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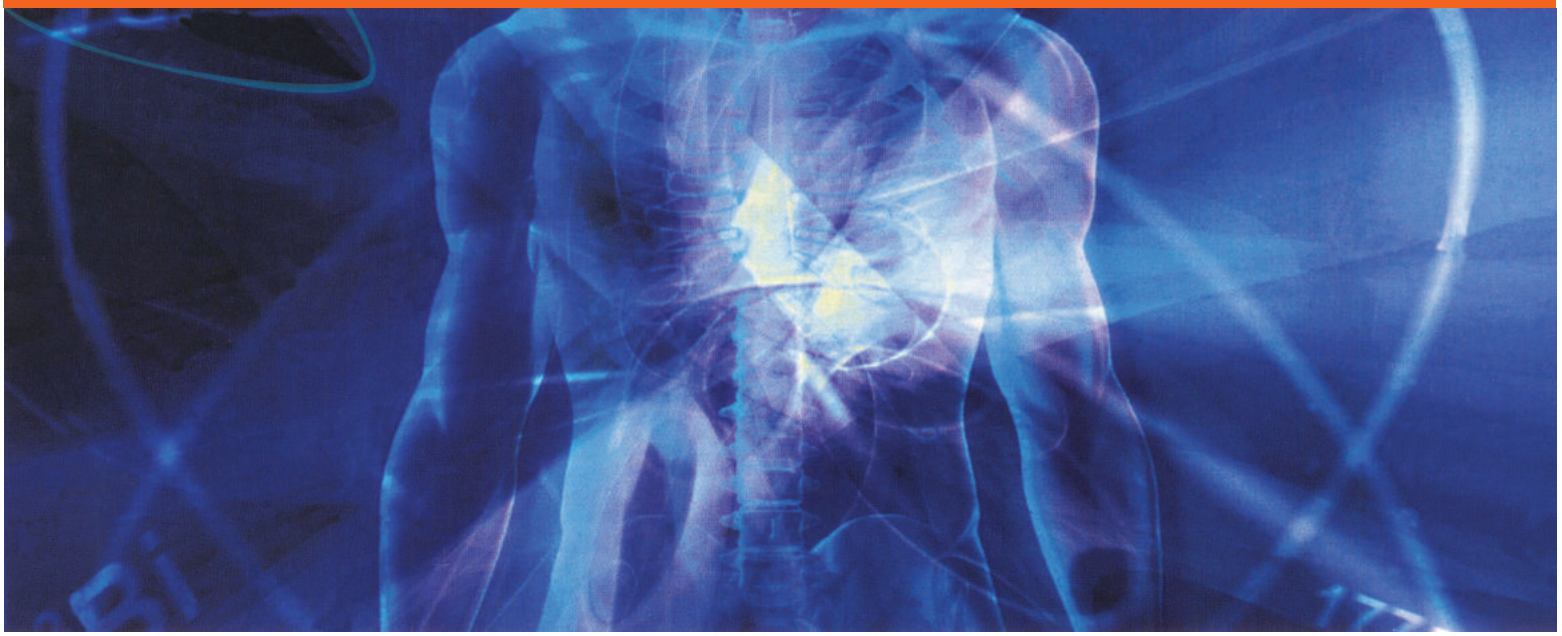

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EDITORIAL

Lead & Triple Cs- Children, Candies and Chocolates

Nasim Karim

Whether it is a matter of birthday, passing an exam, Eid, marriage ceremony or any matter of celebration in our lives, without candies and chocolates it appears as if picture is without colors or a flower is without fragrance. Especially when it comes to children without candies and chocolates life appears incomplete. Children, candies and chocolates together make triple "Cs" and are interwoven like threads in a piece of cloth.

Lead is a naturally occurring heavy metal. A wide range of adverse effects could be induced in human beings depending upon the dose and time period of lead exposure.[1] Along with other heavy metals as cadmium and mercury, lead has no biological role.[2] It is considered a highly poisonous metal that can affect almost every organ and system in the body. The component limit of lead is documented as 1.0 µg/g. This represents the daily intake of lead an individual should have maximally. It is said that even at this low level, a prolonged intake can turn out to be dangerous and hazardous.[3] Exposure to lead occurs primarily through ingestion, to a lesser extent through inhalation and occasionally by direct contact also.[4]

Foods, drinking water, lead paints, chocolates, candies are some of the sources that expose children. Children are more soft and sensitive targets to the effects of lead in comparison to adults.[5] Children may suffer from learning disabilities resulting in a decreased intelligence known as decreased IQ, attention deficit disorder, behavior issues, nervous system damage, speech and language impairment, decreased muscle growth, decreased bone growth, kidney damage, abdominal cramps, constipation, sleep disturbances, headache etc.[6]

Problem is produced as heavy metals interact with essential metals and if, their metabolism is similar then they interfere with these essential metals, such as lead interacts with calcium in the nervous system and zinc present on heme enzymes.[7,8] It acts as a calcium mimetic agent and crosses blood brain barrier. It then causes degradation of neuronal sheaths, interferes with neurotransmission routes, and decreases neuronal growth.[9] Heavy metals as lead can interact with proteins, DNA and RNA and can affect or even stop their normal metabolism. They can also interact with unknown compounds thereby changing the physiologic processes.[10] Harmful effects of heavy metals in the body when they are consumed above the recommended limits, are known as bio-toxic effects. They are categorized as acute, chronic, sub-chronic, neurotoxic, carcinogenic, mutagenic, teratogenic etc., depending upon their presentation.[11]

Epidemiological studies have documented that concentration of lead in blood even less than 5mcg/dL may cause subclinical problems related to cognition in young children exposed to this metal. Central nervous system in developing fetus and young children is well recognized as the most vulnerable target. Lead acts by blocking incorporation of iron into porphyrin IX. It also increases fragility of red blood cell membrane and thereby reduces their survival time. In this way lead can predispose to various types of anemia like normocytic, microcytic, hypochromic etc depending upon its concentration in blood.[12]

Devi and colleagues in India have recently highlighted that children are vulnerable to heavy metal contamination through consumption of candies and chocolates. Analysis by flame atomic absorption spectrometry has revealed an average concentration of Zn, Pb, Ni, and Cd to be 2.52±2.49, 2.0±1.20. 0.84±1.35, and 0.17 ± 0.22 µg/g respectively with cocoa-based candies at the top of the list. They have recommended that content of candies and chocolates should be monitored on regular basis especially for lead because children are very fond of both candies and chocolates and they are the ones highly susceptible to their adverse effects.[13]

"As You Sow", a California-based health watchdog group in USA have documented in their recent survey that some chocolates contain 9 times the daily amount of lead. They analyzed fifty samples of different types of cocoa and found that more than half of them had lead and cadmium, and that too in levels exceeding the limits mentioned in California's guidelines. This includes Cadbury's Royal Dark Mini Eggs and Royal Dark Chocolate Bar, Godiva's 72% and 50% cacao dark chocolate, and Hershey's Special Dark chocolate.[14]

In food products, maximum limit as recommended by Food and Agricultural Organization (FAO) and by World Health Organization (WHO) for lead is 0.1ppm. Whereas analyses of forty six samples of flavored candies collected from whole sale markets of Karachi, showed a mean lead concentration of 1.9627. These candies are being sold openly at cheap affordable rates in low income areas of city particularly outside the schools, in small shops of residential areas and in the nearby markets.[15]

Unsafe storage conditions, improper raw materials, food additives, type of wrappers, ink used for packaging, metal contamination by utensils used during the preparation of candies and chocolates are factors promoting high level of heavy metals specifically lead in candies and chocolates.[13,14]

The problem has been pointed out by the researchers around the globe. In the developed countries branded

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stuff is involved or we can say rightly that FDA and governmental guidelines are followed strictly, even then this big flaw has happened. Conversely it is reverse in our part of the world. In developing countries as Pakistan we probably are facing this menace double folded as branded chocolate stuff is not alone exposing our children but a great chunk is being added by the non-branded stuff that is available freely at low cost to our population without any proper regulatory procedure.

The point to ponder is any C of the Triple Cs-Children, Candies and Chocolates, is not detachable from the other two. Measures should be taken to keep all these "Cs" together in a good manner without compromising the health of the children.

Awarness among the community must be disseminated through print and electronic media regarding the use of only approved/ stamped candies and chocolates. Government, regulatory authorities, manufacturers, health care providers all should work together to build up and implement a system in true letter and spirit to safeguard our future generations.

