contents in reused cooking oil and to find out the awareness about its effect on health.
Methodology: A cross-sectional study was conducted during 2012. Convenient sampling technique was used to collect oil samples from home, and lower, middle and high class restaurants. A self-administered questionnaire was used in this process and the samples were analyzed in the laboratory of PCSIR for reused cooking oil contents.
Results: A total of 28 oil samples were obtained from home, lower, middle and high class restaurants. Most of the respondents 12 (42.9%) were using same cooking oil 2 times, mixing of oil was done by 16 (57.1%) and 12 (42.9%) were aware about the hazards of reused cooking oil.
The mean value of free fatty acid was 48.3 ± 5.4%, Peroxide (meq/kg) was 20.3 ± 9.12 and mean acid value was 0.88 ± 1.05%
Conclusion: The repeated use of the same cooking oil is a very common practice in Pakistan due to unawareness of its hazards. In order to rectify this health issue, proactive measures should be taken both by the concerned authorities as well as the consumers to maintain a healthy lifestyle.
Keywords: Repeatedly heated cooking oil, Hazards, Awareness.

INTRODUCTION:

Deep frying is the most popular and one of the ancient methods of preparing food throughout the world, which is involved in heat and mass transferral. However, in order to decrease the cost of prepared food, oil used in frying is consumed repeatedly. Repeated heating alters the physical characteristics of the oil with increase in its consistency, change of color (darkening), frothing and reduction in smoke point[1], which may change the fatty acid constitution of the oil and makes it harmful for human consumption. Oil undergoes a number of chemical changes by heating, such as polymerization, hydrolysis and oxidation[2], leading to formation of oxidative products like hydro peroxide and aldehydes, having the risk of being absorbed into the prepared food[3].

Cooking oils are "vegetable oils", which are extracted from sunflower seeds, coconut, palm, ground nut and cotton seeds etc. These days these oils are extensively used in the cooking of food. These oils have fats, which are the esters of glycerol and several straight chained mono carboxylic acids. Foods are more prone to be contaminated with chemicals during processing of food, cooking methods, time, temperature, amount of fat and oil added[4]. Several studies on formation of mutagens during preparation of food have been done earlier, but most of them were on items/cooking methods that are most often in practice in the developed countries. When cooked at higher temperatures (160–190°C) for a prolonged time, oil is susceptible to thermal oxidation, hydrolysis and polymerization with a conformational change of fatty acid from cis to trans isomers and accelerates the formation of oxidized and polymerized lipid compounds in the medium. Peroxide value is a helpful method to ascertain the quality of oil[5].

In Pakistan, consumption of fried foods made at road side eateries, food outlets in markets and restaurants is quite common. Socio-economic status of people determines their food intake pattern. It has been reported in a survey in Pakistan that 62% of people consumed fast food on weekly basis[6]. The genotoxic potential of such repeatedly heated oils have been evaluated in few studies[7,8]. Investigations that have been carried out in animals demonstrate that use of repeatedly heated cooking oil increases the presence of reactive oxygen species (ROS) and thus a decreased radical scavenging activity and thereby oxidative stress[9].

Cooking oil is used in preparation of food by home cooks, food manufacturers and catering establishments such as restaurants and industrial kitchens. When used in frying at multiple times results in the formation of free radicals and other harmful constituents which adversely affect the heath of the consumer by increasing blood pressure[10,11,12,13], risk of cardiovascular diseases[14,15], endothelial dysfunction[16], increased lipid peroxidation, increased levels of low density lipoprotein[17] and

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atherosclerosis[18]. So there is a need to measure the quantity of biochemical compounds in reused cooking oil and to assess the awareness about its hazards on human health among Pakistani population in order to make a public policy to combat this public health problem.

METHODOLOGY:

This cross-sectional study was done in 2012 at Hamdard College of Medicine and Dentistry, Hamdard University Karachi, after obtaining approval from the institute Ethical Review Committee. The cooking oil samples were obtained from home, lower, middle and high class restaurants using non probability convenient sampling technique. A total of 28 samples were collected after taking informed consent by the study team and anonymity was assured.

A self-administered questionnaire was used to record the site of sample collection, type of cooking oil, colour of oil, number of times the same oil was used, number of food items fried in same oil, and knowledge of consumer about the hazards of reuse of cooking oil. The biochemical analysis of each oil sample was done at Pakistan Council of Scientific & Industrial Research (PCSIR) Laboratory in Karachi for free fatty acid percentage, peroxide and acid value.

Each sample of 100 millilitre (ml) cooking oil was collected in a standard plastic container. For free fatty acid, oil sample (approximately 50 ml) was kept in a conical flask. Neutralized ethanol (50ml) in another conical flask was added with 1ml phenolphthalein 1% and 1-8 drops of 0.1% NaOH. The reagents were kept in a water bath chamber for 2 minutes for warming purpose, then added to weighed oil sample in a conical flask, and titrated with 0.25% NaOH. The end point was brick red colour. The burette reading and free fatty acid value of the oil sample was noted. The fatty acid constitution was expressed as the percentage of total fatty acids.

For peroxide measurement approximately 50 ml oil sample was weighted in a conical flask, added with 30 ml of Acetic Acid and chloroform. After shaking for 1 minute, 0.5 ml of potassium iodide and 30 ml of distilled water was added. Then it was titrated with sodium thiosulfate. When the solution became light in colour, 0.5ml soluble starch 1% was added and re-titration was done until solution became colourless. The burette reading and its peroxide value of the oil sample was noted. The values were expressed in milliequivalent of peroxide per kilogram of the sample.

Descriptive statistics was done by determining frequencies and percentage by using SPSS version 20

RESULTS:

Out of the total 28 oil samples, equal number of samples (7) were obtained from home, as well as low, middle and high class restaurants (25% each). Most of the respondents were using same cooking oil 2 times (Table-1). Vegetable oil was used by 14 and combination of oil was used by 14 respondents for cooking. Mixing of oil was done by 16 and only 12 were aware about the hazards of reused cooking oil. Most of the oil samples were light brown in colour (Table-1).

TABLE-1: Percentage and frequency description of oil

	Characteristics	Frequency (n)	Percentage (%)
Sample collection point	Home	7	25
	Lower Class Restaurant	7	25
	Middle Class Restaurant	7	25
	High Class Restaurant	7	25
Number of times same oil used	1	4	14.3
	2	12	42.9
	3	6	21.4
	> 3	6	21.4
Type of oil	Vegetable	14	50
	Combination of oil	14	50
Mixing of oil	Yes	16	57.1
	No	12	42.9
Colour	Yellow	8	28.5
	Light Brown	10	35.7
	Dark Brown/Red	5	17.9
	Black	5	17.9
Knowledge about hazards of reused oil	Yes	12	42.9
	No	16	57.1

The mean value of free fatty acid (percent), Peroxide (meq/kg) and mean acid value (percent) are shown in Table 2.

Table -2: Measurement of hazardous contents in oil samples

VARIABLE	MEAN
Free fatty acid (percent)	48.3± 5.4
Peroxide (meq/kg)	20.39± 9.12
Acid value (percent)	0.88± 1.05

DISCUSSION:

The objective of the present research was to focus on the quality of the oil based on hazardous contents in the oil (free fatty acid, peroxide & acid value). Use of repeatedly heated cooking oil has become popular practice and majority of the people are unaware about the hazards of reused cooking oil on their health[19]. Nowadays, deep fried foods are being consumed in excess leading to enhanced risk of obesity[20]. Equal percentage of samples were collected from different level of classes which consist of lower, middle and high class restaurants to ensure that the mean value is determined fairly. Number of times oil reused was twice with percentage of 42.9% while 21.4% were using oil more than three times. Study done in Kuala Lumpur reported that 47.6% of respondents were using cooking oil 3 times or more[19]. In our study the color of cooking oil was dark brown (17.9%). Studies have reported that repeatedly heating reduced the quality of cooking oil by darkening its color and altering its smell as well as the taste[1,23].

The results of this study showed that only 42.9% of respondents were aware about the hazards of reused cooking oil. Study about the level of knowledge, attitude and practices regarding repeatedly reused cooking oil showed that most of the study participants had only moderate (53.0%) or low (18.0%) level of knowledge[19]. The procedure of frying leads to the formation of free radicals and other noxious agents. Free-radical initiated oxidation is one of the main causes of rancidity in fats and oils[21]. During frying, food is immersed in hot oil at a high temperature of 150°C to 190°C. This study showed a very high mean peroxide level which exceeded the upper limit determined by the American Oil Chemists' Society (AOCS) which is 10 meq/kg oil[22]. The high value indicated increased lipid peroxidation products, mainly the peroxides that were formed in the oil while heating. Another study reported the peroxide value (>10 meq/kg) of oil heated more than five times[23].

Free fatty acids are very sensitive; at raised temperatures they go through chemical transformations like hydrolysis, oxidation, and polymerization[24]. Heat and water quicken the hydrolysis of triglycerides and enhance the amount of free fatty acid in the oil. This study showed increased mean percentage of free fatty acid (48.3) in repeatedly used cooking oil. Another study showed that waste frying oil contained high free fatty acid content (16.415%)[25].

CONCLUSION:

The repeated use of the same cooking oil is a very common practice in Pakistan due to unawareness of its hazards. Based on values that we observed in our research, both peroxide and free fatty acid increased with the repeated use of cooking oil which are harmful for health, however, many consumers of oil focus more on their earnings rather than the quality of oil. This especially occurred at lower and middle class restaurants. Thus, people visiting these restaurants are at risk of developing diseases caused by increased percentage of harmful constituents of repeatedly heated cooking oil such as, Type II Diabetes, hepatic steatosis and cardiovascular diseases. In order to decrease this health issue, proactive measures should be taken both by the concerned authorities as well as the consumers to maintain a healthy lifestyle.

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ORIGINAL ARTICLE

Emergency Obstetric Hysterectomy

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ABSTRACT:
Objective: To evaluate the frequency of emergency obstetric hysterectomy, and to find out its indications and accompanying maternal and perinatal morbidity and mortality.
Methodology: This cross sectional study was undertaken at Obstetrics and Gynaecology department of Unit-I, Jinnah Postgraduate Medical Centre, Karachi from 1st January 2015 to 31st December 2016. Those patients who had emergency obstetric hysterectomy at JPMC during this period were included in the study. Their parity, booking status, age, indication and, the type of surgery undertaken was recorded. Maternal and fetal morbidity and mortality were also determined. Data was analyzed using SPSS 20.
Results: A total of 14,157 deliveries were carried out during the study period. Out of them, 32 hysterectomies were undertaken due to obstetric indications (0.22%). The most common indication was ruptured uterus in 20 (62.5%). The most common complication was infection (40.6%). Five patients could not survive after the surgery (15.6%) and perinatal deaths were 19 (59.3%).
Conclusion: Obstetric hysterectomy needs to be done in emergency cases where life of the patient can not be saved otherwise. However, clear judgement, highly professional surgical technique and optimal time for the surgery can decrease mortality and morbidity in such cases.

Keywords: Obstetric Hysterectomy, Postpartum haemorrhage, Uterine rupture, Maternal & Perinatal Mortality & Morbidity

INTRODUCTION:

Emergency obstetric hysterectomy (EOH) is the removal of uterus at the time of caesarean section, immediately after vaginal delivery, or following a caesarean section or vaginal delivery in the period of puerperium due to intractable haemorrhage in order to save the life of the patient[1].

In the developed world, emergency obstetric hysterectomy is seldom required. Commonly this procedure is done for gynaecological indications such as endometrial carcinoma, but in developing countries, severe haemorrhage due to various causes is the most common indication after failure of conservative measures[2,3]. Previously, it was mostly carried out due to ruptured uterus and uncontrollable hemorrhage[4]. Abnormally adherent placentae, and placenta praevia are the major reasons for carrying out obstetric hysterectomy and are most probably associated with rise in the incidence of caesarean sections over the last two decades[4,5]. Increased incidence of caesarean sections results in exaggerated number of scarred uteri, leading to a greater exposure of pregnant women to growing morbidity from placenta praevia, adherent placenta such as accreta, and even uterine rupture. All of this results in augmented incidence of emergency obstetric hysterectomy.

Emergency obstetric hysterectomy can be associated with intra-operative complications, such as severe blood loss and post-operative maternal mortality and morbidity[6]. Obstetric hysterectomies can rescue maternal lives, but need proper judgement and excellent surgical skills. With this background in mind, this study was planned to evaluate frequency, indications, and maternal and perinatal mortality and morbidity related with this procedure at a tertiary care hospital.

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METHODOLOGY:

This cross sectional study was undertaken at the Obstetrics and Gynaecology department of JPMC from 1st January 2015 to 31st December 2016. All cases of obstetric hysterectomy during this two-year study period were enrolled. Parity, booking status, age and the reason for the obstetric hysterectomy was recorded. The type of surgery undertaken was also noted and they were followed up for maternal and fetal mortality and morbidity. The collected data was analyzed on SPSS 20. Qualitative variables were evaluated as frequencies and percentages. A 95% confidence interval for indications and complications was also determined to compare our results with other studies. Quantitative variables were calculated as mean ±Standard Deviation (SD).

RESULTS:

A total of 14,157 patient were delivered during the study period, comprising of 10,422 (73.6%) vaginal deliveries and 3,735(26.4%) caesarean sections. Of all these deliveries, 32 (0.22%) cases resulted in obstetric hysterectomy. Twelve cases were followed by vaginal delivery, whereas 20 cases resulted during the procedure, or following a caesarean section. This lead to a frequency of 1 in 442 of all deliveries. The data showed that it was 1 in 868 vaginal deliveries, but the frequency was increased among caesarean sections, accounting for 1 in 186. Only 12 (37.5%) of these patients were booked, whereas rest 20 (62.5%) were un-booked. They were referred from other other local hospitals and clinics to JPMC (Table-1).

All the patients were part of low socio-economic class. Their age were between 26 to 45 years, mean age being 31.6 ± 6.58 years. The parity was from 3–11 (mean 5.7± 2.18). The surgery carried out on all the patients was total abdominal hysterectomy with preservation of either one or both ovaries. All the procedures were carried out by consultant obstetricians or by experienced senior registrars. Blood was transfused to all the patients, with a minimum of 3 and maximum of 21 units.