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REVIEW ARTICLE

Nonstandard Shift Work and Subsequent Health Hazards : A Review

Surriya Jabeen

ABSTRACT:
Present age has moved into twenty four hours a day; seven days a week economy. Concept of 24-hour economy is based on the pattern of work; that for a given work, eight-hour working day can be carried out at any time during twenty-four hour day/night period, which is achievable by shift work (routine method being three shifts of eight hours each per day). According to international labor organization, shift work is defined (1990) as placement of an employee in schedule where workers succeed one another at job, hence the management can function more than the hours of work. The other term often available in 24-economy is shift sharing, and flexi-time. Over the years scientific research has been focused to explore relationship between organism and its environment to establish link between disease and man-made environment. The current review has addressed how de- synchronized physiological rhythm could lead to human pathophysiology by un- standardized shift work.
Keywords: Shift work, Circadian rhythm, Sleep, Health hazards, Metabolic disease

INTRODUCTION:

The knowledge that effect does not depend on a single cause, but rather diseases are multifactorial in origin, resulted in wide spread interest towards preventive aspect, and concentrated research studies focusing all those questions which directly or indirectly have influence on health and well being of an individual. Scientific research has been trying to appreciate the measures to reach the goal of prevention rather than treatment. In the recent years, there is a growing concern on job related injuries such as the effect of de- synchronized sleep rhythm on health of an individual as observed in shift workers[1,2,3].

The social environment of an individual influences sleeping at different time and organizes daily activities during the light/dark cycle (Day/Night)[4,5,6] which illustrates complexity of current life style, more heightened in rotating shift workers. The disaccord between social time and biological rhythm of the body in rotatory shift work results in a state when the body systems misalign the physiological norms, irregular meal time and hormonal control important to maintain the hemostasis in body[7]. Major progress has been made in understanding the physiology of circadian rhythm in humans with focus on "what is the time in brain". The fundamental pacemaker or the biological clock is the Suprachiasmatic nucleus (SCN) in the anterior hypothalamus. Sleep/wake rhythm in the human body is controlled by this endogenous clock[8,9,10,11]. The oscillatory signal of biological clock is sent to metabolic systems via the efferent system from the SCN[12]. SCN coordinates all the cellular circadian clocks as expression of ion channels throughout the body tissue which completely follow circadian principle[13]. Similarly Heart rate variability (HRV) operates according to circadian rhythmicity as evidenced in morning-evening fluctuation, the lowest heart rate being observed in the morning, consequently physiological rhythm in the body is maintained[14,15].

Present life style has increased the need of rotating shift work and as for now prevalence of shift work has increased in both developed and developing countries[16]. In recent years, studies are channelizing circadian rhythm functioning from health perspective, leading to multiple disorders, one of which is Shift work disorder (SWD) observed in those people who work during normal sleep hours[17]. Human body is not meant for 24/7 work. This type of life style and health do not complement each other, instead there is degeneration[18,19]. The pathological response such as metabolic syndrome(Met S); diabetes, hypertension and hyperlipidemia have been observed in conjure to the circadian stress of unnatural sleep schedule and irregular feeding time[20,21,22].

METHODOLOGY:

To observe the effect of shift work on Health, detailed medical literature search was made using multiple electronic data base like Pub Med, Google Scholar, Science direct. Extensive search was made in particular to those articles having a circadian component as their major substance. Inclusion criteria was studies involving only human subjects, published in English, in peer reviewed journals from 1994 to 2016. Abstract, editorials, commentaries and conference proceeding were excluded.

Different combination of key words were used to meet the relevant terms, starting from broader term and then confining it to the desired key word. The rationale of this article was to examine nonstandard shift work and its effect on health outcomes. Multiple research work was available internationally on this subject, however, insignificant work was available locally. Present search was able to identify 1000 articles, however it was shortlisted to 120 articles because of work duplication, some were not directly related to aim of the study, and others were based on animal models. Again 61 studies were removed since these articles did not incorporate

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shift work as a key element of the study. Finally 59 articles were selected and included in this review.

LITERATURE REVIEW:

Shift work and sleep:

A common disorder presently defined in circadian sleep science is called shift work disorder (SWD)[23,24]. This is a response of the body to mismatch endogenous rhythm and exogenous social time. Shift work sleep disorder (SWSD) is defined as the "report of difficulty falling asleep, staying asleep, or non-restorative sleep for at least one month" and it must be associated with "a work period that occurs during the habitual sleep phase"[25]. Employees working non-standard shifts observed to be sleep deficient were often more fatigued which subsequently effected work efficiency and increased vulnerability to errors and accidents. The symptoms reported from nonstandard shift workers with poor sleep quality were mostly somatic, such as headache, epigastric discomfort, neck and back pain, chronic fatigue, etc, which were eventually effecting their home life and triggering family conflicts. There was convincing evidence that sleep length in split shift workers was shortened by 2 -4 hours[26]. Out of all the sleep stages, reduction was most evident in stage 2 and REM, however the slow wave sleep which comprises of Stages 3 and 4 was seldom affected. To assess the effect on sleep latency in nonstandard shift workers, it was observed that sleep latency was increased as compared to morning shift, and was decreased in night shift workers[27,28]. Present life style has contributed to 24-hour-economy at the cost of disturbed sleep pattern. Presently sleep deprivation has touched an epidemic magnitude. The prevalence of sleep deprived population was reported to be 25% [29].

Shift work and Obesity:

WHO defined obesity as abnormal or excessive fat accumulation which may impair health. Various studies have depicted direct relationship between sleep pattern and weight gain[30]. Currently it became mandatory to evaluate the environmental contribution to increased weight[31]. Body mass index (BMI) is a practical indicator which incorporates weight and height (Kg/M2). If BMI ascended or descended from recommended ideal range, it was found to be related to diseases. Certain inappropriate practices were observed in shift workers like smoking[32]. However mostly their life style was due to the nature of jobs, resulting in irregular feeding habits, inability to participate in sports related activities etc. Moreover, the consequences of abnormal interaction of natural biologic cycle and behavioral cycle (feeding/fasting) was associated with altered appetite and hunger at wrong time of day/night cycle[33].

Shift work and gastrointestinal symptoms:

Multiple studies had established link between shift-work and gastrointestinal symptoms, resulting in disordered digestive enzymes and acid-alkaline balance. Prior studies had established these disorders with sleep pattern and it was found to bear positive relation with the last night sleep[34]. Another research observed that Shift-work should be considered as risk factor for duodenal ulcer, as it was shown that ulcer-genic ability of H-pylori infection was potent in infected shift workers[35]. A research conducted in Iceland determined that nurses who were engaged sixteen hours in a day/night shift had more severe gastrointestinal symptoms[36].

Shift work and neuropeptides:

Orexin is one of the hypothalamic neuropeptide which is essential in regulation of sleep/wake cycle along with its pivotal role in energy metabolism. In adolescents, raised level of orexin had been found with weight reduction. Orexin deficiency seen in sleep disorders, like narcolepsy was found to be associated with increased body weight. If the release of orexin was affected as in shift work, it was invariably found to be associated with obesity[37]. Importance of orexin signaling in energy metabolism and sleep was indicative of its control over other physiological processes in human body. The neuropeptide has significant role and assistance of central inflection of sleep, activity and energy metabolism[38].

Shift work and gut peptide :

Altered biological rhythm due to altered environmental signals (shift work) and metabolic strain, effect neuro-hormonal control of hunger and satiety, and subsequently influence energy balance which is routed by central mechanisms collaborating inhibitory hypothalamic stimuli of appetite control by adipose tissue (Leptin). Prior studies have observed influence of circadian oscillation and sleep on leptin circulatory level[39]. Appetite regulating peptide from lower and upper gut with its significant role in obesity and metabolic dysfunctions namely Ghrelin had been observed to increase during fasting and its level tends to fall following meal. Leptin level was decreased in sleep restriction, concurrently it was negatively correlated to Ghrelin. Therefore circulatory level of ghrelin which is an appetite stimulant is increased suggesting that sleep restriction can increase apatite[40].

Shift work and Lipid metabolism:

Prior research had shown that feeding at night time tends to elevate LDL/HDL ratio[41]. Human body is not meant for nocturnal feeding. Several studies had reported elevated serum triglycerides and decreased HDL levels in shift workers than in fixed day workers. In addition, many prospective studies have evaluated association between shift work and coronary artery disease[42]. Some studies have linked shift work and lipid metabolism as a risk factor for hypercholesterolemia[43].

Shift work and cancer:

The international agency for research on cancer (IARC), a constituent agency of WHO (2007), related

circadian disruption with breast cancer. It was established that night shift work is a risk factor for this malignancy. With this new concept, multiple studies were conducted on this subject and positive relation was established. It was realized that chronic chronodisrupton was a long term factor associated with the risk of breast cancer and it was evidenced as an occupational disease[44,45]. Night shift work (NSW) increased the risk of breast cancer by 1.9% for 5 years, 2.5% for 5–10 years, 7.4% for 10–20 years, and 8.8% for >20-years. Additionally, rotating NSW enhanced the morbidity of breast cancer by 8.9%[46].

Shift work and metabolic dysfunction:

Circulating currency in the blood is in the form of ATP, which is the energy body derived from various macronutrients after they are broken to smaller units. Metabolic syndrome characterizes group of risk factors which are metabolic in origin, and are forerunner and interconnected to serious outcomes in an individual[47]. One proximate study which was conducted keeping duration of shift work as one of the variable, comprising of 4 groups; one who never worked, other worked for one year, next group for 10, and ≥ 20 years. The findings suggested elevated all ratios for Met S in both gender workers after 10 years of shift work and demonstrated a gender difference on the relationship between shift work and Met S[48]. Earlier research had determined dissimilarities in the development of Met S between men and women shift workers[49]. Another study discovered that Chinese males got increased frequency of Met S and its constituents complications, and faster development of Met S[50]. Another study concluding that stroke, cardiovascular diseases and metabolic disorders were more prevalent in rotating shift work, has questioned the concept of occupational health and safety which were established issues that jeopardize worker health[51].

Shift work and mental health:

According to WHO, mental health is a state of complete well-being in which person recognizes his or her own capabilities, can handle normal stresses of routine life and is productive to the community. Many studies had suggested that de-synchronization of circadian rhythm contributed to many chronopharmacologic alterations such as depression[52]. Depression may manifest differently in individuals, however, identification is based on the presence of a distinct change in mood (sadness or lack of pleasure) accompanied by change in appetite and activities, including decreased energy, psychomotor retardation or agitation, weight loss, change in sleep wake cycle, and depression rumination or thought of suicide for at least 2 weeks[53]. Cortisol, commonly described as stress hormone is secreted by adrenal cortex which is vital for life. Normally diurnal oscillation of cortisol is higher in the morning and gradually decreases by evening. However alternate response of adrenal cortex is the result of environmental stress[54]. Daily emotions are related to cortisol[55]. Multiple studies have established relationship between shift work and depression[56].

Shift work and stress:

Stress is the response of the body to any situation that is threatening, frightening or exciting, however, this stress may be positive "Eustress" or it may be "Distress" which is unpleasant to the mind. Over the years, our knowledge on shift work and health grew exponentially. A series of findings began to identify harmful psychological effects of shift work, consequently it became mandatory to address the stress as a risk factor responsible for multiple diseases, for instance to find the mechanism to establish a causal relation between shift work and cardiovascular disease (CVD)[57]. Human body in response to stress produces more catecholamines to prepare the body to flight and fight. These hormones increase heart rate, blood pressure and blood glucose level. If the person remains unable to cope with this state, the catecholamines remain permanently elevated[58]. One prior study aimed to find relationship between shift stress and abortion. The Danish National Birth Cohort examined whether shift work, or job stress correlated with late fetal abortion. They had concluded in the findings a higher fetal loss in women working night shifts accompanied by habitual smoking[59].

CONCLUSION:

Present research has concluded that disturbed sleep pattern due to shift work has serious consequences. Relevant strategies should be planned based on circadian principles to minimize the adverse effects of unconventional shift system. Clockwise (morning, evening, night) rotation is favorable rather than counterclockwise, since delaying sleep time is easier as compared to advance sleep time, which elucidates that morning shift should enter to evening, and evening merges in night shift and then night workers should rotate to morning work.

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ORIGINAL ARTICLE

Knowledge of Hepatitis B Infection among Dental Students and Dental Professionals

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ABSTRACT:

Objective: This research was aimed at evaluating the knowledge of transmission, diagnosis, vaccination, and post-exposure prophylaxis of HBV among dental students, dentists and paramedics.

Methodology: A randomized cross-sectional study was conducted at Bahria University Medical & Dental College, Karachi with a sample size of 240 subjects from February to March 2016. Self-administered questionnaires were distributed to assess different parameters regarding knowledge about Hepatitis B infection. Dental students, dentists and paramedic staff participated in the study.

Result: The response rate was 65.8%. Out of 158 individuals, 39(25%) were males and 119(75%) females. The difference in knowledge of males and females was insignificant ($p>0.01$). The respondents obtained a mean correct answer of 6.94±2.59 out of 17. Dental students obtained mean correct score of 5.84±2.59, 5.84±2.26, 7.92±1.91, 7.35±2.66 in 1st, 2nd, 3rd and final year BDS respectively. The mean score for correct answers in dental professionals was 6.94±2.59. The knowledge difference among students of 1st, 2nd, 3rd and final year and Faculty/ Paramedic was significant ($p < 0.01$).

Conclusion: The overall awareness regarding hepatitis B infection was found to be lacking. This underlines the need for more emphasis on the said topic in current BDS curriculum and conducting more refresher CDE sessions for dental professionals as an effort to limit the spread of infection.

Key words: Hepatitis B, Post-exposure prophylaxis, Vaccination, Dentists

INTRODUCTION:

Hepatitis B, world's leading liver infection is caused by a double stranded DNA Hepatitis B virus (HBV)[1]. From 2 billion people in the world infected with HBV, 400 million are suffering from chronic HBV infection[1,2]. Pakistan is highly endemic with HBV with 4.5 million infected people and approximately 7-9 million carriers with a carrier rate of 3-5%[3,4].

Hepatitis B infection poses a major health concern, since it is the most common blood borne viral infection. It is 50–100 times more infectious than HIV[5]. It places health care workers, medical, and dental professionals at high occupational risk[6]. The routes of transmission of HBV include un-screened blood transfusion, re-use of contaminated needles/IV drug use, un-sterilized dental/medical instruments, sexual intercourse, and vertical transmission from mother to child during pregnancy[7].

In dental setting, the most common mode of transmission from infected patient to dentist is through needle stick injuries[8,9]. However, it may also spread from inoculation of infected blood, saliva, or gingival crevicular fluid on broken skin[9,10].

Clinically, Hepatitis B may present as asymptomatic carrier state, acute self-limiting infection or hepatic failure, or chronic hepatitis with progression to cirrhosis, and hepatocellular carcinoma[11,12]. According to a WHO report of July 2017, an estimated 257 million people are infected with hepatitis B virus (defined as hepatitis B surface antigen positive). Furthermore, hepatitis B resulted in 887 000 deaths, mostly from complications including cirrhosis and hepatocellular carcinoma in 2015.[13]

Numerous studies have been conducted worldwide in order to assess the knowledge of Hepatitis B among health care workers, dental practitioners and dental students. Global literature showed varying degrees of awareness from poor to moderate among the dental students without difference of knowledge according to the gender[14,15,16].

The degree of knowledge regarding Hepatitis B increased with successive years of dental programs[17]. According to a study published in 2011, health care professionals and general population in some areas of Pakistan had high HBV prevalence, more than 5% and there is an urgent need of mass vaccination and awareness programs[4]. Studies have shown that the risk of exposure for dentists is about three to four times greater than

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general population as compared to non-immunized surgeons who have about six times higher risk[18]. In Pakistan, however, only few researches assessed the extent of knowledge regarding availability of post-exposure prophylaxis[19].

The knowledge of Hepatitis B infection is indispensable for all dental students. They actively participate in community outreach programs in 2nd year BDS, and start working in dental OPD from 3rd year. Thus, they are at a constant risk for contracting HBV. The awareness of paramedic staff regarding HBV also holds prime importance in limiting the spread of disease. The aim of this study was to assess the level of awareness regarding transmission, diagnosis, immunization, and post-exposure prophylaxis of Hepatitis B infection among dental students and professionals; to compare gender differences in knowledge of Hepatitis B infection and to compare differences in knowledge of dental students and professionals.

METHODOLOGY:

This randomized cross-sectional study was conducted at Bahria University Medical & Dental College, Karachi after approval from Ethical Review Committee from February 2016 to March 2016. Self-administered questionnaires were distributed to assess the knowledge regarding diagnosis, transmission, immunization and post-exposure prophylaxis of HBV infection. The sample size was set at 240 subjects by convenience sampling technique. The study population included dental students of BDS 1st, 2nd, 3rd and final year, practicing dentists, dental teaching faculty and paramedics. Participation from subjects was voluntary. Informed consent was obtained from participants.