Table-1: Frequency of Hysterectomy among 14157 deliveries

Mode of Deliveries	No. of Deliveries	% of Total Deliveries (n=14,157)	Hysterectomy (n=32)	% of Hysterectomy (n=32)	% of Hysterectomy among mode of deliveries
Vaginal deliveries	10422	73.6 (72.9 - 74.3)	12	37.5 (22.1 - 55.0)	0.11 (n=104,22) (0.06 - 0.19)
Caesarean Section	3735	26.4 (25.7 - 27.1)	20	62.5 (44.9 - 77.8)	0.53 (n=3,735) (0.33 - 0.81)
Total	14157	100.00	32	100.0	0.22 (n=14,157) (0.15 - 0.31)

Figures in parentheses are 95 % Confidence Intervals

Ruptures uterus was the indication of hysterectomy in 20 patients. Of these 12 patients did not have history of previous lower segment caesarean sections (LSCS, thus unscarred uterus), but all of these were grand multipara; 6 had obstructed labour due to disproportion; 2 had malpresentation; 4 had history of excessive dose of injectable oxytocin given as bolus at home by trained birth attendant; while 8 suffered from rupture of former caesarean section scar (Table-2). Only one patient presented with severe, uncontrollable uterine haemorrhage due to atony of uterus, not responding to conservative management. Constant haemorrhage from placental site due to major degree of placenta praevia was the reason in 2 patients requiring hysterectomy, while 9 patients underwent hysterectomy due to morbidly adherent placentae. But these patients presented with a uterine scar from former 2, 3 or 4 previous LSCS.

Table-2: Indications for obstetric hysterectomy (n=32)

Indication	No. of Patients	Percentage	95% CI
Ruptured uterus, due to	20	62.5%	44.9-77.8
1. Oxytocin injection	04	12.5%	4.1-27.4
2. Obstructed Labour	06	18.7%	7.9-34.9
3. Malpresentation	02	6.2%	1.0-19.1
4. Previous LSCS	08	25%	12.3-42.0
Postpartum haemorrhage due to uterine atony	01	3.1%	0.1-14.4
Placental Abnormalities	09	28.2%	14.6-45.3
1. Placenta accreta	03	9.3%	2.4-23.4
2. Placenta increta	04	12.5%	4.1-27.4
3. Placenta percreta	02	6.2%	1.0-19.1
Placenta praevia Type IV	02	6.2%	1.0-19.1

C.I: Confidence Interval

Intra-operative and post-operative complications occurred in 16 patients. Infection was the commonest complication (Table-3). There were 5 maternal deaths. 3 patients died due to intractable bleeding on the operating table, 1 death occurred immediately after the surgery from irreversible haemorrhagic shock after uterine rupture, and 1 died due to Disseminated Intravascular Coagulation (DIC). There were 19 (59.3%) perinatal deaths; 18 were stillborn due to ruptured uterus. Only 1 was early neonatal death due to intra-uterine hypoxia. 13 (40.6%) babies were alive and well.

Table-3: Maternal Morbidity

Complications	Number of patients	Percentage
Sepsis	13	40.6%
Acute renal failure	02	6.2%
Bladder injury	01	3.1%
Total	**16**	**50.0%**

DISCUSSION:

Obstetric hysterectomy is regarded as one of the most difficult judgement in modern obstetric. It is a life saving surgical procedure in life threatening conditions, so it was easier to decide about performing this procedure in the grand multipara in this study, as compared to low-parity women, where this difficult choice was undertaken to save a life. Since this is a tertiary care centre, most of the incoming cases are already complicated, but despite this fact, the frequency of the procedure was 0.22%, which was in accordance with the frequency reported from Bahawalpur, Pakistan, and low when compared with cases from Peshawar and Hyderabad[7-9]. The frequency of EOH at the JPMC in this study was almost the same as reported in previous studies in 1995 (0.3%), and 2012 (0.27%)[10,11]. Most common age group presented between 20-30-year, and were multipara. Same observations were made by Ahmad and Barclay[12,13]. Ruptured uterus was the most common indication in the present study, followed by pathological attachment of placenta and intractable haemorrhage from the placental bed. Analogous results were observed in various researches from Pakistan[7,8,12], the reasons were also similar, while the predominant causes determined in other developing countries were pathological adhesion of placenta and atony of uterus[14,15].

A profound alteration in the indication of obstetric hysterectomy has been seen over a period of time from one area to other. In this study, obstructed labour due to disproportion, grand multiparity, malpresentation and excessive, and injudicious use of oxytocin led to the spontaneous extensive rupture of unscarred uterus, and distorted the gross structure of uterus to such a degree that conservative surgery became impossible. This is most likely due to the social factors our society is facing such as poverty, illiteracy, ignorance of health care facilities like lack of antenatal care and poor availability of healthcare services.

The hazardous combination of prior caesarean sections, placenta praevia and morbid attachment of placenta was also seen in this study. Other studies have also reported this dangerous combination[16,17,18,19]. It has been found in the literature that the frequency of obstetric hysterectomy due to atony of uterus had decreased from 42% to 29.2%, whereas the number of cases have increased from 25.6% to 41.7% due to pathological placentation[20,21,22]. This might be due to the exaggerated rate of caesarean deliveries and decreased cases of postpartum haemorrhage due to uterine atony because of better treatment with prostaglandins during past two decades. Similar results were seen in another study reporting 0.5% to 3.9% rise in the incidence of abnormal adhesion of placenta[19].

Total abdominal hysterectomy with conservation of one or both ovaries was carried out in most patients in this study. It was in contrast with studies undertaken in various cities of Pakistan reporting subtotal hysterectomy as the most frequent procedure[8,9,12]. This study is in accordance with prior studies exhibiting association between high maternal morbidity and mortality with emergency obstetric hysterectomy[7,8,10,11]. Maternal morbidity in this study was 50%; and most of the complications seen were sepsis, urinary tract damage, and DIC which were in accordance with previous studies[10,11,13,21,22]. Even maternal mortality (5 cases, 15.6%) was in line with previous studies from Pakistan,[7,8,9,10] but extremely high in comparison to the developed countries[18,23,24,25]. The most common reasons for maternal deaths were mishandling by poorly trained birth attendants and doctors at homes or inadequately equipped clinics, late presentation and non-availability of proper transport or ambulances for such patients. The patients were already in shock or DIC by the time they were brought to the hospital, highlighting the severity

of the problem for which surgery was performed, instead of the procedure itself. Survival rate of 85% was because of highly skilled technique, efficient anaesthetist, and adequate blood transfusion.

There was 59.3% perinatal mortality in this study, most frequent reason being uterine rupture. This was less as compared to a study done by Redman et al in Libya and anther in Saudi Arabia showing 73% fetal mortality in their study due to ruptured uterus[26, 27].

CONCLUSION:

Emergency obstetric hysterectomy although obsolete in developed countries, remains an essential tool for consultant obstetricians in our part of the world where patients present with severe complications. They are required to operate at the optimum time with sharp judgement, using skilled surgical technique to save maternal as well fetal life and to reduce mortality and morbidity.

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ORIGINAL ARTICLE

Morphometric Analysis of Celiac Trunk in Male and Female Adults of Karachi by using 3D Multidetector Computed Tomography Angiography (MDCTA)

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ABSTRACT:

Objective: To determine the length and diameter of celiac trunk by using Multidetector computed Tomography Angiography (MDCTA) and to find its association with gender.

Methodology: 160 individuals, 85 (53.1%) males and 75 (46.9 %) females) without any vascular or upper abdominal visceral disease who presented to Radiology Department, Ziauddin University Hospital, Clifton, Karachi, for abdominal 3D MDCTA from March, 2017 to August, 2017 were recruited in this study. Length and diameter of both classical and non-classical celiac trunk was measured. Statistical analysis was done on SPSS version 20. All variables were presented as mean and standard deviation. Independent T test was applied. Correlation analysis by using Pearson's correlation was applied to test the relationship between variables. P-value ≤ 0.05 was considered significant.

Result: The difference between mean length of classical celiac trunk and non- classical celiac trunk was significant (P = 0.005).The difference in mean length (P = 0.007), and mean diameter (P = 0.007) of classical celiac trunk between males and females was significant. A weak positive association (r = 0.247) was found between length and diameter of classical celiac trunk (P = 0.004). A moderate positive association (r = 0.401) was found between length and diameter of non-classical celiac trunk (P = 0.043).

Keywords: Artery, Stent, Transplant, Angiography, Gender, Classical Celiac trunk, Non- Classical Celiac trunk

INTRODUCTION:

With the introduction of abdominal angioplasty, catheterization and minimally invasive surgeries, the study of splanchnic vasculature has become increasingly important for better preoperative planning[1]. Celiac trunk is the first anterior visceral branch of abdominal aorta[2] arising just below the aortic hiatus at T12/L1 vertebral level[3, 4]. It measures 1.5-2 cm in length[3, 5] and provides arterial supply to the foregut derivatives [6, 7]. Classically, celiac trunk gives rise to three main branches namely common hepatic, left gastric and splenic artery[8, 9]. In 1997 Uflacker classified the celiac trunk into 8 branching patterns[10, 11]. According to Uflacker's classification, a classic celiac trunk is type I while type II to Type VIII are non-classical types having varying branching patterns[12]. The abdominal vessels, especially the celiac trunk are subject to diverse variations in their origin, course and dimensions[13]. Anatomical variations of celiac trunk are well explored in literature but information regarding the variability in its dimensions across different populations is still scanty[14]. However, the reported mean lengths from different populations vary from as low as 17 mm in Indians [15] to as high as 28.35 mm in Albanian popula-tion[16].

Knowledge of arterial diameters is important for stent placement procedures and for the designing of such stents to customize them according to the specific dimensions of a certain population. Arterial diameter of celiac trunk branches is of great importance for preoperative planning in organ transplant surgeries and also for precise radiological diagnosis of arterial aneurysms and stenosis[17, 18].

MDCTA has replaced conventional angiography for preoperative imaging as it is the emerging most accurate modality[15]. MDCTA has various advantages like increase in high spatial resolution, imaging acquisition speed and more coverage of the patient[19]. Multidetector computed tomography angiography (MDCTA) in association with digital images processing by software resources represents a useful tool, which is particularly attractive for its non- invasiveness[20].

Celiac trunk variations and pathologies are relatively common occurrences. With the advent of computed tomography (CT) technology, these conditions are being diagnosed with an increased frequency even among asymptomatic individuals. CT angiography is used noninvasively for preoperative staging and vascular mapping in patients with pancreatic and hepatobiliary neoplasms. MDCTA also allows the accurate depiction of the abdominal splanchnic vessels' stenosis, collateral vessels and atherosclerotic plaques[21].

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METHODOLOGY:

Sample Collection: This cross-sectional study was carried out from March, 2017 to August, 2017. The study was performed on 160 individual aged 20-60 years of both genders having serum creatinine level of < 1.4mg/dl[22]. Recruitment of study participants was done from patients who were referred to Radiology Department of Ziauddin University Hospital for abdominal contrast MDCTA examination due to various indications such as abdominal pain, altered bowel habits, kidney and adrenal pathologies. Persons having hepatobilary pathologies, pancreatic or abdominal vascular lesions, abdominal malignancy distorting vascular anatomy, vasculitis and atherosclerosis were excluded from the study. Patients having history of liver transplant or upper abdominal surgeries or those having history of allergic reaction to contrast agents and pregnant ladies were also excluded from the study. The study was conducted after approval from Ethics Review Committee of Ziauddin University.

Data Collection: Informed consent was obtained from each participant.

1. **Questionnaire**: Based on demographic profile, including age, gender and medical/surgical history was filled.
2. **MDCTA** was performed

All CT examinations were performed on a 16-slice MDCT scanner (Toshiba 16 slicer Alexion, Japan) using the automatic dose modulation technique (Real Exposure Control, Toshiba Medical Systems) in the arterial phase. The subject was asked to lie in supine position on the platform of CT scanner. Contrast material was administered and the patient was instructed to hold his/her breath for 15 seconds.

Morphometric analysis was performed in axial plane with reconstruction techniques in the sagittal and coronal planes. Images were modified through Multiplanar reformatting (MPR), maximum intensity projection (MIP) reconstructions and volume rendered (VR) techniques. Through MDCTA, reconstruction programs, especially MIP and VR images are used to depict small calibre vessels[20] while MPR is the process of using the data from axial CT images to create non-axial two-dimensional images[23]. MPR program was used to reconstruct images in coronal, sagittal, axial or oblique planes for visualization of celiac trunk. A slice thickness of 5 mm was taken to evaluate the celiac trunk. Images were acquired from the dome of diaphragm to the pubic symphysis in craniocaudal fashion. In an axial plane, length of classical and non- classical celiac trunk was measured between two points, the first point was taken at the origin of celiac trunk from abdominal aorta and the second point was taken at its bifurcation. Diameter of the celiac trunk was measured 5 mm distal to its origin.

Data was analyzed on SPSS version 20. All variables were presented as mean and standard deviation. Independent T test was applied for the variables. Correlation analysis was done using Pearson's correlation to test the relationship between variables. P-value ≤ 0.05 was considered significant at 95% confidence interval.

RESULTS:

Out of 160 participants, the trifurcation of celiac trunk i.e. classical celiac trunk was observed in 72 males and 62 females (total 134 individuals, 83.9%), while variations were found in 26 individuals (16.1%, 13 males and females each) (Figure-1).

The difference between mean length of classical celiac trunk and non-classical celiac trunk was statistically significant (p = 0.005), whereas the difference between their mean diameter was insignificant (p = 0.586) (Table-1).

The difference between mean length as well as mean diameter of classical celiac trunk between genders was statistically significant (P = 0.007) (Table-2).

The difference between mean length of non-classical celiac trunk in males and females was insignificant (P = 0.965), and the difference between their mean diameter between genders was also insignificant (P= 0.832) (Table-3).

A weak positive association (r = 0.247) was observed between classical celiac trunk length and diameter with significant difference (P = 0.004) (Table-4).

A moderate positive association (r =0.401) was observed between length and diameter of nonclassical celiac trunk with a significant difference (P = 0.043) (Table-5).

Figure-1: Pie chart showing frequency of Classical and Non-Classical Celiac Trunk

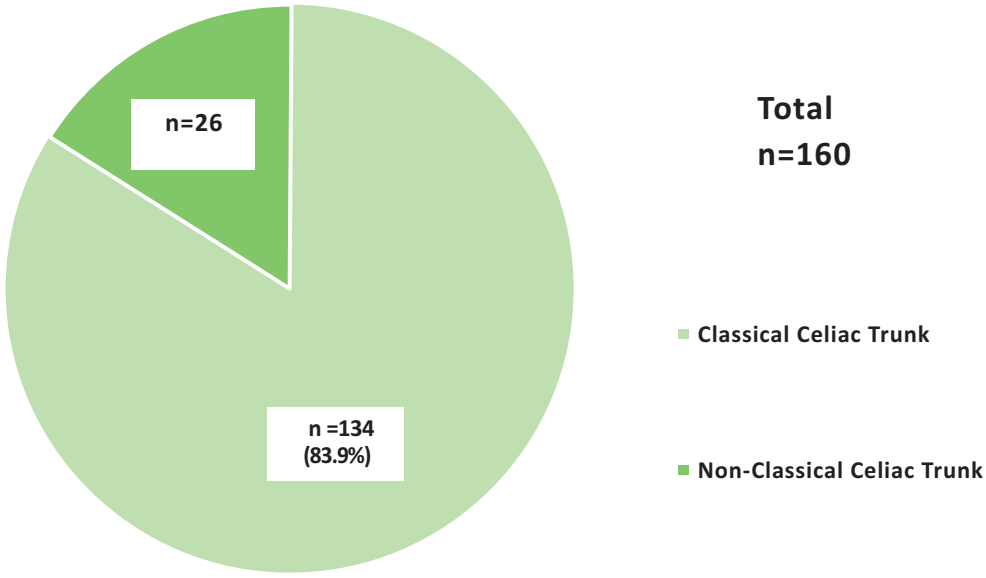

Table 1: Length and Diameter of Classical and Non-Classical Celiac Trunk

Variables	Classical CT (n=134)	Non-Classical CT (n=26)	P-value
Length *(Mean ± SD mm)*	27.5±7.9	22.7±7.5	0.005*
Diameter *(Mean ± SD mm)*	7.0±1.1	7.2±1.2	0.586

CT (Celiac Trunk). *p-value ≤ 0.05 was considered significant

Table 2: length and diameter of Classical Celiac Trunk with respect to gender

Variables	Gender		P-value
	Male (n=72)	Female (n=62)	
Length of Classical CT *(Mean ± SD mm)*	29.2±7.8	25.5±7.5	0.007*
Diameter of Classical CT *(Mean ± SD mm)*	7.3±1.1	6.7±1.1	0.007*

CT (Celiac Trunk). *p-value ≤ 0.05 was considered significant.

Table 3: Length and Diameter of Non-classical Celiac Trunk with respect to gender

Variables	Gender		P-value
	Male (n=13)	Female (n=13)	
Length of Classical CT *(Mean ± SD mm)*	22.7±7.6	22.8±7.6	0.965
Diameter of Classical CT *(Mean ± SD mm)*	7.2±1.3	7.1±1.0	0.832

CT (Celiac Trunk). *p-value ≤ 0.05 was considered significant.

Table 4: Correlation between length and diameter of Classical Celiac Trunk

Variables	(Mean ± SD mm)	P-value	R
Length of Classical CT	**27.5±7.9**	**0.004***	**0.247**
Diameter of Classical CT	**7.0±1.1**		

CT (Celiac Trunk). *p-value ≤ 0.05 was considered significant.

Table 5: Correlation between Length and Diameter of Non-Classical Celiac Trunk

Variables	Non classical CT Mean ±SD mm	P – Value	R
Length	**22.7±7.5**	**0.043***	**0.401**
Diameter	**7.2±1.2**		

CT (Celiac Trunk). *p-value ≤ 0.05 was considered significant.

DISCUSSION:

Celiac trunk is the main artery of the foregut and through its branches, namely splenic, left gastric and common hepatic arteries, it supplies the primary organs of supra-colic compartment of abdomen which includes the stomach, pancreas, duodenum, spleen, and liver[15, 24]. The knowledge of the diameter and length of the vessels is essential in surgeries, for placement of arterial stents and it is also useful for professionals who design and develop the stents[1].

In literature, very few studies were found regarding morphometry of celiac trunk by MDCTA. To the best of our knowledge the present study is the first morphometric analysis of celiac trunk by MDCTA on Pakistani population.

In order to make a precise and correct radiological diagnosis of arterial aneurysms, there is a need to have a complete knowledge of arterial diameter in a particular population. Previous anatomical knowledge of precise normal values for a particular artery might help in early diagnosis of an arterial stenosis through radiological examination, even before clinical signs of low arterial flow appear[25].

Our results showed that the mean length of classical celiac trunk was more than that of non-classical celiac trunk with a significant difference (p= 0.005). By using MDCTA in Indian population the mean length of celiac trunk was found to be 17 mm[15]**.** In Brazilian population mean length of celiac trunk was found to be 23.3±6.5 mm[1] while in Albania it was found to be 28.35 mm[16].

Our mean length of celiac trunk was close to that of Albanian population.

In our study the mean length of classical celiac trunk in males was significantly more than in females while the mean length of non-classical celiac trunk between genders did not show any significant difference.

In an Indian study, the mean length of celiac trunk in males was found to be 17.2 mm, while in females, mean length was found to be 17 mm. No significant difference was observed between gender[26]. In a study conducted in Brazil the mean length of celiac trunk was found to be 17.4 mm, and it was equal in males and females[27].

Few cadaveric studies have also been conducted on morphometry of celiac trunk. In an Indian study mean length of celiac trunk was found to be 17.1 mm[26]. A study conducted in Croatia showed a mean length of celiac trunk to be19±0.8 mm[17]. Another study from Saudi Arabia on cadavers reported the mean celiac trunk length to be 15.5 mm[28]. Literature thus suggests that longer lengths were reported in studies conducted on living subjects by the most accurate modality MDCTA as compared to cadaveric studies. This is perhaps due to the loss of elasticity and stiffer vessels in cadavers.

A study conducted on Indian population reported that non-classical celiac trunk is associated with a shorter length[29]. It has been suggested by Gielecki et al that if celiac trunk length is greater than normal, the surrounding tissues could be more susceptible to disease. Patients who present with abdominal pain should be assessed for Celiac trunk compression syndrome arising from the probable existence of a congenitally formed extended celiac trunk[30].

In a cadaveric study from Greece, Venieratos et al denoted a classical celiac trunk as true tripod and variant branching pattern of celiac trunk as false tripod. The mean length of true tripod in males was 26±7.99 mm and in females it was 28±7.47 mm. The mean length of false tripod in males was 32±5.94 mm and in females was 31±11.66 mm. They could not find any significant difference between the length of true and false tripod in both the genders[31].

In our study the mean diameter of classical celiac trunk was less than that of non-classical celiac trunk but it was not statistically significant. So the diameter of classical or non-classical types did not vary significantly.

By using MDCTA in Indian population, Brazilian population and Albanian population the diameter of celiac trunk was found to be 6.5 mm[15], 8±1.3 mm[1] and 7.65 mm[16] respectively.

In our study, the mean diameter of classical celiac trunk in males was found to be more than in females with a significant difference (P = 0.007). In an Indian study, they found that in male cadavers the diameter of celiac trunk was found to be 6.5 mm while in female cadavers it was 6.7 mm with no significant difference in diameter between genders[26]. A study done in Brazil showed a mean diameter of celiac trunk to be 6.5 mm in males and 6.7 mm in females[27]. To the best of our knowledge non-classical celiac trunk diameter has not been studied in relation to gender.

In our study a weak positive correlation was found between length and diameter of classical celiac trunk. However, these dimensions of the non-classical celiac trunk showed moderate positive correlation. A Brazilian study has also reported a moderate positive correlation between celiac trunk length and diameter[1].

CONCLUSION:

It is concluded that the length of classical celiac trunk is more than that of non-classical celiac trunk. The length and diameter of classical celiac trunk is greater in males than in females. It is also concluded that with increasing length, the diameter also increases more for the non-classical celiac trunk as compared to the classical celiac trunk.

Considerable diversity has been observed internationally in length and diameter of celiac trunk among different population and ethnic groups. Data specific to Pakistani population presented in this study may be utilized by surgeons and radiologists to minimize complications during upper abdominal surgeries and interventional procedures. It can also be used for designing of stents or catheters, so that all information can be integrated and used for the patients' well-being.

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ORIGINAL ARTICLE

Effect of Nigella Sativa on Biochemical Changes in Doxorubicin- induced Nephrotoxicity in Albino Rats

Wazeer Ahmed[1], Basheer Ahmed[2], Ashok Kumar[3], Mumtaz Ali[4]

ABSTRACT:

Objective: To evaluate the protective effects of Nigella Sativa on biochemical changes in the kidney of Albino rat treated with Doxorubicin.

Methodology: This experimental study was undertaken in April 2015 for a duration of 05 weeks at BMSI, JPMC. Forty Albino rats were divided into four groups, ten animals in each group. Group-A was taken as control. Group-B was treated with Doxorubicin (DOX). Group-C was given doxorubicin and Nigella Sativa (NS), and Group-D was treated with Nigella Sativa only. At the end of the study, the serum urea and creatinine levels were measured.

Results: The mean values (mg/dl) of serum urea and creatinine levels in group-A and B were 23.40±3.07, 0.61±0.059, 85.50±7.93, and 1.06±0.071 respectively. There was highly significant increase in the mean values of serum urea and creatinine levels in group-B when compared with group-A. Further, the mean values (mg/dl) of serum urea and creatinine levels in group-C were 56.10±6.87 and 0.96±0.087 respectively, which showed highly significant increase when compared with group-A, and significant decrease when these values were compared with group-B. The mean values (mg/dl) of serum urea and creatinine levels in group-D were 25.01±3.39 and 0.67±0.057 respectively. There was insignificant increase when these values were compared with group-A, and highly significant decrease when compared with the groups-B and C.

Conclusion: This study concludes that Doxorubicin induced biochemical changes can be minimized by the administration of aqueous powder of Nigella Sativa. The free radical scavenging effects of Nigella Sativa might be attributed to the presence of flavonoid, alkaloids and steroids which are powerful antioxidant and anti-inflammatory agents.

Keywords: Doxorubicin, Nigella sativa, Serum Urea, Serum Creatinine

INTRODUCTION:

Doxorubicin is an Anthracycline Antibiotic, and represents a class of anticancer drug used as antineoplastic agent for a variety of human neoplasms[1,2]. Doxorubicin is isolated from cultures of Streptomyces peucetius and it is used in the management of various hematological malignancies and neoplastic diseases, such as renal, cardiac, breast cancer, soft tissue, leukemia[3]. The clinical use of Doxorubicin is restricted due to its toxic effect on various organs including kidney and heart[4], it targets both the normal and tumour cells[5].

Doxorubicin is a highly potent chemotherapeutic agent that causes cell damage by a variety of biochemical changes in the body[6]. The exact mechanism of doxorubicin-induced nephrotoxicity remains unclear[7]. The main anticancer activity of Doxorubicin is thought to occur due to DNA damage through inhibition of topoisomerase II[8]. According to various researches, Doxorubicin-induced cellular damage occurs due to plasma membrane injury caused by free anthracycline radicals[9]. Doxorubicin causes an imbalance between free radicals and antioxidants. The disruption in oxidant-antioxidant systems has been shown with lipid peroxidation and protein oxidation resulting in tissue injury[10]. Doxorubicin induced renal damage is manifested as raised serum urea and creatinine levels and histological damage to proximal tubular cells[11]. Doxorubicin induced nephrotoxicity in rats is evidenced by an increased glomerular capillary permeability and tubular atrophy due to oxidative stress[12].

Therapeutic plants and herbs have an important role in the treatment and prevention of renal diseases[13]. Nigella Sativa is a kind of seed, also known as black seed, or kalonji, is a small annual spicy herb belonging to the family Ranunculaceae, native to South west Asia, North Africa, and cultivated in many countries in the world like India, Pakistan, Syria, Turkey and Saudi Arabia[14]. The nutritional composition of Nigella Sativa is carbohydrates, proteins, minerals, vitamins and fats, and also include eight or nine essential amino acids[15]. Significantly, it is narrated with saying of Prophet Muhammad (PBUH) that the black seed can heal every disease except death[16]. Aqueous Nigella sativa has been used as a natural cure for more than 2000 years to enhance health and treat diseases, such as gastrointestinal disorders, intrinsic haemorrhage and amenorrhoea, asthma, cough, bronchitis, diabetes, inflammation, headache, eczema, fever, dizziness and hypertension[17]. Nigella Sativa has various therapeutic effects such as

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antioxidant, nephroprotective, anti-inflammatory, anticancer, antiallergic and antibacterial[18]. Thymoquinone (Nigella sativa seed) improved serum urea and creatinine levels, renal glutathione depletion and lipid peroxide accumulation in Doxorubicin-induced nephropathy[19]. As Nigella Sativa seeds are widely available, at affordable price and being a safe product, its scavenging effects can be utilized in Doxorubicin-induced nephrotoxicity.

METHODOLOGY:

This experimental study was conducted in the department of Anatomy, in collaboration with the Department of Pathology Basic Medical Sciences Institute, Jinnah Postgraduate Medical Centre (JPMC), Karachi,in April 2015 for a duration of 35 days. The research was initiated after approval from ethical committee of JPMC. Forty Albino rats (about 180 to 250 gram), 90-120 days were obtained from the animal house of JPMC. Nigella Sativa seeds were dried, freed of dust and crushed in the grinder (WestPoint, WF-9221 France). Prepared extract powder was collected and stored in refrigerator till use. Doxorubicin (Pfizer Pharma Pvt. Ltd. Pak) was used in the form of an injectable commercial product (Adriblastina vials). Each vial contained Doxorubicin hydrochloride as a freeze-dried powder 50mg/25ml. The contents of each vial were freshly dissolved in sterile saline solution just before use. It was administered at the doses of 3mg/kg/week ip for five weeks[20]. Rats were divided into four groups. Each group consisted of 10 animals. Group-A served as control. Group-B received Doxorubicin injection in a dose of 3mg/kg/body weight/week[20] intraperitoneal (IP) for five weeks. Group-C was given Doxorubicin injection at the same dose as in group-B with aqueous suspension of powdered Nigella Sativa 1000mg/kg body weight orally daily[21] for five weeks[22]. Group-D received aqueous suspension of powdered Nigella Sativa 1000mg/kg body weight orally daily for the experimental duration.

Blood samples for serum urea and creatinine levels (1 ml) from each animal were drawn under chloroform anaesthesia by cardiac puncture with disposable syringe. After clotting, the serum was centrifuged at 3000r/pm for 10 minutes and stored at -20^{o}C till the estimation of serum urea and creatinine. Data was analyzed with SPSS version 20. P value less than 0.05 was considered as significant.

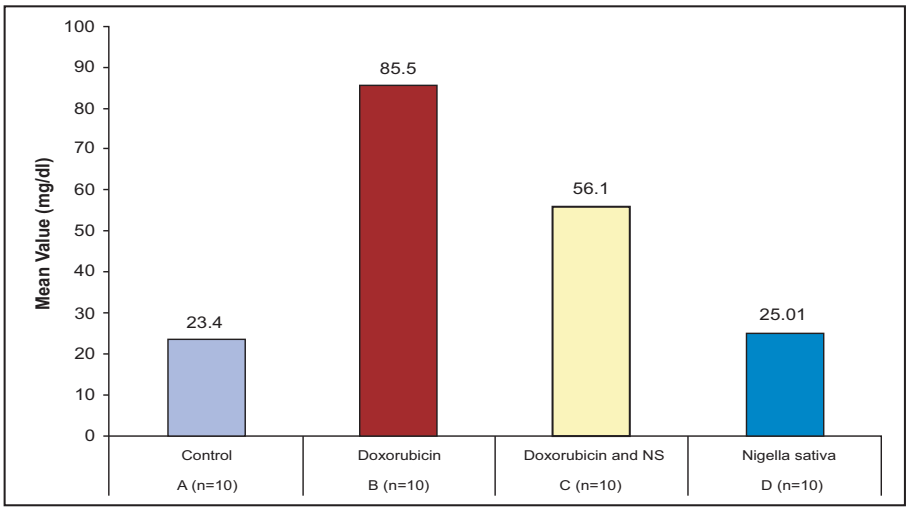
RESULTS:

The mean values of serum urea level in different groups of experimental animals is given in Figure-1, where as mean values of serum Creatinine levels is shown in Figure-2. There was highly significant increase in the mean value of serum urea and creatinine levels in group-B when compared with similar values of group-A.