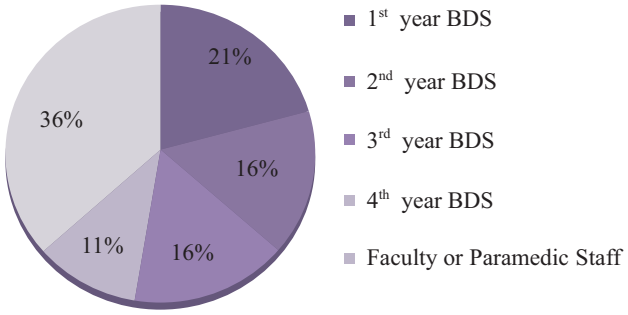
A modified questionnaire[5] was distributed among all participants of the study. It was a close-ended self-reported questionnaire having at least three options for every question. The questionnaire consisted of 17 questions regarding diagnosis, transmission, immunization and post-exposure prophylaxis of Hepatitis B infection. A portion was given for the demographics and designation in college. Participants were instructed to use their prior knowledge and take no external help to answer the questions which ensured minimal respondent bias.

Analysis was performed using SPSS version 16. Frequencies and percentages were calculated for categorical variables like Gender and Year of Study. Mean and standard deviation were calculated for continuous variable like mean knowledge score. A score of "1" was given to every correct answer and "0" for every wrong answer. Independent Samples t test and one way ANOVA were used to compare the mean difference in knowledge score between different groups at 1% level of significance. Post hoc comparisons using Tukey HSD test were then done to verify the results of ANOVA at 5% level of significance.

RESULTS:

A total of 240 questionnaires were distributed, and 158 were received with a response rate of 65.8%. Out of 158 individuals, 39(25%) were males and 119(75%) females. The percentage of students from each class, faculty members and paramedics is shown in Figure-1.

FIGURE-1: Pie Chart Showing Percentage of Study Participants



Males and females scored mean correct answers of 7.15±2.97 and 6.88±2.46 respectively. The comparison of mean score between difference in level of knowledge in males and females was found to be insignificant (Table-1). The mean scores obtained by the students, as well as faculty members and paramedical staff is also shown in Table-1.

Table-1:
Knowledge score of participants with respect to the demographic characteristics

Variable	Mean±SD	P-Value
	6.94±2.59	
Gender		
Male	7.15±2.97	0.572
Female	6.88±2.46	
Year of Study/Profession		
Ist Year	5.84±2.59	
2nd Year	5.84±2.26	
3rd Year	7.92±1.91	
4th Year	7.35±2.66	0.001*
Faculty or Paramedic Staff	6.94±2.59	*p<0.01

The knowledge of participants regarding transmission of HBV, its incubation period, the duration for which HBV can survive outside body, disinfectant recommended for HBV contaminated surfaces, management of needle stick injury, blood test to be done in the patient following a needle stick injury, timing for

HBsAg test, post-exposure prophylaxis in an non-vaccinated individual, dosing schedule for Hepatitis B vaccination, when to check the post-vaccination titre for evaluation of vaccination success, the timing of booster dose and knowledge about the protocol that should be followed in case the vaccination fails to raise the antibody titre to the required level is shown in table-2.

Table-2 Distribution of Respondents' Knowledge

Questions	Correct answer N(%)	Incorrect answer N(%)
Can HBV be transmitted from an asymptomatic /carrier state?	108(68.4)	50 (31.6)
Do you know HBV has 50-100 times higher ability to cause infection than HIV?	69(43.7)	89 (56.3)
Is the risk of transmission of HBV through infected blood higher than infected saliva?	117(74.1)	41 (25.9)
Is the risk of transmission of HBV through aerosols high?	59(37.3)	99 (62.7)
Can HBV transmission occur whilst it is in the incubation period in the body?	46(29.1)	112 (70.9)
What is the incubation period of HBV ?	31(19.6)	127 (80.4)
For how long can HBV survive outside the body?	36(22.8)	122 (77.2)
What is the recommended disinfectant for cleaning environment surfaces after a blood spill?	52 (32.9)	106 (67.1)
After a needle stick injury, what is the first measure a dentist should take?	86 (54.4)	72 (45.6)
In case of needle stick injury to a dentist, which blood test should be done in the patient who was being treated?	71(44.9)	87 (55.1)
In case of needle stick injury to dentist, for how long should he wait to get blood tested for detection of HBV surface Antigen?	40(25.3)	118 (74.7)
If an unvaccinated individual is exposed to HBV, what should be the prophylaxis?	49 (31)	109 (69)
Is it necessary to get immunized against HBV even if proper infection control and sterilization are carried out?	135(85.4)	23 (14.6)
What is the ideal dosing schedule of Hepatitis B vaccination?	61 (38.6)	97 (61.4)
When should post-vaccination antibody titer (body response to vaccine) should be checked?	44(27.8)	114(72.2)
If an individual does not respond to initial vaccination course, what should be done?	94 (59.5)	64 (40.5)
When is a booster dose required as per WHO criteria?	49 (31)	109 (69)

The mean score for overall sample was found to be statistically significant, as an analysis of variance (ANOVA) yielded significant knowledge difference among students of 1st year, 2nd year, 3rd year, final year and Faculty/ Paramedic (Table-3).

Table-3: Diifference in Knowledge between and among the groups determined by ANOVA

ANOVA

T-SCORE

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	115.787	4	28.947	4.703	.001
Within Groups	941.808	153	6.156		
Total	1057.595	157			

Post hoc comparisons using the Tukey HSD test indicated that the knowledge score of First year and 2nd year students significantly differed from students of 3rd year ($p<0.05$) and Faculty/ Paramedic ($p<0.05$). However, the difference in knowledge score of Final year students as compared to other groups was not statistically significant (Table-4)

Table-4
Post hoc comparisons using Tukey HSD test indicating the differences in knowledge between respondents.

Multiple Comparisons

Dependent Variable: TSCORE
Tukey HSD

(1) Year	(J) Year	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
1st Year	2nd Year	.00848	.65784	1.000	-1.8075	1.8245
	3rd Year	-2.07152*	.65784	.017	-3.8875	-.2555
	4th Year	-1.50446	.74069	.256	-3.5492	.5403
	Faculty or Paramedic Staff	-1.66876*	.54098	.020	-3.1622	-.1753
2nd Year	1st Year	-.00848	.65784	1.000	-1.8245	1.8075
	3rd Year	-2.08000*	.70175	.029	-4.0172	-.1428
	4th Year	-1.51294	.77995	.301	-3.6661	.6402
	Faculty or Paramedic Staff	-1.67724*	.59360	.042	-3.3159	-.0386
3rd Year	1st Year	2.07152*	.65784	.017	.2555	3.8875
	2nd Year	2.08000*	.70175	.029	.1428	4.0172
	4th Year	.56706	.77995	.950	-1.5861	2.7202
	Faculty or Paramedic Staff	.40276	.59360	.961	-1.2359	-2.0414
4th Year	1st Year	1.50446	.74069	.256	-.5403	3.5492
	2nd Year	1.51294	.77995	.301	-.6402	3.6661
	3rd Year	-.56706	.77995	.950	-2.7202	1.5861
	Faculty or Paramedic Staff	-.16430	.68427	.999	-2.0533	1.7247
Faculty or Paramedic Staff	1st Year	1.66876*	.54098	.020	.1753	3.1622
	2nd Year	1.67724*	.59360	.042	.0386	3.3159
	3rd Year	-.40276	.59360	.961	-2.0414	1.2359
	4th Year	.16430	.68427	.999	-1.7247	2.0533

*.The mean difference is significant at the .05 level.

DISCUSSION:

A multitude of researches can be found on knowledge, attitude and practices regarding Hepatitis B infection in medical students, health care workers and general public. Few studies have been designed solely on the assessment of dental students' knowledge on this important disease. Although many studies have been done in our region but these were inconclusive because of varying results, which could be explained by cultural diversity and lack of uniform educational system. The mean knowledge score was analyzed to be poor since the subjects were able to answer approximately 6 questions correctly out of 17 questions. This was similar to the study conducted in Iran where mean score was 14.3 out of 44[20]. The results also concur with study in India where only 59.7% were aware of the HBV infection[5] and in Iraq where only 41% had the knowledge regarding HBV infection[21]. Moreover, a study on medical students in Karachi to evaluate knowledge, attitude and practice regarding Hepatitis B concluded the results to be significantly low (57.1%), at par with our knowledge score[22]. Another study in Sudan showed that students had poor knowledge and awareness, particularly about HBV compared to AIDS[23]. Other studies speculate on the findings which indicated moderate to good knowledge[24]. In a study conducted by Sain et al, results showed 81.55% and 94% were correct on their knowledge about transmission and vaccination[25]. Another study in Iran presented a mean knowledge score of 51.45 ± 3.16(out of 63) which indicated good knowledge[15]. Another study had results similar to our conclusion[26]. Three questions in the questionnaire were formulated to assess the knowledge on transmission, and they were answered with variegating responses. The subjects

possessed a fairly good knowledge for the transmission in carrier state and via infected blood but were largely unaware that the HBV can be transmitted in its incubation period[26]. A study by Shigri et al also observed the lack of knowledge regarding transmission in incubation period[27].