The data showed a highly significant increase in the mean values of serum urea and creatinine levels in group-C when compared with group-A, whereas highly significant decrease in urea level and a significant decrease in serum creatinine values when these levels were compared with corresponding values in group-B animals (Table-1 &2).

The results demonstrated an insignificant increase in the mean value of serum urea level in group-D when compared with group-A, and highly significant decrease when compared with group-B and C. There was also an insignificant increase in the serum creatinine level in group-D when compared with group-A, and highly significant decrease in these levels when compared with group-B and C (Table-1 & 2).

Figure-1: Mean serum urea level (mg/dl) in different groups of albino rat



Data is presented as Mean

n= number of albino rat

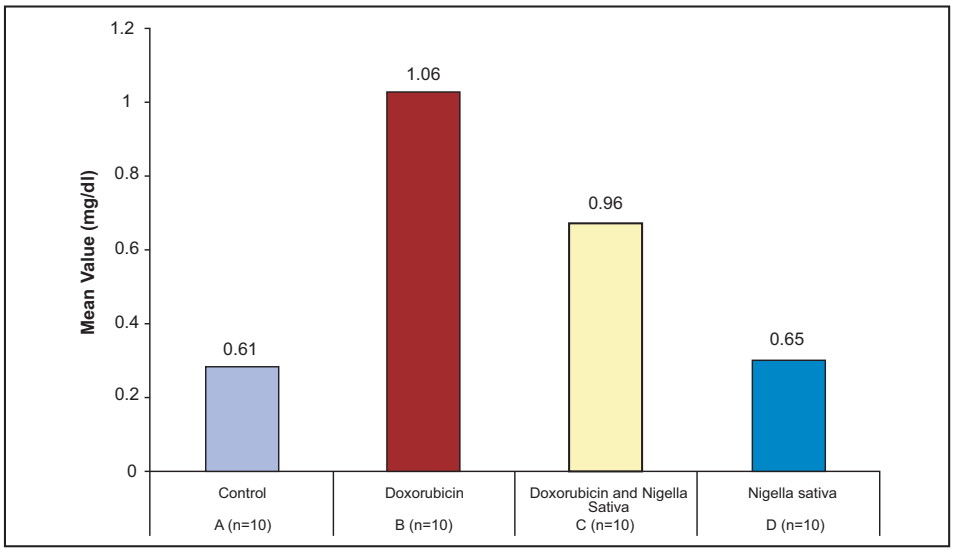
Table-1: Statistical analysis of mean serum urea level between different groups

Statistical Comparison	P-value
B vs A	<0.001**
C vs A	<0.001**
D vs A	0.280
B vs C	<0.001**
B vs D	<0.001**
C vs D	<0.001**

P<0.05 (*) significant difference

P<0.01 (**) highly significant difference

Figure-2: Mean serum creatinine level (mg/dl) in different groups of albino rats



Data is presented as Mean

n= number of albino rat

Table-2: Statistical analysis of mean serum creatinine level between different groups

Statistical Comparison	P-value
B vs A	<0.001**
C vs A	<0.001**
D vs A	0.140
B vs C	0.011*
B vs D	<0.001**
C vs D	<0.001**

P<0.05 (*) significant difference

P<0.01 (**) highly significant difference

DISCUSSION:

The nephrotoxicity produced by Doxorubicin in group-B was demonstrated by highly significant increase in serum urea and creatinine levels when compared to control group-A. Our results were in agreement with Shinde et al[23] who reported that a single dose of Doxorubicin (15mg/kg/body weight) induced acute nephrotoxicity in rats manifested by increase in blood urea and creatinine after 72hours; and with Ayla et al[12], who showed that Doxorubicin caused a marked increase in serum urea and creatinine, and sodium and potassium levels in albino rats treated with single dose of Doxorubicin. Our results were also in agreement with Al- Saedi et al[24], who reported an increase in serum urea and creatinine levels, indicating a decrease in glomerular filtration rate in albino rats treated with single dose of Doxorubicin (25 mg/kg body weight ip) on the day 3; and with Roomi et al[25], who showed significantly increased levels of renal markers, including serum creatinine, blood urea nitrogen and uric acid in mice treated with single dose of Doxorubicin (20 mg/kg body weight ip). Our results were also supported by Refaie et al[7], who found nephrotoxic effects of Doxorubicin characterized by decreased glomerular filtration rate leading to increased serum urea and creatinine levels at the single dose of 15mg/kg body weight on 11th day of treatment in albino rats.

Aqueous suspension of powdered Nigella sativa administered with Doxorubicin in group-C resulted in significant decrease of serum urea and creatinine levels when compared to group-B; evidently, showing protective role of Nigella sativa. Our results were in agreement with Al-Azzawi and Baraaj[26], who reported that oral administration of aqueous suspension of Nigella Sativa at the dose of 2g/kg body weight prevented toxic effects of Rifampicin, as indicated by significant reduction in serum creatinine, urea and uric acid levels in albino rats; and with Majeed and Tahir[27], who used Nigella Sativa (500mg/kg body weight orally daily for 7 days) combined with Amphotericin-B producing a significant decrease in serum urea and creatinine levels. Group-D treated with aqueous suspension of powdered Nigella Sativa 1000mg/kg body weight daily orally, did not show any significant difference in serum urea and creatinine levels when compared to group A. Our observation was comparable with the results of Dollah et al[22], who observed that the supplementation of Nigella Sativa to the diet of rats (1.0g/kg body weight) for five weeks did not alter the renal function i.e. serum urea and creatinine levels. Our results were also in agreement with Onoshe and Madusolumuo[28], who found no significant difference in serum urea and creatinine levels between group-i (control) and group-iii (Nigella sativa) 250mg/kg body weight for 14 days in albino rats.

CONCLUSION:

The present study demonstrated that co-administration of Nigella sativa with Doxorubicin caused significant decrease in the serum urea and creatinine levels, indicating that considerable protection is afforded. Further investigations on the mechanism of improvement of aqueous suspension of powdered Nigella sativa is required and may have a considerable impact on future clinical treatment of patients with acute renal failure.

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ORIGINAL ARTICLE

Role of Tobacco Metabolism in the Causation of Oral Squamous Cell Carcinoma in a High-Incidence Area of South Asia

Mohiuddin Alamgir

ABSTRACT

Objective: To establish the association between *CYP1A1 Msp*I polymorphism, tobacco-habit and oral cancer.

Methodology: 150 Oral squamous cell carcinoma (OSCC) and 108 controls were enrolled, comprising of individuals without and with tobacco habits which match in frequency and duration with patients. Study subjects were divided into four groups, namely: exclusive chewers, exclusive smokers, mixed-habit and no habit. Lifetime tobacco exposure was calculated as chewing and smoking index. After age adjustment, 140 OSCC cases and 90 controls were subjected to genetic analysis. White blood cells were used for DNA isolation while *CYP1A1 Msp*I polymorphism was detected with the PCR-RFLP technique. Three polymorphisms were tested namely wild type, heterozygous variant and homozygous variants. Odds Ratios (ORs) were calculated while the precision of ORs was adjusted by 95% confidence interval (CI). The risk was determined by binary logistic regression model with *CYP1A1* m1/m1 as the reference category.

Results: Out of all 258 studied subjects, 60.85% subjects were exclusive tobacco chewers which turned out to be the most prevalent tobacco habit. Cheek was the most common site (56%) followed by tongue (21%). The frequencies *CYP1A1Msp*I wild-type, heterozygous and homozygous variants were found to be 18.57%, 62.85% and 18.57% among OSCC cases and 26.53%, 62.24% and 11.22% in controls. The homozygous (m2/m2) variant of *CYP1A1Msp*I conferred an increased risk to OSCC with an OR of 2.36 (95% CI, 1.0-6.20, p=0.05). OR further increased to 7.2 (95% CI, 1.8-27.5, p=0.003) when considered in exclusive tobacco chewer's and 26 (95% CI, 2.2-304.5, p=0.009) in the above median exposure group.

Conclusion: Present analysis showed a clear association between *CYP1A1Msp*I polymorphism and the increased risk for oral cancer and this risk seems to be tobacco modulated. Hence *CYP1A1Msp*I homozygous genotype could be a major determinant of high rates of oral cancer in the indigenous population of Karachi.

Keywords: Oral squamous cell carcinoma, Pre-cancerous lesions, Gene polymorphisms, *CYP1A1Msp*I.

INTRODUCTION:

Oral squamous cell carcinoma (OSCC) ranks as the eight most frequent malignancy globally but the incidence in developing countries like Pakistan, India and Sri Lanka are very high[1]. In Pakistan it ranks as the second most frequent cancer in adults constituting 6.69% of all malignancies[2]. Use of smokeless tobacco (SLT) products has been the most prevalent mode of consumption in our region and varies from chewing relatively pure tobacco to a mixture of tobacco with additives such as seen in products like Paan (quid), Naswar, Pan-masala, Gutka, Khaini, and Mishri, etc[3,4].

There are more than 30 known carcinogens in various tobacco products[5]. Three major classes include tobacco specific nitrosamines (TSNAs), Poly Aromatic Hydrocarbons (PAHs), and aromatic amines[6]. These compounds are procarcinogens and need metabolism by Xenobiotic Metabolizing Enzyme Systems (XMEs) for conversion into carcinogens. XMEs such as Cytochrome-P450 (CYPs) are involved in their bio-activation to carcinogenic species while Glutathione-S-transferases (GSTs) cause their detoxification[7].

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The enzyme P4501A1 or *CYP1A1* encodes for the aryl hydrocarbon hydroxylase involved in the activation of PAHs and aromatic amines. It is expressed in the oral tissue[8]. Genetic polymorphisms affect its expression levels. One base substitution of thymine by cytosine in a non-coding region of the gene at position 3801 creates an *Msp*I recognition site (*CYP1A1*2A)*, which does not exist in the wild type genotype[9]. Among all polymorphisms, *CYP1A1Msp*I is the most common and is associated with increase in enzyme activity and hence generation of more carcinogenic moieties[10,11]. This polymorphism results in three genotypes: wild-type (m1/m1), heterozygous variant (m1/m2) and homozygous (m2/m2) variant[12].

Due to variable expression profile for XMEs, polymorphisms of their respective genes can alter the cancer risk posed by tobacco-related carcinogens. Interactions between genotype and environment exposures have long been postulated and studied, however, it has assumed great significance for Pakistan in general and Karachi in particular because of the widespread tobacco use among its citizens and rising prevalence of OSCC.

A recently published meta-analysis on this association has been reviewed[13]. It comprises of 10 studies from 1999 to 2012[14-23]. The overall analysis suggested that the *CYP1A1 Msp*I gene variants (hetero and homozygous) impart an increased risk than those with wild type genotype especially among Asians. A study from the neighboring country of India, another region with a very high incidence of oral cancer associated

with smokeless tobacco (SLT) consumption, an increased risk has been reported with an OR of 3.2 among individuals having both tobacco smoking and chewing habits[24]. From northern province of Pakistan a study documented weak association of *CYP1A1* variants with OSCC [OR:1.121(0.717-1.752)]. The same study showed an increasing association if there is simultaneous presence of *GSTM1* and/or *GSTT1* null genotypes. Studied subjects were all naswar users while 30.5% were also smoking cigarettes[5].

METHODOLOGY:

A total of 150 clinically diagnosed and histologically confirmed cases of OSCC and 108 controls were initially enrolled comprising of individuals without and with tobacco habits which match in frequency and duration with patients. For the purpose of analyzing the interaction between the nature of tobacco exposure and genetic susceptibility, the study subjects were further divided into: *Exclusive chewers* – individuals who consumed tobacco only in the smokeless form either with or without additives such as betel nut and lime etc., *Exclusive smokers* – individuals who smoked tobacco in forms like cigarettes, bidis etc., *Mixed tobacco habitués* – individuals who consumed tobacco in both the smokeless form and were also smokers and *Habit free group* – individuals who reported lack of former or current consumption of tobacco in any form. Life-time exposure was calculated as chewing and smoking index among all tobacco users for both cases and controls as follows[24]:

Chewing index= Frequency of chewing events per day × Duration in years

Smoking index= Number of cigarettes/10 × Duration in years

Prior to this, age-adjustment was done so as to achieve a certain level of tobacco-habit matching by cutting down the original 150 OSCC and 108 control cases for statistical analysis to 140 and 98, respectively. Hence, mean and median lifetime exposures were determined. White blood cells were used for DNA isolation while employing the Kit-method. *CYP1A1 Msp*I polymorphism was detected with the PCR- RFLP (Restriction fragment length polymorphism) technique. A 340bp fragment of exon-7 of *CYP1A1* containing the polymorphic region was amplified by using PCR as described previously[25]. Primers sequence: Forward (5'-CAGTGAAGAGGTG TAGCCGCT-3'), Reverse (5'-TCCGTACTCTGTTCT GAGGATT-3') .

10µl reaction mixture contained 4.0 µl DNA, 1.5 µl each primer, 10X buffer 1µl Taq DNA polymerase 0.25µl, $MgCl_2$ 0.2 µl and H_2O 1.55µl.

Reaction was amplified using following thermal profile:Initial denaturation at 94ºC for 3 minutes, followed by 35 cycles of denaturation at 94ºC for 30 seconds, annealing at 54ºC for 60 seconds and elongation at 72 ºC for 45 seconds and final elongation at 72 ºC for 5 minutes (Rotorgene Thermal Cycler). The PCR product was digested with *Msp*I (Hpall, Thermo Scientific) restriction enzyme for 12hrs at 37ºC[26].

After digestion, the *CYP1A1* amplified products were loaded on agarose gel stained with ethidium bromide and after electrophoresis observed under UV light. Presence of *Msp*I restriction site resulted in splicing of the original 340 bp *CYP1A1* fragment into two 200 bp and 140 bp fragments. On the gel each of the three polymorphisms were identified as:wild type (m1/m1) ⟶only one 340 bp band; heterozygous variant (m1/m2) ⟶three bands of 340 bp, 200 bp and 140 pb, respectively; and the homozygous variant (m2/m2)⟶ only two bands of 200 bp and 140 bp.

Odds Ratios (ORs) were calculated among cases and controls while the precision of odds ratios was adjusted by 95% confidence interval (CI). Mean age of patients was adjusted to exclude the aging factor as described previously. The risk (OR) was determined by binary logistic regression model with *CYP1A1* m1/m1 considered as the reference category.

RESULTS:

Ages of OSCC patients ranged from 20-78 years while that of controls from 15-87 years with mean ages being 47.1±12.22 and 41.6±14.58, respectively. Numbers of males/ females in cancer cases were 98/52 and in controls were 80/28, respectively (Table-1). 83.33% of OSCC patients and 92.5%% of controls gave a positive history of tobacco use. Out of all 258 studied subjects, 157 (60.85%) subjects were exclusive tobacco chewers which turned out to be the most prevalent tobacco habit. Exclusive smoking was seen in 6.2% cases while mixed habit of chewing plus smoking was present in 20.15% subjects. Cheek was the most common site for OSCC (56%) followed by tongue (21%). More than half of all OSCC cases (59%) were moderately differentiated cancers and 52% presented in advanced stages either III or IV (Figures 1& 2).

Table-1: OSCC Cases According to Age, Sex and Intraoral Sub-site

	Location within the oral cavity														
Age	Alveolar		Cheek		Floor		Lips		Palate		Retromolar		Tongue		**Total**
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	
11-20			1											1	2
21-30		1	6				3		1				2	1	14
31-40	1		20	1			3	1					5	4	35
41-50	1	1	18	11			2	4		1			4	4	46
51-60	5		10	9		1	2	1	1		1		4	2	36
61-70			3	3	1			3	1				2	1	14
71-80			1	1										1	3
Total	7	2	59	25	1	1	10	9	3	1	1	0	17	14	150

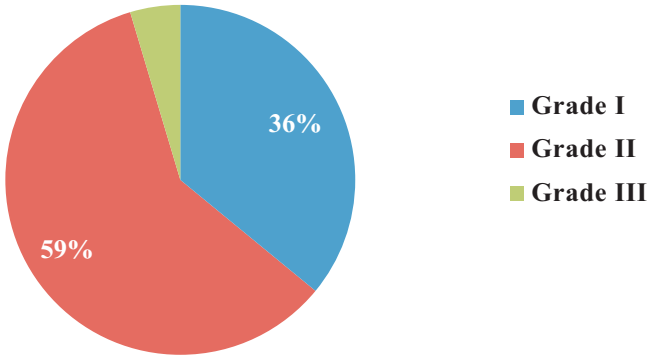

Figure-1: Proportion of OSCC cases according to histological grade

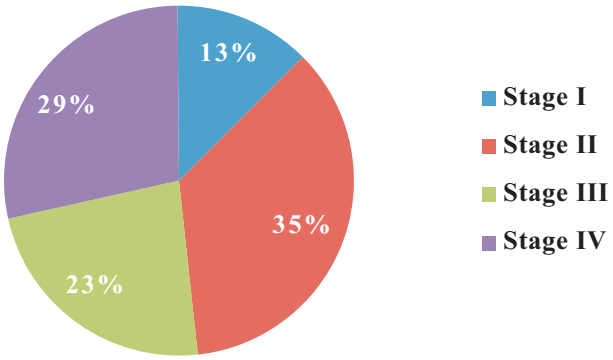

Figure-2: Distribution of OSCC cases based on clinical stage

The association between genotypes and the risk level for oral cancer was examined in individuals exposed to different tobacco habits. Table-2 and Fig.3 show tobacco indices for various tobacco habits as mean and median values. For all chewers, comprising of individuals with exclusive tobacco chewing habit plus those having chewing as a component part of mixed habit, mean and median values were comparable. However, among exclusive chewers, cancer cases reflected lower mean and median values as compared to controls. Again among all smokers, these values were comparable, while for exclusive smokers the median value was slightly higher in cancer cases.

Table-2: Tobacco indices in OSCC cases & controls

Tobacco Indices	Controls	Oral cancers
All chewers		
Mean±SE	279.01±25.65	264.27±26.96
Median	200	200
Exclusive chewers		
Mean±SE	277.46±29.0	230.17±28.01
Median	210	150
Smoking index		
All smokers		
Mean±SE	27.15±4.62	28.22±5.55
Median	21	20
Exclusive smokers		
Mean±SE	31.57±7.16	34.21±10
Median	30	40

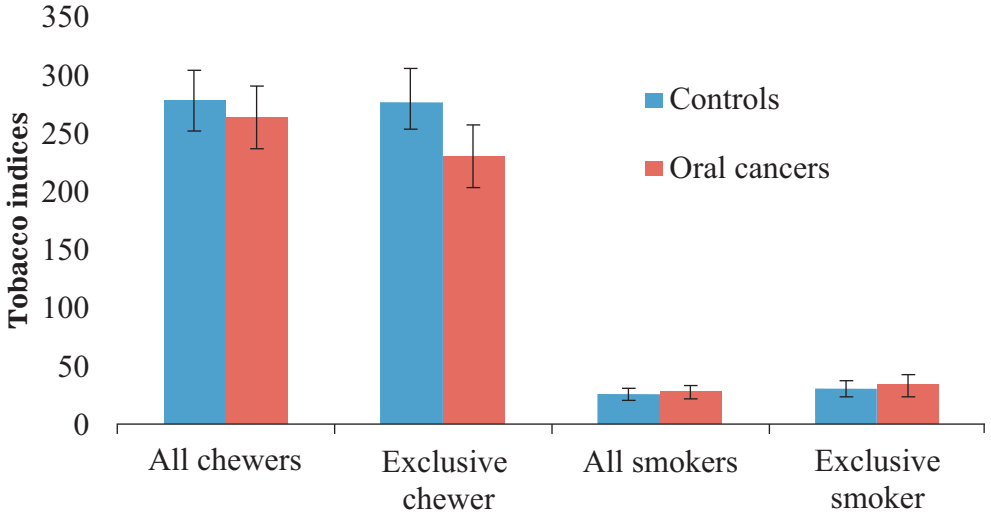

Figure 3.Mean tobacco indices in OSCC and controls

The frequency distribution of *CYP1A1Msp*I wild-type, heterozygous and homozygous variants was found to be 18.57%, 62.85% and 18.57% among OSCC cases and 26.53%, 62.24% and 11.22% in controls, respectively. The frequency of *CYP1A1* m1/m2 (heterozygous) variant in controls approximates that of cancer cases. However, the number of *CYP1A1* m2/m2 (homozygous) gene variant was appreciably higher in cancer patients as compared to controls with a significant p-value ($p<0.05$). Table-3 gives the ORs with 95% CI for this homozygous variant gene group when different tobacco habits were present.

Table-3: Risk analysis for different tobacco exposure groups

Genotype	Tobacco-habit Category	Homozygous variant in OSCC (n)	Homozygous variant in Controls (n)	Confidence Interval (CI) (95%)	Odds Ratios	P value
CYP1A1 m2/m2	Chewers	18	4	1.8-27.5	7.2	0.003
	< median exp.	5	3	0.42-13.38	2.3	0.32
	> median exp.	13	1	2.2-304.5	26	0.009
	Smokers	1	4	0.0035-1.94	0.083	0.12
	Mixed habits	4	1	0.29-39.6	3.42	0.32
	No habit	3	2	0.078-7.20	0.75	0.81
	Total	26	11	0.97-5.7	2.36	0.057

The homozygous (m2/m2) variant of *CYP1A1Msp*I conferred an increased risk to OSCC with an OR of 2.36 (95% CI, 1.0-6.20, p<0.05). When observed in the exclusive chewers Category, the OR increased to 7.2 (95% CI, 1.8-27.5, p=0.003). On dividing tobacco chewers into above and below median life-time exposure, the risk conferred was further increased to several folds for the above median exposure group (OR 26, 95% CI, 2.2-304.5, p=0.009).

DISCUSSION:

OSCC is a multi-factorial disease with evolution of tumor as an outcome of cumulative molecular events. These events are influenced by both individual's genetic predisposition as well as exposure to chemical carcinogens with a predominant role of tobacco exposure[27,28,29]. Previously contradictory reports existed about the association of *CYP1A1 Msp*I genetic aberration and oral cancer risk. Out of seven studies reviewed [14,24,30-33] , only three reported a risk association[14,24,30]. Devasena et al reported ORs of 3.2 for OSCC cases for the mixed-habit group among Indians harboring the homozygous variant of *CYP1A1Msp*I polymorphism[24]. In the current study, we have tried to evaluate the relationship between tobacco- metabolizing enzyme gene polymorphisms and oral cancer risk. This is the very first study of its kind that has been conducted on the indigenous population of Karachi which exhibits a very high incidence of this cancer. In our series, the percentages of *CYP1A1Msp*I wild-type, heterozygous and homozygous variants in the control group were quite low for the wild type genotype and high for the polymorphisms when compared to the variants reported by Zakiullah et al from naswar-consuming population from KPK province of Pakistan, i.e., 63.3% for wild type and 36.4% for polymorphisms[5]. The reported frequencies of *CYP1A1Msp*I homozygous variant allele ranged between 0-30.0% for OSCC cases and 0-10.5% for controls[13].

In the present study we observed *CYP1A1 Msp*I homozygous variant in 18.57% of cancer cases and 11.2% of controls. This is in confirmation to the previously reported data. However, the heterozygous variant (m1/m2) of the same gene we found in as much as 62.85% of our OSCC cases and in 62.24% of our controls. Both OSCC cases and controls in the present study had higher proportions of heterozygous variant than any of the ten studies included in the meta-analysis[13]. This may partly explain why our population has such a high prevalence of oral cancer especially in the presence of tobacco habit as the risk modulator, confirming the gene-environment equation. For the homozygous variant, an OR of 2.36 (95% CI, 1.0-6.20, p=0.05) was found and the result was statistically significant. A further increase in risk by homozygous variant was observed (OR=7.2) among exclusive tobacco chewers. When these individuals were stratified into above and below median exposure groups, the risk increased to several folds (OR=26) in the above median lifetime tobacco exposure category and the results were statistically significant. This observation becomes even more significant when we examine it in light of the fact that majority of OSCC cases (58%) in our series belonged to the exclusive tobacco chewer category. However, no statistically significant association was observed among exclusive smokers and mixed tobacco habitués (smoking plus chewing). There was a relatively small representation of tobacco smokers in our study population. This may partly be explained by an overall trend of reduction in cigarette smoking due to higher cost of this product in contrast to other chewable forms of tobacco.

In the current study we found grade II tumors as most rampant (59%) followed by grade I (36%). Only 5% of OSCC cases in our series were the most anaplastic grade III tumors. Other oral cancer treatment facilities from Karachi have variably reported grade-I tumors as 59.53%, 60%, 25%; grade-II tumors as 32.55%, 36%, 55% and, grade-III tumors as 7.9%, 4%, and 20%, respectively[37-39].

Metastatic involvement of neck lymph nodes determines the outcome of oral cancer patient better than any other prognostic factor. Advanced-stage OSCC cases, i.e. stage III/IV tumors, have been reported in proportions like 70%, 56.1% and 55.7% in different studies from Karachi city[39-41]. In our study clinical stage III and IV were 52% of all cases while in contrast to other studies stage II was found to be the largest group with 35% of all cases.

CONCLUSION:

In our study subjects the homozygous variant genotype of *CYP1A1Msp*I enhanced oral cancer risk only when there is a history of tobacco use, i.e., in exclusive tobacco chewers. This effect was found more pronounced among tobacco users having more than median life-time exposures, confirming the gene-environment equation.

RECOMMENDATIONS:

1) Organize awareness campaigns for general public that include genetic counseling for susceptibility genotypes in addition to tobacco-cessation drives.
2) Screening for susceptible genes should be planned by government health agencies to identify genetically vulnerable, high-risk ethnicities and sub-groups within the population.

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ORIGINAL ARTICLE

Association of Student's Intrinsic Motivation and Autonomous Support of Teachers on Academic Performance of Dental Undergraduates of Karachi

Kiran Fatima[1], Farnaz Ilyas[2], Wahab Buksh Kadri[3], Kanza Urooj[4], Ayesha Saeed[5]

ABSTRACT

Objective: To assess the impact of teacher's autonomous support on student's academic performance among dental undergraduates of Bahria University Medical and Dental College (BUMDC), and to find out the influence of intrinsic motivation (self-determination theory) on academic performance of dental undergraduates of BUMDC.

Methodology: It was a cross sectional study conducted among dental undergraduates of BUMDC. Total sampling technique was used in this study. Out of total 200 dental students in all four years of BDS, 185 questionnaires were completely filled in all aspects and therefore included for data analysis.

Results: The final calculated scores of two sub-scales of the Learning Self-Regulation Questionnaire (SRQ-L, autonomous motivation and controlled motivation) had an average mean of 5.1 and 3.95. The average of the Learning Climate Questionnaire (LCQ) for tutor autonomy support was 4.51. The average academic performance score was 74.1%. More than half of the respondents (60%) were autonomously motivated. Students' autonomous support and perception towards tutors' autonomy support was (5.1 and 4.51 out of 7 scoring) respectively.

Conclusion: It was concluded from this study that the intrinsic motivation of dental undergraduate has direct association on strong academic performance of learners. On the other hand, teachers' autonomous support has an inverse relationship over academic performance of dental undergraduates.

Keywords: Academic performance, Autonomous motivation, Autonomy support, Self-determination theory

INTRODUCTION:

Learning is a unique process of acquiring knowledge and experience to master great skills and ability to make a difference in the world. Efficient learning results from using systematic, structured and well planned study techniques to the best of one's ability. Also one's curiosity in the subject plays a significant role in determining the academic results[1]. Considerable changes for last few years in the medical education curricula has affected the ways of learning including theoretical and practical understanding of the subject, assessing and imparting quality education and the adroitness required from the doctors[2,3]. In both the medical and non-medical fields, motivational theory has been modified from quantitative to qualitative education, hence, self-determination theory (SDT) explains an educational model that infers to the importance of quality over quantity and emphasizes that teachers' autonomy support and learning environment play a crucial role in enhancing one's self determination and motivation[4,5,6]. Medical students face a lot of challenges while studying various subjects at a time and memorizing all the facts and figures including aetiology, pathophysiology of a disease, investigations and the best quality treatment that can be provided to the patients and yet retaining everything to the best of their abilities[7]. Therefore self-motivation theory accentuates a healthy relationship between teachers and students. Autonomous motivation is known as intrinsic motivation and plays a crucial role in enhancement of students learning capabilities as teachers are advised to pay more attention to the students with poor learning skills and low self-motivation[8,9,10].

Self-determination theory (SDT) was first looked in to by Reeve et al and has since become a topic of increasing interest over the years; it helps to explore and elucidate various types of motivation based on qualities of which other motivation theories are incompetent of clarifying[11]. SDT is the integration of autonomy, competence and relatedness that promotes positive school functioning and cross-culturally nurtures psychological needs of learner[11]. Autonomy can be defined as the ability to make choices according to one's own free will and assume that autonomous-supportive social contexts tend to facilitate self-determined motivation, healthy development and optimum performance. Competence is the ability of an individual to do a job the correct way. A competency is a set of defined behaviours that provide an organized guide enabling the identification, assessment and development of the behaviour in individuals. It

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generally refers to perception of cognition in wide academic areas, such as how good a student is in general. Relatedness is the need to develop close and secure contact with others; when related, students feel emotionally connected to and interpersonally involved in cordial, compassionate relationships[12].