The relationship between year of study and level of knowledge was found to be significant which suggested that the first year had poor knowledge as compared to third and final year BDS. This can be explained by the incorporation of topics related to viral infections in the curriculum and more clinical exposure in later years. This was in line with a study done on 300 medical students in Lahore Medical and Dental College[28] which suggested that with successive years of dental education, the knowledge increased. In our study, the knowledge score of Faculty and Paramedic staff was lower than that of dental students. The low score could be attributed to grouping paramedic staff with dentists, as former are usually less qualified in our country. Another study[29] showed insufficient knowledge in auxiliary and paramedic staff. This emphasized the rationale of this study which was to arrange continuing educational programs for dental students, dentists and paramedic staff, crucial to reinforce personal protection, vaccination, and post-exposure prophylaxis protocols in the dental setting. The questions related to immunization, prophylaxis, and booster dose were not answered satisfactorily. A study by Gayathri et al[30] also pointed out the misconceptions in the sample population related to vaccination, prophylaxis and treatment of HBV. A study in Nigeria[31] explained that the respondents had good basic knowledge of HBV infection owing to the awareness programs organized by different authorities but lacked deeper knowledge and understanding regarding HBV infection and HBV immunology.

The limitations of our research were the lack of inclusion of proper assessment tools for evaluating the practice of infection control protocols among dental students, low sample size and response rate. The merging of paramedical staff with dentists might have also affected the knowledge score as the former group in Pakistan mostly does not receive formal degree in the field.

CONCLUSION:

The overall awareness regarding hepatitis B infection was found to be lacking. This underlines the need for putting more emphasis on the said topic in current BDS curriculum and conducting more refresher CDE sessions for dental professionals as an effort to limit the spread of infection.

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CONFLICT OF INTEREST:

There was no conflict of interest.

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ORIGINAL ARTICLE

Prevalence of Xerostomia in Healthy Individuals

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ABSTRACT:

Objective: To determine the prevalence of Xerostomia in apparently healthy individuals.

Methodology: This prospective cross sectional study was conducted on persons accompanying the patients at Medical and Dental OPD of Muhammad Medical College, Mirpurkhas in collaboration with Liaquat University of Health Sciences (LUMHS) Jamshoro from January 2016 to July 2016. 156 patients visited and the accompanying persons were 3015. Only adults were included and 915 patients consented to participate. Standardized questionnaire regarding demographic details, systemic diseases, use of drugs, and cigarette smoking was filled. Fox questionnaire was used to confirm Xerostomia. The data collected was analyzed by SPSS version 22. Qualitative variables were expressed as number and in percentage.

Results: Among nine hundred and fifteen participants, age range was 21-65 years. The mean age was 47±7.6years, those above 30 years were 813 (88.9%), whereas under 30years were 102 (11.1%). Xerostomia was more common in persons above 30 years and difference between two age groups was statistically significant. In our study, 317 (34.6%) gave history of tobacco consumption as cigarettes or gutka or pan. Out of 915 patients, 508 (55.5%) had systemic diseases. Out of these 508 only 387 (76.1%) were taking medications. A significant association of Xerostomia with drug intake was seen.

Conclusion: The frequency of Xerostomia in apparently healthy subjects was high and alarming. Predisposing factors were age, female gender, systemic disease, use of drug and tobacco consumption.

Keywords: Xerostomia, Systemic illness, Drugs, Tobacco consumption, Frequency

INTRODUCTION:

Xerostomia is not an uncommon condition. It is a subjective sensation of dry mouth. The dryness is due to reduced or absent saliva. It could be a symptom or side effect of radiation or drugs, common in old age and affects about 20% elderly[1]. Normal salivary function is mediated by M_3 (Muscarinic Receptors). After stimulation of oral mucosa, signals are transmitted to salivary nuclei in medulla. These nuclei are also influenced by cortical input due to taste, smell, anxiety and depression. The efferent nerves are cholinergic and increase salivary secretions[2]. The increased incidence in women could be due to the menopause, and also because of depression which is common in women[3].

The saliva has defensive role in oral environment and decreased salivary secretions predispose to increase risk for oral diseases. Saliva has multiple functions. These include transportation of nutrients and digestive enzymes, lubrication of oral cavity, re-mineralization of teeth; it also helps in chewing and swallowing. Many studies have reported that 1 in 5 people have Xerostomia, but there is increased prevalence in elderly[4].

Symptoms of dry mouth are variable. They may be mild in the form of discomfort, or severe, interfering with dietary intake and quality of life[1]. It also has antimicrobial action due to the secreted immunoglobulins which adhere and inhibit growth of viruses and bacteria[5]. It also facilitates speech and taste and if there is loss of salivary gland function, it leads to dysguesia that is altered taste[6]. Sjogrens syndrome is an autoimmune disorder in which there is Xerostomia and xeropthalmia[7]. It is also seen in diabetes[8]. Radiation and chemotherapy also cause Xerostomia, especially radiation of head and neck[9].

Xerostomia is a subjective feeling of dry mouth[6]. Saliva has a critical role in digestion, lubricates bolus of food while swallowing, cleans oral cavity and has a buffering capacity for acids in food and those produced by microflora in plaque. Inadequate production of saliva will lead to caries and candidiasis, and loss of tooth structure due to abrasion and erosion[10].

Oral health is much more than just healthy teeth. It affects looks, socialization, as well as physical and psychological wellbeing. Patients should be inquired about dryness of mouth on routine dental checkup, as this problem can affect their quality of life. There is an increased risk for periodontitis in such patients. Adequate research has not been done in our set up to find the prevalence of this important disorder, so this study was undertaken to find its frequency in apparently healthy individuals, and then to find cause and preventive measures for its control.

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METHODOLOGY:

This prospective, cross sectional study was conducted on persons accompanying the patients at Medical and Dental outpatient departments of Muhammad Medical College Mirpurkhas in collaboration with Liaquat University of health sciences Jamshoro from January 2016 to July 2016, after approval from Ethical Review Committee of the institution. The persons accompanying the patients were initially screened by asking them about history of dryness of mouth; whether it is always, frequently or never. Those who answered in affirmative for first two questions were selected, written consent was taken and questionnaire was explained to them. Fox questionnaire[11] translated into Urdu and Sindhi was filled in.

About 10,156 patients visited the OPD and attendants were 3015. 915 subjects consented to participate. Male or female attendants who were more than 18years of age were selected for the study. Pregnant females or patients with a history of radiotherapy were excluded. Xerostomia was diagnosed by history of dryness and confirmed by questionnaire. Demographic details regarding age, sex, smoking habits, consumption of pan or gutka, systemic diseases, and medicine was recorded. The data was analyzed by SPSS version 22. Independent variables were expressed as number and in percentage.

RESULTS:

Among 915 participants, age range was 21-65 years. The mean age was found to be 47±7.6years. 813 out of 915 (88.9%) subjects were above 30 years of age and difference between two age groups was statistically significant i.e. ($p<.0001$). 317 (34.6%) gave history of tobacco consumption as cigarettes, gutka or pan.

Out of 915 patients 508 (55.5%) had systemic diseases including thyroid disease, anxiety, diabetes mellitus, HIV, Hepatitis C infection, or autoimmune disease such as Sjögren's syndrome. 407 had no systemic diseases. Out of these 508, only 387 (76.1%) were taking medication, while 121 (3.9%) did not take treatment. There was a significant association of Xerostomia with drug intake. The Fox[11]questionnaire included following questions:

Q-1: Does your mouth feel dry when eating a meal?

Q-2: Do you sip liquids to aid in swallowing dry foods?

Q-3: Do you have difficulties swallowing any food?

When Fox questionnaire was analyzed, 57% responded in positive to any one question of the questionnaire. 43% had any of the symptoms, where as 3.2% gave positive answer to **question no-1.** 27.9% gave positive answer to **question no-2.** 1.2% gave positive answer to **question no-3.** 15.8% gave positive answer to **question no-1 & 2.** 0.9% gave positive answer to **question no-1 & 3.** 4.3% gave positive answer to **question no-2 & 3.** 12.5% gave positive answer to **question no-1, 2&3**.

DISCUSSION:

Xerostomia affects mainly older population and the range is 12-47%[12]. The prevalence is 10% in people in their early thirties[13]. Drugs used for systemic diseases have been identified as major risk factor[14]. Xerostomia is related to oral-health-related quality of life[15]. The role of saliva is protection against bacteria and fungi. It also re- mineralizes teeth due to its calcium and helps in chewing food, swallowing and speech. Xerostomia predisposes to halitosis, soreness of mouth, difficulty in swallowing, and altered taste[16].

The prevalence of Xerostomia is variable as has been found in various studies. In England it was found in 12.7% of patients[17]where as, in our study it was 55.5%. This could be due to high environmental temperature, decreased intake of water, and consumption of pan and gutka. In Scandinavian countries, the incidence of Xerostomia ranged from 0.9-64.8%[18,19]. A study in Iran reported increased prevalence in elderly people i.e., 38%; our study also showed high occurrence in elderly (88.9%). Another study reported Xerostomia in 55%[18].

In our study, 61.3% women reported Xerostomia and this number was higher than men. Studies from Saudi Arabia and Japan reported similarly whereas other studies reported opposite and found male predominance[18,19,20]. In a study by Orellana et al, no difference was found in prevalence of Xerostomia in men and women[21].

Studies by Porter et al[14] and Borges et al[22] concluded that cigarette and tobacco predispose to dryness of mouth. Smoking or oral tobacco consumption predispose to Xerostomia, this is also reported by other studies[23,24].

Xerostomia and presence of systemic diseases go hand in hand because systemic diseases are main cause of Xerostomia and use of medicine due to illness exacerbates it. In our study, 49% had systemic disease and 73% used drugs; a positive correlation was seen. In our study, the commonly used drugs were anti-hypertensive, oral hypoglycemics, analgesics and antidepressants[25,26,27], this was also reported by Thomson et al[28].

CONCLUSION:

The study concluded that Xerostomia is common in our community, with a predisposition in females, elderly individuals, those having systemic illness and using drugs, and tobacco consumers. Owing to its prevalence, management should be multi- disciplinary, by involving physicians to alter the medication, patient education and life style modification. Masses should be educated about effective removal of plaque with twice daily tooth brushing, flossing and use of mouth washes.

LIMITATIONS

We were unable to determine the quantity of saliva; both un- stimulated and stimulated saliva flow, consistency, pH, ability to buffer acids and level of bacteria. Sialography could not be done due to lack of resources.

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ORIGINAL ARTICLE

Association of Liver Histology with Serum ALT Levels in Patients with Chronic Hepatitis C

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ABSTRACT:
Objective: To evaluate the incidence of liver damage based on grading of necro-inflammatory and fibrotic changes on hepatic cytology in patients suffering chronically with hepatitis C, presenting with alanine transaminase levels in normal ranges.
Methodology: A cross-sectional survey was accomplished at department of medicine, PAF Hospital Mushaf, Sargodha for six months of duration from April 2012 to October 2012. 100 cases were evaluated. Liver biopsy was done using large bore sure cut biopsy needle under all aseptic measures after ultrasound marking and sent in 10% formalin for histological studies of inflammation and necrosis. Liver damage was declared for patients having grade 1 or more activity on METAVIR scoring system.
Results: Majority of the patients were between 31-40 years of age and lowest age was 20 years. Average age of the patients was 33.2±7.4 years. Out of 100 patients, 47 patients (47.0%) were male while remaining 53 patients (53.0%) were females. Liver damage was found in 41.0% patients.
Conclusion: Liver biopsy should be performed for a clear diagnosis in patients suffering from HCV with alanine transaminase level within the normal ranges. Patients may suffer advanced hepatic disease despite normal levels of hepatic enzymes.
Keywords: Liver histology, Chronic hepatitis C, Normal alanine transaminase

INTRODUCTION:

Hepatitis is a disease that has been with us for a long time. It is contagion that damages the Liver. Many of the patients suffering from chronic hepatitis C have tenaciously ALT levels in normal ranges[1]. The virus accountable for the disease is typically evident in the blood by polymerase chain reaction (PCR) test within a month after being infected. The antibodies that are produced in response of viral infection are usually evident within a month to one and a half year. Eradication rates of Hepatitis C virus are extremely inconsistent; upto 60 percent[2] of the patients remove the virus from their blood at some stage in acute phase, as revealed by normal levels of the liver enzymes Transaminase Alanine and Aspartate Transaminase. Though, many of the time infection is persistent[3] and the majority of patients get chronically ill, i.e., infection is long-lasting over half a year[4,5]. Although liver enzymes levels commonly keep up a correspondence with the commotion of the ailment, even a normal stage could not leave out a grim histological damage. Therefore, these facts should remind the physician to perform a liver biopsy prior to therapy[6]. Reasons that have been accounted for the progression of the disease embraces increasing age, males are more prone to the disease, utilization of alcohol, subjects infected with human immunodeficiency virus (HIV), and fatty liver. Mild chronic hepatitis patients with slow or absent progression to cirrhosis suffers chronically with the disease and usually have doggedly normal ALT blood levels, though cirrhosis is can be observed in few of these patients[7]. However, Fibro test and Acti test estimate hepatic fibrosis and extent of necrotic inflammation[8]. In the study carried out by Syed and Sadiq at Jinnah Post Graduate Medical Centre Karachi in 2009, it was accomplished that elevated ALT blood levels are allied with more evident forms of necroinflammation and hepatic fibrosis. Though it was also established that severity of disease cannot be predicted using ALT levels as some patients with normal ALT levels had grade1 activity whereas others had severe necroinflammatory disease which supports the fact that liver biopsy is required to discover the complexity of liver. [9] When patients suffering from chronic hepatitis C were tested extensively; nearly half of the patients had normal serum ALT levels. The diagnosis of chronic hepatitis C should be confirmed by testing for HCV RNA. The existence of HCV RNA shows that the patient is currently suffering from viral infection regardless of normal ALT levels. While another study done by Sanai et al in Riyadh Military Hospital Saudi Arabia it was observed that none of the hepatitis C patient with normal ALT had normal liver histology[10]. The objective of this study was to find out the incidence of hepatic damage assessed following the METAVIR system in patients with hepatitis C with normal ALT

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levels. Previous studies have shown differences in degree of damage and ALT levels.

METHODOLOGY:

This was a cross sectional study conducted at department of medicine, PAF Hospital Mushaf, Sargodha. Study was carried out over a period of six months from April 2012 to October 2012. Data comprised of 100 patients selected via non probability convenient sampling. Sampling error was calculated to be 10%. Liver damage was assessed using METAVIR scoring criteria. Inclusion criteria comprised of patients presenting to the OPD with chronic hepatitis C during the study duration. Diagnosis was confirmed using HCV RNA levels and anti HCV antibody +ve for more than 6 months, ALT less than 40 U/L and Patients of both genders, age between 18- 60 years were included in the study. Subjects with previous history of therapy like interferon for treatment of the disease (treatment non-responders), Pregnant women and lactating mothers, Hepatitis BsAg positive, patients with History of Chronic hepatic disorders like Autoimmune hepatic disorders, hepatocellular carcinoma and Alpha1 Anti Trypsin deficiency, a platelet count less than 100 x 10^9/L or Prothrombin time (PT) more than 3 seconds of control were excluded from the study design.

100 Patients fulfilling inclusion/exclusion criteria were enrolled after informed consent from Medical OPD of PAF Hospital Mushaf, Sargodha. Demographics like Name, gender, age & address was noted. Then liver biopsy was done by the researcher herself using large bore sure cut biopsy needle under all aseptic measures after ultrasound marking and sent in 10% formalin for histological studies of inflammation and necrosis in PAF hospital Mushaf laboratory by single histopathologist, effect modifiers were controlled by following exclusion criteria. All the patients had a biopsy sample compatible with chronic hepatitis C as assessed by the METAVIR scoring system (grades the stage of fibrosis on a five-point scale, F0 = no fibrosis, F4 = cirrhosis, and histological activity on a four-point scale,A0 = no activity, A3 = severe activity). Liver damage was declared for patients having grade 1 or more activity on METAVIR scoring system and report of histopathology was gathered. SPSS version 16 was used to analyze the data. A Descriptive statistical analysis was executed. Data on continuous variables was reported as mean±standard deviation like age and METAVIR score and data on categorical variables like gender, Liver damage (Yes/No) were presented as frequency and percentage.

RESULTS:

100 Patients fulfilling inclusion/exclusion criteria were examined in this study. Age of majority patients was between 31-40 years and the lowest age reported was 20 years. Mean age of the patients was 33.2±7.4 years (Table 1).Out of 100 patients, 47 patients (47.0%) were male while 53 patients (53.0%) were female. Frequency of liver damage was based on grading of necroinflammatory and fibrotic changes on liver histology in Chronic patients, presenting with normal ALT was 41.0% (Table 2).