Enormous literature demonstrated that in order to be effective, sufficient contribution is needed from both students' autonomous motivation and teachers' autonomous support to achieve excellence academic performance[11]. According to Richardson; pupils who were taught by conventional/traditional methods performed well in tests comprising of definitions and learned concepts but scored poorly in tests concerning creation and innovation[13].

SDT in a social context entails the relation between students and teachers which markedly contributes in modification of controlled motivation to autonomous motivation or vice versa during the learning activity. This depends on how much independent support is given by the teachers to the students. Nonetheless, teachers are advisable to give autonomy, support and structure at the same time for those students who need improvement in self-regulated learning skills[9,13]. Teachers impose structure in place to aid students engage in learning and become competent[14]. Structure is defined as teachers' advice to their students on students' behaviour. For example; students with poor self-regulated learning skills, teachers are advised to give help in forms of communicating clear goals or prospect, self-regulated learning strategies and regularly evaluating students' progress. The structure will amend students' self-regulated learning skills and autonomous support will inspire students to stay consistent during the study[14].

According to literature, there were some studies conducted on SDT focusing on medical undergraduates but no study had been so far conducted on dental undergraduates. This was the first study conducted in this domain of SDT in Pakistan among dental undergraduates.

It was hypothesized that there is an impact of self-motivation/intrinsic motivation (locus of control, self-efficacy, interest in subject) on academic performance of learner. It was also assumed that teachers' autonomous support has the association with the student's academic performance.

METHODOLOGY:

This cross sectional study was conducted after approval from the institutional Ethical Review Committee (numbered 32/17) among dental undergraduates of BUMDC. The participants were between 18 to 26 years of age. By total sampling technique, 200 questionnaires were distributed among all four years of dental undergraduates, from which 185 participants consented and filled the questionnaires completely and were included in the study. The data was collected in January 2017, when students were promoted to next professional year after their final professional examination. The questionnaires were explained prior to conduction of the study to all the participants and rationale was also given. Data was collected by using two types of validated questionnaires: Learning Self-Regulation Questionnaire (SRQ-L) and Learning Climate Questionnaire (LCQ). SRQ-L is a 12-item questionnaire to measure students' motivation having two sub-scales: autonomous regulation (7-item; α= 0.80) and Controlled Regulation (5-item,α= 0.75). For Tutor's Autonomy Support, LCQ was used to assess autonomous support from teachers. It was six item questionnaire. Participants indicated their disagreement or agreement with each statement on a 7-point likert scale from 1 (not true at all) to 7 (very true). The sub-scale score was obtained by averaging the total score from the item[15,16]. Hence, the responses that were provided were either controlled (i.e., external motivation or introjected regulation) or autonomous (identified regulation or intrinsic motivation). Student's academic performance was assessed by grades. The students who secured more than 80% in professional examination were considered as A^+, students who earned more than 70% were labeled as A grade and students who secured less than 70% were regarded as B grade.

Data was analyzed on SPSS version 23. Descriptive data was calculated by using mean and regression analysis test. Regression Analysis was carried to evaluate the association of tutors' autonomy support towards students' academic achievement. P value less than 0.05 was taken as statistically significant. The collected data was checked for accuracy.

RESULTS:

Out of total 200 questionnaires distributed among all four years of dental undergraduates, 185 questionnaires were eligible to be included in this study. The response rate was 92.5%. From 185 questionnaires 44 (Year-1), 47 (year-2), 47(year-3) and 47 questionnaires from 4th year were included in this study. The final scoring of LCQ was performed by adding mean of every item. The two sub-scales of the LSRQ (autonomous motivation and controlled motivation) had an average mean of 5.1 and 3.95. The average of the LCQ for tutor autonomy support was 4.51. The average academic performance score was 74.1%. More than half respondents (60%) were autonomously motivated. Students' autonomous support and perception towards tutors' autonomy support was 5.1 and 4.51 out of 7 scoring respectively (Table-1).

Table-1: Descriptive Analysis of Self Determination Theory

Variables	N	Mean
Autonomous Motivation	185	5.1
Controlled Motivation	185	3.9
Tutor autonomy Support	185	4.51
Academic Performance	185	74.1

The explicit descriptive analysis of SRQ-L and students' academic performance accepted the research hypothesis. Therefore this study revealed that there was an impact of student's intrinsic motivation on student's academic performance.

Regression Analysis was carried out to evaluate the association of tutors' autonomy support towards students' academic achievement. Regression analysis was performed using academic performance grades in professional summative assessment of dental students. Academic performance was taken as dependent or outcome variable and tutors' autonomy support as independent variables. The analysis revealed that teacher's autonomous support had only 0.019 effect on student's academic performance. Therefore, we failed to accept the research hypothesis as there was no positive association between academic performance of dental undergraduates and teachers autonomous support in this institute (Table-2).

Table-2: Multiple Regression Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.138	0.019	-.014	0.79871

DISCUSSION:

The present study was the first of its kind conducted in Pakistan and in Bahria University Medical and Dental College Karachi, to assess the impact of students' motivation on their academic performance and to assess the relationship between autonomous support of teachers on academic performance of undergraduate dental students. Multiple researches conducted worldwide discovered that students with strong autonomous/intrinsic motivation had a propensity to achieve good grades and indicated that students' desire of learning is directly related to his/her autonomous motivation[4,17]. The response rate of the this study was 92.5%, which was comparatively higher than the study conducted by Halvari et al in 2010[18] and was lower than the study conducted by Feri et al[15]. The observed results of this study divulged that students' intrinsic motivation had an impact over the academic performance of students and these results were indistinguishable with the study conducted among Medical Students of Indonesia in setting of Problem based learning[19]. The primary research hypothesis denoted that the learner's intrinsic motivation was mandatory to excel in academic performance and these findings were consistent with the study conducted by Daniela[19].

It has been evidenced by Feri et al that students with strong autonomous motivation had healthier interpersonal relationship and biopsychosocial value towards patients' health care[15,17]. On the other hand, incongruous results were also stated in ample literatures for example according to Black and Deci[16], there was an absence of direct association between enrichment in student's academic performance and autonomous motivation of students. In this same study, it was proved that improvement in student's academic performance in training of organic chemistry depended on learner's intrinsic motivation[15,17]. Some studies[20,21,22] have proved that allegiance to self-directed learning through deep

learning approach can improve medical student's academic performance by strong intrinsic autonomous motivation. Other studies also revealed that teacher's autonomous support had a negative impact on learner's academic achievement[22,23] and these findings were consistent with our study results. On the contrary, multiple studies revealed that teacher's autonomous support was fundamental to develop future clinical competence, strong academic performance and well-built interviewing skills among learners[16,17,20,24].

The reasons of why teachers' autonomous support weakened the learner's academic performance in this study was different educational background of all four years of dental undergraduates; they experienced teacher centered learning environment and the learners were not used to with deep learning approach and self-directed learning which had a direct causality with student's intrinsic motivation. The changes in dental education teaching strategies were on initial stages in Bahria University Medical and Dental College, Karachi; though teaching strategies from teacher centered to student centered were highly implemented in all four years of dental under graduate studies, but some difficulties were discovered to accept this changes among first year dental students, via mentoring session, as students of first year completely relied on teachers centered learning in their high school years and were beginner in this educational system. This observation was similar with the first year medical undergraduates and nursing students in a study conducted in Indonesia[25].

The limitation of the study was less sample size, and before implementing Self Determination Theory assessment, orientation of educational background of the learners should have been considered, which was not done in this study. The academic performance could have been evaluated through subject based performance. The strength of this study was use of validated questionnaires as a study tool

CONCLUSION:

It is concluded from this study that the intrinsic motivation of dental undergraduate has direct association on strong academic performance of learners. On the other hand; teachers' autonomous support has an inverse relationship over academic performance of these students. Therefore, it is recommended to revisit the educational strategies implemented in dental curriculum in Pakistan and multicenter study should be conducted for more validated results.

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COMMENTARY

An Organizational Challenge: Reframing Of Leadership to Introduce "Master's Program in Basic Sciences"

Rehana Rehman[1], Rabiya Ali[2], Rakhshaan Khan[3], Fazal M Arain[4]

ABSTRACT:
There is a severe dearth of post graduate institutes in our country. Therefore, there is a need to initiate post graduate program for students who have talent and passion for research and teaching. The post graduate program will be aimed to strengthen the multi-disciplinary integrated concepts of Basic sciences as a solid foundation for developing research mentors and educators. This can only be made possible by analyzing the challenge in structural, human, political and symbolic leadership frames and device a solution which is in line with the vision and mission of the organization.
Keywords: Leadership, Structural frame, Human resource frame, Political frame, Symbolic frame.

BACKGROUND:

Bolman and Deal proposed that leaders observe organizational challenges in the light of leadership frames[1]. Bolman and Deal's reframing of pedagogics delivered the theory for accepting the intricate change process and the participation as a leader[2,3]. By means of practical application of this theory, leaders can understand their organization, refine their skills and improve their expertise for the change[4]. The procedure of reframing using the four frames- structural, human resources, political, and symbolic offers the theoretic pedagogics to produce agreement on purpose and practice of the change process[4]. Furthermore, "the talent to utilize various frames is linked with greater efficiency of leaders"[3]. This challenge is a set of urgency for leadership to create arenas, build alliances and diffuse oppositions (Dolman; Political frame), review, modify and strengthen a post graduate program by designing, maintaining, and aligning structural reforms with the tasks, technology, environment and strategic/tactical goals (Dolman; Structural frame). The strategies adopted will empower faculty with the desired skills, credibility connections and authority to move the program in the right direction (Dolman; Human resource frame). Moreover, the theme in post graduate education will be communicated through a combination of words, deeds and symbols aligned with vision and strategy of organization culture (Dolman; symbolic frame)

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Planning for change by leadership frames:

The first strategic step is to identify the strengths, weaknesses, challenges and opportunities of the leader as well as the organization and analyze them in respective leadership frames and then redesign of all four frames in practice based context[5] is required for a full range leadership model[6].

Structural leaders try to define internal processes of the organization within the structural environment[1]. Human resource theorists put emphasis on the interdependence between people and organizations. The process of real change begins with the capitalization of passion of the group and consensus building[7]. This political structure in organization is mentioned as the jungle model[7]. Political theoreticians see authority, conflict, and sharing of scarce assets as a fundamental concern[2,3].

How can we acquire this change?

Strategies will be required in all the frames of leadership

Structural reform

- Determine organizational readiness.
- Formulate strategic planning committee with departmental chair, members from the developmental team, representatives from advanced board of graduate studies, medical education department and research office.
- Establish committees to evaluate these documents.
- Assign roles to different committees to assess documents with dead lines.
- Frequent meetings of steering committee to analyze the reports from sub-committees.
- Evaluate the strengths and competencies of faculty and staff from desk records and students

evaluations
- ❖ Define competencies/skills and specialized roles of faculty members
- ❖ Assess the need for recruitment of new faculty members
- ❖ Develop a policy for recruitment of new faculty members in line with the policy of the organization
  - o Plan advertisement
  - o Review selection criteria
  - o Recruit staff
- ❖ Recruitment process of support and allied staff
  - o Review competencies, prepare criteria, advertise and recruit
  - o Recruit full time/part time support staff depending upon available budget
- ❖ Admission criteria for graduates
  - o Review and modify (if necessary) the admission criteria
  - o Review and modify fee policy (if necessary)
- ❖ Check the availability of physical resources (infrastructure, finances and material)
- ❖ Submit educational grants to arrange finances for development of program

Strategies for human resource reform:
- ❖ Address the apprehensions/ demands of the faculty and staff
- ❖ Individualized consideration[8]:
  - o Providing feedback, encouragement, and consistent communication with the committee members, faculty and staff
  - o Initiate formal faculty research mentoring program
  - o Empower them by increasing their participation
  - o Give autonomy
- ❖ Intellectual stimulation[4]:
  - o Stimulate thinking of faculty using brain storming techniques (Suggestions from faculty to improve the program)
  - o Refresher training of faculty members on changes in curriculum
- ❖ Inspirational motivation:
  - o Acknowledgement of staff member's separate efforts and requirements with positive reinforcement [2,3,8]
- ❖ Idealized influence:
  - o Open door policy (being accessible and visible to staff with readiness to listen to problems)
- ❖ Information sharing:
  - o Informal and formal meetings of former and present faculty members and staff

Strategies for Political reform

Advocacy Plan

Recognize Power Bases: The power base of leader is built by the position**,** resources and information that can be exchanged for cooperation, ability to provide incentives to others and personal qualities like; credibility, persuasiveness, tolerance that inspire confidence and a willingness to follow. Administration of conflict is serious to the organizational effectiveness[9]. Leader needs to identify if:

- ❖ They arise from personal differences, lack of information, role of inappropriateness (goals and responsibilities) and environmental pressure (resource scarcity and uncertainty).
- ❖ Or they are hierarchic (i.e. between people or groups in a vertical relationship) or horizontal (i.e. between people or groups at the same level).
- ❖ Both type of conflicts; horizontal among faculty members and vertical with power interest groups; University Board of advanced Studies, funding agencies for grants and government officials for sponsorship and scholarship (vertical) will be dealt with.

DISCUSSION:

It is well known that learning of basic sciences when placed in the context of clinical and professional practice is more meaningful and relevant to students[10]. There is nonetheless dearth and need of integration in basic sciences both at post graduate and undergraduate levels[11]. The advancement in clinical and translational science is thus hindered by compartmentalization of disciplines and "siloed" efforts of the researchers[12].

The leadership challenge is to introduce an integrated approach of Basic Sciences in existing post graduate curriculum so as to identify and nurture graduate students with talent and passion for research and teaching[13]. In order to approve and implement a post graduate program with integration in Basic Sciences; a leader should be ready for the change, will need to exhibit knowledge, skills and ability clusters of "self and public understanding", "interpersonal impact and supervision", 'authenticity and honesty" and "public and political center in/ out of organization"[14,15]. For this, leader should consider political realities; understand concerns of power in interests groups so as to align them with the vision of the organization[4]. Moreover, leader will recognize the expertise and perspective of each stake holder so as to build coalitions and create arenas for negotiations. Leader will inspire all the team members to have faith in the program and be committed to obtain its recognition with qualified and competent faculty members, innovative curriculum and technology

enhanced learning. This will retain reputation of organization as a center of excellence in line with institution's traditions, culture and values. The strategies adopted will empower faculty with the desired skills, credibility connections and authority to move the program in the right direction

CONCLUSION:

There is a requirement to initiate post graduate program in Pakistan for talented students who have aptitude for research and teaching. The post graduate program will be aimed to strengthen the multi-disciplinary integrated concepts of basic sciences as a solid foundation for developing research mentors and educators. Moreover, the theme of post graduate education will be communicated through a combination of words, deeds and symbols aligned with vision and strategy of organizational culture.