Table:1

Distribution of cases by age

Age in Years	Incidence of the disease	Percentage
< 20	3	3
20-30	30	30
31-40	41	41
41-50	18	18
51-60	8	8
Total	**100**	**100**

Table: 2

Distribution of cases by sex and Liver Damage

Sex	**Number**	**Percentage**
Male	47	47
Female	53	53
Liver damage	**Number**	**Percentage**
Yes	41	41
No	59	59

DISCUSSION:

Hepatitis C virus (HCV) is a globally prevalent pathogen and a leading cause of death and morbidity.[11] The most recent estimates of disease burden show an increase in sero-prevalence over the last 15 years to 2.8%, equating to >185 million infections worldwide.[12] About 10 million of the inhabitants are affected with the disease in Pakistan[13]. The adult personnel, patients with haemodialysis or blood transfusion are mostly affected with the disease[14]. The major diagnostic tool is hepatic biopsy in Elevated serum ALT (eALT). On the other hand, now days, a few hepatitis C patients may be seen cirrhotic regardless of normal enzyme levels (ALT). In fact ALT levels are commonly variable, revealing that ALT levels in normal ranges may not exactly be a sign of the course of the hepatitis. The efficacy of rise of serum ALT levels in forecasting of severity of hepatic damage in chronic patients is questionable[15]. A study found that 5% of patients with normal ALT levels had cirrhosis and 3% had bridging fibrosis [16]. As the usefulness of serum ALT levels in predicting the severity of Hepatitis C virus infection is uncertain so we aim to compare histological scoring of liver pathology in patients with chronic HCV infection with normal or elevated serum ALT. Previous studies have shown that Hepatitis C can be found with elevated serum ALT or with normal serum ALT[17]. Histological evaluation of hepatic biopsy specimens is the important way for measuring fibrosis[18]. There is no association of HCV RNA and serum ALT levels and degree of hepatic injury in individual persons. Liver histological assessment is necessary for the clinical assessment of patients suffering chronically with the disease [19].

Mc Cormick in his study observed that there was no patient having normal ALT levels in grade 3 and 4 fibrosis[19]. Significant fibrosis has been reported, with large variation among studies, when inclusion criteria and length of base line follow up was different[20]. Studies have shown AST/ALT ratio increased with liver histological progression. The ratio ≥1 was predominantly in cirrhotic patients[21].

In present study frequency of liver damage based on grading of necroinflammatory and fibrotic changes on liver histology in chronic disease patients, having ALT levels in normal ranges was 41.0%. Some studies have suggested that up to 25% of patients with chronic hepatitis C virus infection have persistently normal aminotransferase levels (10% to 40%, according to different studies). [22,23,24] Another study showed that approximately 30% of patients with chronic hepatitis C have normal serum alanine aminotransferase (ALT) levels and another 40% have ALT levels that are less than twice the upper limit of the normal range[25]. Few studies have shown mean viral load significantly higher in chronic HCV patients with persistently normal ALT levels[26].

CONCLUSION:

In conclusion, liver biopsy is suggested for a clear diagnosis in patients suffering from HCV with alanine transaminase level within the normal ranges. Patients may suffer advanced hepatic disease inspite of having normal levels of hepatic enzymes.

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ORIGINAL ARTICLE

Evaluation of Neurobehavioral Effect of *Citrullus Lanatus* Juice on Albino Mice

Nuzhat Sultana[1], Shahid Ali[2]

ABSTRACT

Objective: To observe the effect of Citrullus lanatus var. lanatus on albino mice model of anxiety and depression.

Methodology: This experimental study was done in the Pharmacology department of Karachi University for a period of 02 months from 5th February-9th April 2016. Watermelon (Citrullus lanatus var. lanatus) was used. Animals were randomly assigned into 4 groups A, B, C and D (n=10). Group A was control (normal saline). Group B was treated with Citrullus lanatus juice in a dose of 3 ml/kg, Group C was given 6 ml/kg of juice. Two drugs (Diazepam and Fluxetin) were used as standard and given to group D animals. All doses were administered orally. Level of anxiety and depression among animals was tested by light/dark box test and forced swim test. Data was analyzed statistically.

Results: Animals treated with Citrullus lanatus juice showed marked reduction in anxiety which was evident from results of light/dark box test while forced swim test revealed no effect on depression.

Conclusion: Citrullus lanatus contains important natural anti-oxidants like lycopene and vitamin C which prevent injury to vital organs like liver, heart and brain from toxic effects of reactive oxygen species. Arginine in Citrullus juice is also precursor of neurotransmitters like γ-Aminobutyric acid (GABA) and glutamate. These results showed that Citrullus because of its components like arginine played an important role in maintaining normal neurological function and ameliorated anxiety and depression.

Keywords: Anti-anxiety effect, Anti-depressant effect, Citrullus lanatus, Diazepam, Fluoxetine.

INTRODUCTION:

Medicinal plants have a significant role in pharmacological research as well as for drug developers. Presently beneficial constituents of plants are used as therapeutic agents directly, as well as utilized by pharmaceutical companies to form active compounds of drugs. More and more plants must be preserved to ensure their availability in future as it is the only way by which essential plants can be conserved[1].

Plants play a very important role in prevention and treatment of diseases due to their medicinal effects, and are being used globally for this purpose[2,3]. Fresh fruits and vegetables are very important food components and they cannot be removed from diet. It is the ability of human body which can adapt itself physiologically for different types of food[4]. Fruits and vegetables yield less amount of energy, that's why they are beneficial for weight management, but they are also sufficient source of fibres, vitamins and minerals[5].

Egusi watermelon, West African watermelon, Egusi melon, Desert watermelon, and cooking melon are different names of Citrullus lanatus[6]. It belongs to the family Cucurbitaceae[7]. Total amount of energy derived from 100gm of watermelon is 30 kcal. 92% content is water, 7.55% consist of carbohydrates which can be further divided into sugar (6.2%) and dietary fiber (0.4%). It contains low calories because it is cholesterol and fat free[8,9]. Citrullus lanatus juice also contains important amino acids, 71% of which include Arginine and Citrulline[10]. Citrullus lanatus juice also contains many beneficial components such as flavonoids, alkaloids, glycosides, polyphenols, steroids and tannins which produce beneficial effects on body[11].

Arginine, an amino acid, is an essential component of Citrullus lanatus juice. Three important end products are usually derived from catabolism of arginine, each of which acts as cell signaling mediator and includes nitrous oxide (NO), Glutamate and Agmatine. GABA mainly regulates ion channel and is derived from glutamate[12].

Anti-anxiety drugs work by elevating GABAnergic neurotransmission in brain which is the mode of action of most anxiolytic drugs[13]. One-eighth population worldwide is affected from anxiety, that's why in the research field of psychopharmacology, it has gained significant attention[14,15]. There are many drugs used for treatment of stress and anxiety but they have adverse effects too[16].

It is also believed that GABA and cortical GABA-A receptors are deficient in depressive patients. So, drugs which elevate or stimulate GABAnergic system have important impact on depression[17]. It is evident from some studies that deficiency of GABAnergic transmission can result in depression[18]. However, little work has been done in this regard. With this background, this study was undertaken to observe the effects of Citrullus lanatus on anxiety and depression in experimental animals.

METHODOLOGY:

This experimental study was conducted in the research institute of pharmacology department,

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University of Karachi from 5th February 2016 to 9th April 2016 for 2 months. Watermelon (Citrullus lanatus) was purchased from the local fruit market. Sample was taken when it was available in fresh state for experimental analysis. Fresh watermelon juice was prepared on daily basis with the help of muslin cloth.

Mice having weight ranging from 20 to 25gram were used for this study. They were kept under standard laboratory conditions. Free access to water and food was permitted. They were kept in wired gauzed plastic cages in animal house in the Pharmacology department of Karachi University. They were acclimatized for 1 week before the start of administration of Citrullus lanatus juice orally, and kept on standard mice pellet. Animals were randomly assigned in groups A, B, C and D, with 10 animals in each group.

Group A was marked as control and was given normal saline. Group B was treated with 3 ml/kg of Citrullus lanatus juice (CLJ 3 ml/kg), Group C was treated with 6 ml/kg Citrullus juice (CLJ 6 ml/kg)[19]. Two drugs were used as standard and were administered to group D. All doses were administered orally. Group D was further divided into two subgroups; D1= Diazepam 1mg/kg[20] and D2=Fluoxetine 20 mg/kg[21]. Neurobehavioral studies were carried out on 7th, 15th, 30th, 45th and 60th day by light/dark box test and forced swim test. The results of the treated groups were compared with control group after taking mean of all values. Significance of mean was determined by Tukey's post-hoc test. P-value less than 0.05 was considered as significant.