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STUDENTS CORNER
ORIGNAL ARTICAL

Effect of Interactive Sessions (IS) and Problem Based Learning (PBL) With Regards To Student Learning Among MBBS Students of BUMDC, Karachi

Sohail Moosa[1], Adil Dawach[2], Ramsha Muhammad Abid[3], Khushboo[4], Ainul Akber[5]

ABSTRACT:
Objective: To compare the effectiveness of small group sessions in terms of pedagogy and students learning from an undergraduate MBBS student's perspective in Bahria University Medical and Dental College (BUMDC).
Methodology: It was a cross-sectional study carried out in BUMDC from June 2015 to August 2015 by interviewer-administered type questionnaire. 60 students from each year of MBBS (first to final year) were interviewed. Total study population was 300. Those medical students who had attended both PBL and IS during any stage of their medical education were included. Each student was assessed by questionnaire for 5-10 minutes. The student responses were acquired on a scale of strongly disagree, disagree, agree and strongly agree. Frequency of responses was calculated and reported in percentages.
Results: The participants responded to 15 questions given in the questionnaire in relation to interactive session (IS) and problem based learning (PBL). The results of both were comparable. For PBL, 82.6% participants agreed that they were able to learn the content of the subject, whereas 85% of study participants agreed same for IS. 76% said that PBL had helped them to be an active learner, which was 77.3% for IS. For some questions, PBL had better response, whereas for others, IS were considered better by the students.
Conclusion: Although short group interactive sessions, and problem based learning, both are effective methods of teaching from students' perspective, PBL had better appraisal in terms of group dynamics, confidence building in students, communication skills, presentation skills and to develop higher order thinking. Rest of the questions in the questionnaire had better results for interactive session, confirming that both teaching strategies are effective as teaching tools, with PBL having an edge over interactive sessions.
Keywords: Interactive session, Problem based learning, Students' perspective, Pedagogy

INTRODUCTION:

There is a saying that "knowledge learnt in isolation is rapidly forgotten". To overcome these drawbacks, students are taught by using interactive learning skills i.e., PBL, Interactive Sessions, Case Base Teaching and Integrated Lectures[1,2,3].

Problem Based learning is a mode of instruction that focuses on student- centered approach which develops an understanding to integrate theoretical and practical knowledge, to conduct research, and apply knowledge and skills to develop a valid explanation to a defined problem[4,5]. This was introduced in McMaster University, Canada in the late 1960s, by Howard Barrows and his colleagues[6,7,8]. But, it is a relatively fresh mode of instruction in Pakistan having started in some medical colleges in the early 2000s. It has been much debated upon the pros and cons of PBL, with PBL being viewed favourably since evidence shows it is supportive in the improvement of the social, psychological and cognitive domains of student[9]. It also promotes student and faculty satisfaction, self-directed learning skills, communication skills and team work[10]. But, its implementation requires homogeneity in the educational background of participants[11]. Not only students but proper training of faculty members for facilitation of such sessions is required, as it introduces a change of viewpoint[12]. In approach to clinical problems a different set of skills is developed due to PBL[13].

The PBL conducted in BUMDC are of 6 hours, carried out in 3 sessions, conducted as 2 hours/session, the clinical scenarios constructed with an integrated approach to all the subjects of the respective year. The first and the third sessions are facilitated by faculty, whereas in the second session there is no facilitator and students come together to share ideas and information gathered. It comprises of 7 jumps which are carried out in the 3 sessions[14].

The students start it with no prior notice as to which

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topics or clinical scenario the PBL will cover, with each individual having prior knowledge which the group is not privy to. The facilitators provide insight to the objectives but, otherwise have a passive role in the sessions.

In its contrast, interactive sessions although different in its execution, provide a productive academic environment which encourages collaborative learning of theory and practice in students by active participation and teamwork. This improves self-directed learning, critical thinking skills and communicational abilities in undergraduate medical student[15]. Interactive Session stimulates discussion among students for building self- motivation, self-esteem and intellectual grasp resulting in a better retention of knowledge[16]. The interactive sessions are conducted once in a week, covering 2 hours in each session. They are held independently for each subject of the respective year. The students are informed beforehand of the topics to be covered in the session so that they come prepared, which leads to better understanding of the topic. The session is facilitated and students are encouraged to share their knowledge about the related topic. The facilitator guides the group through all the objectives of the session, ending it with a summary of discussed objectives.

PBL sessions are carried out in the first, second and third year of MBBS in BUMDC whereas the interactive sessions are conducted in first, second, third and fourth year of MBBS. The PBL and Interactive session are both conducted by the departments of anatomy, physiology, biochemistry, pathology, pharmacology and forensic medicine

METHODOLOGY:

It was a cross-sectional study carried out in Bahria University Medical and Dental College from June 2015 to August 2015 by interviewer-administered type questionnaire. 60 students from each year of MBBS (first year to final year) were interviewed and the total study population was 300.

The medical students who had attended both PBL and IS during any stage of their medical education were included in the study. Each student was assessed by interviewer-administered type questionnaire for 5-10 minutes. The student responses were acquired on a scale of strongly disagree, disagree, agree and strongly agree. The pattern of questionnaire is given below (Table-1):

Table-1: Questionnaire prepared for study

1 Strongly disagree	2 Disagree	3 Agree	4 Strongly Agree	
				PBL IS
Q. No				
1	Do the sessions generally help you learn the content of the subject?			
2	Do the sessions generally help you become an active learner?			
3	Do the sessions generally motivate you to self-directed learning?			
4	Do the sessions generally help you learn the skill of group dynamics?			
5	Do the sessions generally develop confidence in you?			
6	Do the sessions generally help you improve your communication skills?			
7	Do the sessions generally develop clinical skills in you?			
8	Do the sessions generally improve your presentation skills?			
9	Do you go through different books while preparing yourself for the sessions?			
10	Do you generally come prepared for the sessions?			
11	Do the sessions generally induce brainstorming in you?			
12	Do the sessions generally develop adult reasoning skills in you?			
13	Do the sessions generally induce perception of content relevancy?			
14	Does the session generally help you in practising higher order thinking?			
15	Do the sessions generally let the knowledge retain for long after being conducted?			

At the end of sample collection the data was analyzed. Percentages of frequency distribution were calculated on SPSS version 20 and results were obtained.

RESULTS:

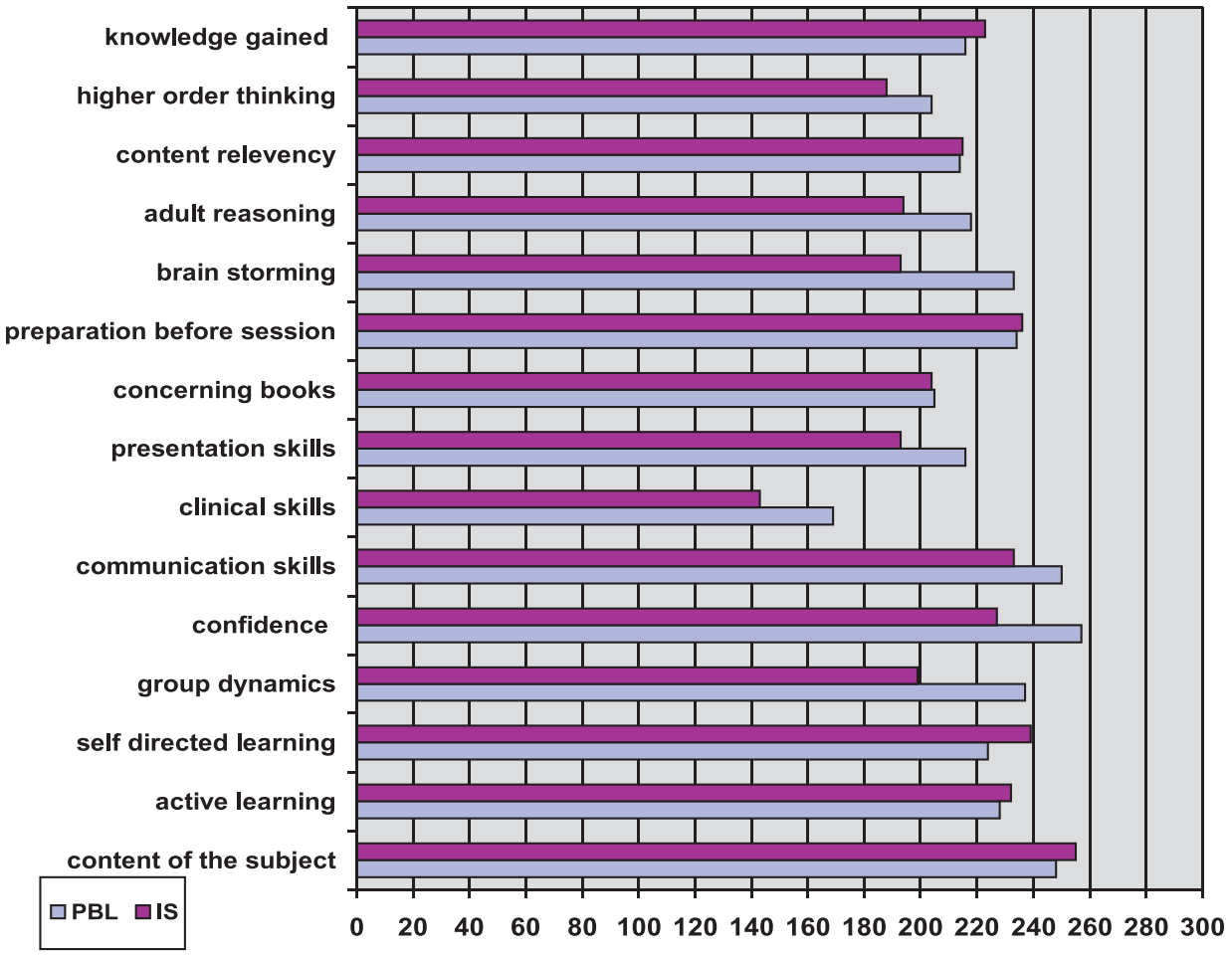
300 students participated in the study. Participants responded to 15 questions given in the questionnaire in relation to interactive session and PBL.

The responses of the students were mixed, and they supported both teaching strategies variably. In some questions, PBL was a preference while in others, interactive sessions received greater value. In questions regarding learning the content of the subject, to be an active learner, motivation regarded self-directed learning, group dynamics, developing confidence, improvement in communication, presentation and clinical skills, increased motivation for brain storming and adult learning and higher order thinking had better response in problem based learning. Some questions had equal response for both teaching modalities like, preparedness for sessions, content relevancy and retention of knowledge for long periods after session was being conducted (Table-2). The comparison of these questions is shown in Figure-1.

Table-2: percentages of response to study questionnaire regarding PBL and IS

	VARIABLES	SESSION	STRONGLY DISAGRE n (%)	DISAGRE E n (%)	AGREE n (%)	STRONGLY AGREE n (%)
1.	Do the sessions generally Help you learn the content of the subject?	PBL	14 (4.7%)	38 (12.7%)	182 (60.7%)	66 (22.0%)
		IS	12 (4.0%)	33 (11.0%)	137 (45.7%)	118 (39.3%)
2.	Do the sessions generally help you become an active learner?	PBL	14 (4.7%)	58 (19.3%)	162 (54.0%)	66 (22.0%)
		IS	19 (6.3%)	49 (16.3%)	129 (43.0%)	103 (34.3%)
3.	Do the sessions generally motivate you to self-directed learning?	PBL	15 (5%)	61 (20.3%)	146 (48.7%)	78 (26.0%)
		IS	21 (7.0%)	40 (13.3%)	138 (46.0%)	101 (33.7%)
4.	Do the sessions generally help you learn the skill of group dynamics?	PBL	19 (6.3%)	44 (14.7%)	151 (50.3%)	86 (28.7%)
		IS	33 (11.0%)	68 (22.7%)	115 (38.3%)	84 (28.0%)
5.	Do the sessions generally develop confidence in you?	PBL	16 (5.3%)	27 (9.0%)	141 (47.0%)	116 (38.7%)
		IS	25 (8.3%)	48 (16.0%)	127 (42.3%)	100 (33.3%)
6.	Do the sessions generally help you improve your communication skills?	PBL	15 (5.0%)	35 (11.7%)	139 (46.3%)	111 (37.0%)
		IS	25 (8.3%)	52 (17.3%)	128 (42.7%)	95 (31.7%)
7.	Do the sessions generally develop clinical skill in you?	PBL	54 (18.0%)	77 (25.7%)	111 (37.0%)	58 (19.3%)
		IS	61 (20.3%)	96 (32.0%)	83 (27.7%)	60 (20.0%)
8.	Do the sessions generally improve your presentation skills?	PBL	32 (10.7%)	52 (17.3%)	142 (47.3%)	74 (24.7%)
		IS	32 (10.7%)	75 (25.0%)	121 (40.3%)	72 (24.0%)
9.	Do you go through different books while preparing yourself for the sessions?	PBL	35 (11.7%)	60 (20.0%)	127 (42.3%)	78 (26.0%)
		IS	33 (11.0%)	63 (21.0%)	120 (40.0%)	84 (28.0%)
10.	Do you generally come prepared for the sessions?	PBL	19 (6.3%)	47 (15.7%)	165 (55.0%)	69 (23.0%)
		IS	22 (7.3%)	42 (14.0%)	145 (48.3%)	91 (30.3%)
11.	Do the sessions generally induce brainstorming in you?	PBL	16 (5.3%)	51 (17.0%)	165 (55.0%)	68 (22.7%)
		IS	32 (10.7%)	75 (25.0%)	122 (40.7%)	71 (23.7%)
12.	Do the sessions generally develop adult reasoning skills in you?	PBL	19 (6.3%)	63 (21.0%)	155 (51.7%)	63 (21.0%)
		IS	32 (10.7%)	74 (24.7%)	125 (41.7%)	69 (23.0%)
13.	Do the sessions generally induce perception of content relevancy in you?	PBL	20 (6.7%)	66 (22.0%)	175 (58.3%)	39 (13.0%)
		IS	27 (9.0%)	58 (19.3%)	144 (48.0%)	71 (23.7%)
14.	Do the session generally help you in practicing higher order thinking?	PBL	16 (5.3%)	78 (26.0%)	149 (49.7%)	57 (19.0%)
		IS	34 (11.3%)	78 (26.0%)	115 (38.3%)	73 (24.3%)
15.	Do the sessions generally let the knowledge retain for long after being conducted?	PBL	28 (9.3%)	56 (18.7%)	150 (50.0%)	66 (22.0%)
		IS	30 (10.0%)	47 (15.7%)	121 (40.3%)	102 (34.0%)

Figure-1: **Comparison of students' response between PBL & IS**



DISCUSSION:

The present study was a trial to compare the effectiveness of interactive sessions and problem based learning sessions concerning student learning, in the students of Bahria University Medical and Dental College. The results indicated positivity towards PBL sessions. The hypothesis was made that students learn more in the PBL session than in an Interactive session.

PBL provides a more intriguing, motivating and pleasant approach towards learning and education[17]. PBL sessions are based on Integrated Learning with learner- centered approach that follows the goal decided by the participant group of students. In contrast, interactive sessions provide pre-determined objective to a group of students in a particular subject, while following an instructors approach. The results were in concurrence with another study which showed medical undergraduate students responded better to an integrated method of learning, concluding an absolute requirement for integrated learning[18]. The role of the tutor is to assist the process of self-learning by helping the group leader to keep group dynamics and facilitating the group, and to ascertain that the group achieves proper learning objectives as designed by those who have made it[15]. In our study it was found that content of the topic was relatively better understood in an interactive session due to predetermined objectives. The students came prepared and were able to comprehend content of the topic faster, in comparison the PBL sessions where they had the required information but were unable to access the knowledge within the information. This was supported in another study where the students assessed after PBL session felt that they did not completely comprehend the content of the topic[19,20].

The response of students was more in favour of PBL with regards to adult reasoning and communication skills. Another research revealed PBL as being beneficial towards physician competency, especially in social and cognitive dimensions[5,14,21,22] which contradicted with our results which showed a negative response in developing clinical skills in both PBL as well as interactive session. Our study showed that only half of the students agreed to have improvement in clinical skills by PBL, which is similar to a study which determined that no convincing evidence was found that PBL improved clinical knowledge or execution of clinical

skills, at least not of the expected magnitude in relation to the effort and resources required for a PBL curriculum[23].

This study showed an equivocal response regarding retention of knowledge for long duration after conduction of a session in case of PBL as well as interactive sessions. However, in literature, it is seen that PBL is thought to improve acquisition and retention of knowledge[24], whereas another study revealed inferior scores by students in basic sciences, with poor performance in examination or assessment in PBL students as compared to others[25].

CONCLUSION:

This study has showed that although PBL and interactive sessions, both are excellent pedagogy, however, PBL has better students' response. Students feel more confident, and develop better communication and presentation skills when they are taught through PBL. It also induces better adult learning, brain storming skills and develops higher order of thinking among students.

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STUDENT ACTIVITY

Pharmacology Student's Competition 2017

Syeda Afsheen Nazar[1], Muhammad Tanvir Ahmed[2]

The department of Pharmacology in continuation of its tradition organized "Pharmacology Student Competition 2017" on 18th May 2017. Students of MBBS 3rd year and BDS 2nd year participated with their Penaflax-posters highlighting the features of drugs with their critical thinking and creativity. They were divided into 21 groups. MBBS students were divided according to their clinical groups into A1, A2, B1, B2, C1, C2, D1, D2, E1, E2, F1, F2, G1, G2, H1, H2, & H3 and the drugs assigned to them were Amoxicillin (A1), Vancomycin (A2), Doxycycline (B1), Erythromycin (B2), Furosemide (C1), Warfarin (C2), Ceftriaxone (D1), Amiodarone (D2), Losartan (E1), Propranolol (E2), Quinidine (F1), Gentamycin (F2), Chloramphenicol (G1), Clindamycin (G2), Ferrous Sulphate (H1), Simvastatin (H2), and Diltiazem (H3). BDS students were divided into A1, A2, B1 & B2 groups and drugs assigned to them were Atorvastatin (A1), Ciprofloxacin (A2), Nitroglycerine (B1) and Sulfamethoxazole (B2). Posters were displayed in the Ibn-e-Sina auditorium of Bahria University Medical and Dental College (BUMDC) and a presenter from each group faced two judges (1) Prof. Dr Zahida Memon, Principal Ziauddin Medical College & Head of Pharmacology Department and (2) Prof. Dr. Syed Saud Hasan, Chairperson Pharmacology, Dow University of Health Sciences and Head of Pharmacology department of Dow Medical College. The event was hosted by Saad Khalid and Rida Fatima, students of MBBS. Prof. Dr. Nasim, Head department of Pharmacology gave the welcome address. The group leaders briefly explained the audience about their group`s work while results were being compiled. The chief guest of event was Vice Admiral (Retd.) Tehseen Ullah Khan HI(M), Director General of BUMDC. He appreciated the students and Pharmacology department for organizing the activity and said that these kind of events increase student's confidence and interest in the subject. The event was formally closed by vote of thanks delivered by Warda Zanib, student of MBBS. 1st and 3rd prizes were awarded to MBBS while 2nd prize was won by BDS students group.

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DG & Dean Health Sciences with the audience

Welcome Address by Prof. Nasim Karim

Presenter giving briefing to Judges

1st Position – Group A1 (MBBS)

2nd Position Group B2 (BDS)

3rd Position Group C2 (MBBS)

CASE REPORT

Arthritis Mutilans: Case Report of an Uncommon Squeal of Psoriatic Arthritis

Farooq Azam Rathore[1], Saeed Bin Ayaz[2]

ABSTRACT:
Psoriatic arthritis (PsA) is a seronegative spondyloarthropathy that presents clinically in different forms. Arthritis mutilans is a rare yet the most aggressive and disabling form of PsA that requires early diagnosis and aggressive therapy preferably in the form of biological agents to prevent or stop the irreversible destruction of small joints. We describe here, report of a case of long standing PsA who developed arthritis mutilans resulting in disability, compromised mobility and a poor quality of life.
Keywords: Rheumatology, Hand deformity, Psoriasis, Arthritis, Joints

INTRODUCTION:

Psoriatic arthritis (PsA) is a chronic inflammatory arthropathy associated with psoriasis, and included among the seronegative spondyloarthropathies[1]. Psoriasis features associated with a higher likelihood of PsA include nail dystrophy, scalp lesions, and intergluteal/ perianal psoriasis[2]. Arthritis mutilans is a severe, deforming and destructive arthritis that affects fewer than 5 percent of people with psoriatic arthritis[3]. Although it is not necessarily a diagnostic challenge given its characteristic features, it is disabling and mutilating to a significant degree. Early diagnosis and adequate management can prevent the progression of disease and development of irreversible deformities. We present a case of long standing psoriatic arthritis who developed disabling arthritis mutilans resulting in restriction of mobility and a poor quality of life.

CASE REPORT:

A 54-year-old man, with 18 years' history of psoriasis presented with progressive pain and deformities in both hands and feet. He had a poor response to methotrexate therapy and was only on non-steroidal anti-inflammatory drugs (NSAIDs) at the time of presentation. He had extensive scaly, erythematous lesions consistent with psoriasis on trunk and all limbs. On hand examination, there was synovial thickening and soft tissue swelling of the wrists and metacarpophalangeal joints (MCPs), dactylitis, and boutonnière and swan neck deformities in both hands (Figure-1). Characteristic nail changes in the form of nail pits, onycholysis, oil drop sign and nail-bed hyperkeratosis were present (Figure-2). Similar changes were also present in both feet (Figure-3).

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X-rays of the hand and feet revealed bilateral, asymmetrical, fusiform soft-tissue swelling, erosive changes and new bone formation in the distal joints, "pencil-in-the-cup" appearance, sub- luxation of the right second metacarpophalangeal joint and joint-space narrowing in the interphalangeal joints (Figure-4). Results of the routine haematologic and biochemical profiles were unremarkable. His rheumatoid factor was negative.

He was advised NSAIDs, retinoid and narrow-band ultraviolet-B (NB-UVB) phototherapy. The skin lesions responded well but the relief in joint pain was not adequate. The patient is on follow-up visits. Biological agents and surgery were not considered because of financial constraints of the patient and the systemic steroids were avoided because of possible rebound of the skin disease upon withdrawal.

DISCUSSION:

Five main clinical patterns of psoriatic arthritis have been identified; distal interphalangeal (DIP) predominant, symmetrical polyarthritis (≥ 5 involved joints), asymmetrical oligoarthritis (≤ 4 involved joints) and monoarthritis, predominant spondylitis, and arthritis mutilans[4]. The diagnosis of psoriatic arthritis is easy in the presence of typical skin lesions, however it can also be made in absence of skin lesions using Classification of Psoriatic Arthritis criteria. Arthritis mutilans (AM) has been described in association with a wide variety of arthropathies, including rheumatoid arthritis, psoriatic arthritis, juvenile idiopathic arthritis, systemic sclerosis and Systemic lupus erythematosus[5]. Bruzees et al published a case series of arthritis mutilans and presented a literature review of the last decade[6]. They documented 120 cases of psoriatic arthritis mutilans (age range 34-71 years), all from the Americas, Europe and New Zealand. This does not suggest that such complications of psoriatic arthritis do not occur in developing world (particularly Africa, Middle East and Asia). It only indicates a low rate of reporting and documentation from these areas. The duration of psoriasis ranged from 10-52 years and of the arthritis mutilans from 0.3 to 30 years. Most of them were managed with DMARDs

(disease-modifying antirheumatic drugs) while only few (7 cases) were given etanercept.

Arthritis mutilans is an aggressive form of arthritis featured by extensive erosion and destruction of small joints of hands and feet. The resulting finger and toe disfigurements impair the patients' functional capacity[6].

The development of PsA is significantly associated with the duration of arthritis and involvement of DIP joints.

Local corticosteroid injections and non-steroidal anti-inflammatory drugs are recommended in milder forms of PsA. Leflunomide and methotrexate are usually the first choice in peripheral psoriatic arthritis[7]. Biological therapies with tumor necrosis factor-α (TNF- α) blockers should be employed if active psoriatic arthritis fails to adequately respond to one or more of DMARDs, or if the patient has active, predominantly axial disease. Arthritis mutilans does not respond to the traditional DMARDs, however, TNF-α blockers, have shown improvement in resolution of bone and joint destruction and improvement in functional capacity in patients with Arthritis mutilans. It has been suggested that these might be more effective than methotrexate in management of PsA[8]. Nevertheless, decision to use biological therapies depends on patient's comorbidities, preferences and affordability[9,10].

CONCLUSION:

Arthritis mutilans is the most aggressive and disabling form of PsA. In patients where methotrexate fails, Tumour necrosis factor α blockers can be the treatment of choice. However, keeping in view the high cost of biological agents, this might not be a feasible option for most of the patients with PsA in developing countries like Pakistan. Therefore in order to prevent permanent joint damage, early recognition and treatment of PsA are critical.

Figure 1: Hands showing psoriatic lesions, synovial thickening of MCPs, dactylitis, boutonnière and swan neck deformities in both hands

Figure 2: Nail pits, onycholysis and nailbed hyperkeratosis in finger nails.

Figure 3: Psoriatic skin lesions, nail changes and arthritis mutilans in feet.

Figure 4: Radiological changes in both hands suggestive of arthritis mutilans

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LETTER TO EDITOR

Effect of Exercise on Anxiety and Depression

Humera Waqar[1], Aisha Qamar[2]

To,
The editor,

The phrase, sound mind in a sound body was at first used by Homer in ancient Greece[1]. Today anxiety and depression have become one of the most common disorders, not only in the developed world but also in Pakistan. They represent a significant component of the global burden of disease, and are proposed to become the second most common cause of disability by 2020[2]. Research on depression and anxiety has shown that physical exercise is a newer modality to improve mood and decrease anxiety. For mild to moderate depression, the effect of exercise parallels psychotherapy as well as pharmacotherapy. Even for severe depression, exercise appears to be a valued adjuvant therapy to the conventional medical treatment[3].

At present the mechanisms by which regular exercise helps to relieve depression and anxiety are not completely understood. However, some biological pathways have been suggested; e.g., by releasing endorphins, increased central norepinephrine neurotransmission, changes in the hypothalamic adrenocortical system and increased secretion of atrial natriuretic peptide, as well as serotonin synthesis and metabolism, all of which make the person sure of ones' self. It also has a psychological aspect, as it diverts one's attention off worries so individual gets away from the cycle of negative thoughts which aggravate depression and anxiety[4,5].

There are certain limitations which do not allow us to benefit fully from the fact that physical activity elates mood and inculcates the feeling of well being in people. In a study done on a large sample size including 19,288 participants, from 1991–2002, has shown that overall prevalence of exercise participation (with a minimum of 60 minutes weekly at 4 METs (Metabolic Energy Expenditure Index) was 51.4%. Exercise participation strongly decreased with age from about 70% in young adolescents to 30% in older adults[6]. This shows that the age group which more often presents with mood disorders, needs to be motivated more.

In conclusion, physical exercise is a pleasant and enjoyable activity which improves the quality of life. There is no better 'drug' to help eliminate depression, and suppress anxiety than exercise. Even half hour a day will go a long way.

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Describe your selection of the observational or experimental subjects (patients or laboratory animals, including controls) clearly. Identify the age, sex, and other important characteristics of the subjects. Identify the methods, apparatus (give the manufacturer's name and address in parentheses), and procedures in sufficient detail to allow other workers to reproduce the results. Identify precisely all drugs and chemicals used, including generic name(s), dose(s), and route(s) of administration. For randomized clinical trials provide information on all major study elements, including the protocol (study population, interventions or exposures, outcomes, and the rationale for statistical analysis), assignment of interventions (methods of randomization, concealment of allocation to treatment groups), and the method of masking (blinding). Authors submitting review manuscripts should include a section describing the methods used for locating, selecting, extracting, and synthesizing data. These methods should also be summarized in the abstract. All studies must be approved by the relevant Ethics Committee/Institution Review Board of the respective institutions.

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Emphasize the new and important aspects of the study and the conclusions that follow from them. Do not repeat in detail data or other material given in the Introduction or the Results section. Include in the Discussion section the implications of the findings and their limitations, including implications for future research. Relate the observations to other relevant studies. Link the conclusions with the goals of the study.

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List all contributors who do not meet the criteria for authorship, such as a person who provided purely technical help, writing assistance, or a department chair who provided only general support. Financial and material support should also be acknowledged.

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Majority of the references must be from last five years. Local references must also be included. Vancouver style should be followed. Examples are:

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b) Organization as author

The Cardiac Society of Australia and New Zealand. Clinical exercise stress testing. Safety and performance guidelines. Med J Aust 1996; 164: 282-4

c) No author given

Cancer in South Africa [editorial]. S Afr Med J 1994;84:15

d) Chapter in a book

Phillips SJ, Whisnant JP. Hypertension and stroke. In: Laragh JH, Brenner BM, editors. Hypertension: pathophysiology, diagnosis, and management. 2nd ed. New York: Raven Press; 1995. p. 465-78

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		2. Review Unstructured (150)	3-6	3000-3500	40-60	4	2
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2017

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