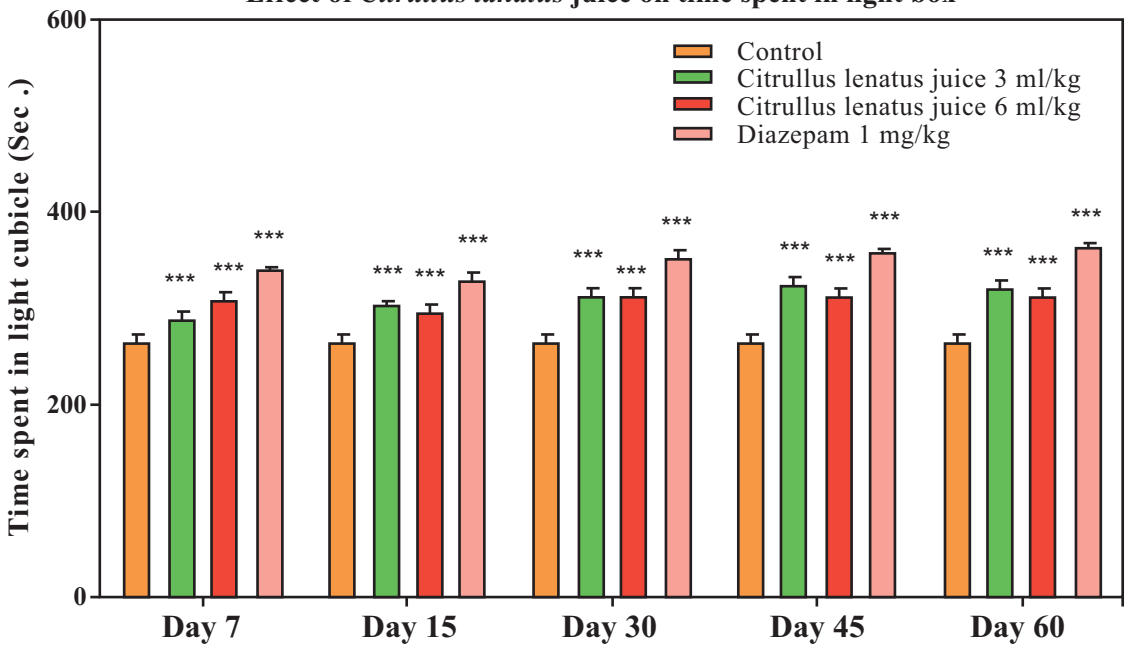
RESULTS:

Light/Dark Box Test: A significant contrast was seen in light/dark box test between four gatherings of mice, in time spent in light box area by one-way ANOVA ($F_{3, 16}=51.32$, $P < 0.001$)and time consumed in dark cubicle ($F_{3, 16}=31.42$, $P < 0.001$) where F was the variation between the groups. Tukey's post-hoc test determined that time spent in light cubicle area was significantly increased in treated groups (CLJ 3 ml/kg and CLJ 6 ml/kg) when compared with the control group (Figure-1a). Whereas, time spent in the dark cubicle was significantly reduced when compared with the saline-treated control group (Figure-1b). Animals after 07, 15, 30, 45 and 60 days of Citrullus lanatus treatment showed significant time consumed in light cubicle and reduced in dark cubicle.

Forced swim test: A significant difference was observed among four groups of mice in immobility time, i.e., time during which mice did not show any struggle ($F_{3, 12}=782.8$, $P<0.001$) in forced swim test, by one-way ANOVA, where F was the variation between the groups. Tukey's post-hoc test indicated that there was insignificant effect on immobility time in treated groups B and C when compared with the saline-treated animals (Figure-2). However, difference was significant among the treated groups and the standard drug group.

Figure-1a

Effect of *Citrullus lanatus* juice on time spent in light box



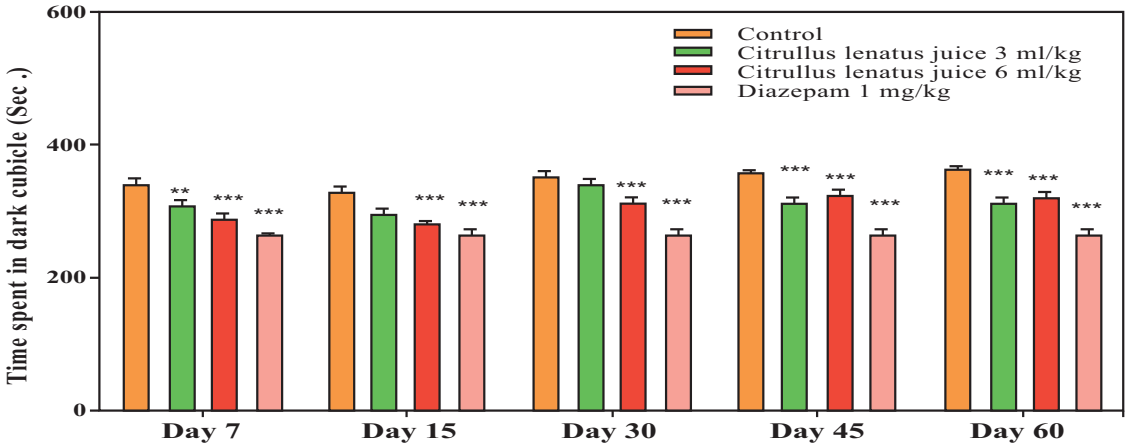
Number of mice per group (n) = 10.

Perceptions written as mean ± S.E.M

$^{***}P < 0.001$, $^{**}P < 0.01$, $^{*}P < 0.05$; ANOVA took after by Tukey's test.

Figure-1b

Effect of *Citrullus lanatus* juice on time spend in dark box



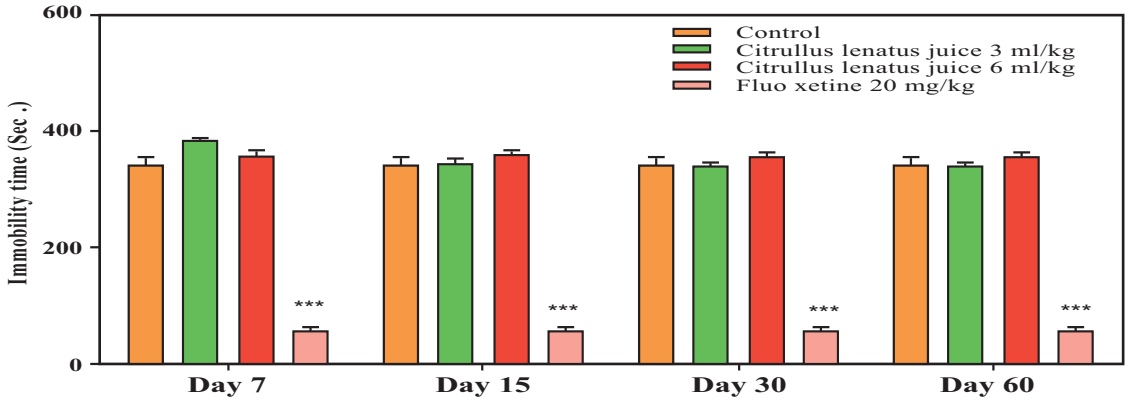
Number of mice per group (n) = 10.

Perceptions written as mean ± Standard error of mean.

***P < 0.001, **P < 0.01, *P < 0.05; ANOVA took after by Tukey's test.

Figure-2

Effect of *Citrullus lanatus* juice on immobility time



Number of mice per group(n) = 10.

Perceptions written as mean ± Standard error of mean.

***P < 0.001, **P < 0.01, *P < 0.05; ANOVA took after by Tukey's test.

DISCUSSION:

All medicines have adverse effects, although they can be mild. Even newly discovered drugs have some side effects despite being expensive. Medicines obtained from plants are efficient and less expensive with less side effects[22].

Citrulus lanatus has been used as a herbal medicine for some diseases such as hypertension, erectile dysfunction, jaundice and hepatomegoly[23].

Light/dark box test was used to evaluate anxiolytic effect of *Citrullus lanatus* as compared to control and standard drug groups. It was evident from results that *Citrullus lanatus* juice treated groups showed significant time spent in light box as compared to control group, whereas time spent in dark box reduced markedly. It was thus clear that *Citrullus lanatus* juice possessed anxiolytic activity. As mentioned earlier Arginine is present in its juice in sufficient amounts, which is precursor of GABA neurotransmitter and raised levels of GABA in brain have anxiolytic effect. Anxiolytic drugs act by increasing GABA activity or GABAnergic neurotransmission in brain as reported[13]. Arginine-derived raised GABA levels might be the reason of anxiolytic effect as long term use of *Citrullus* juice significantly increased the time

utilized in light box and reduced in dull box.
Depression in animal models can be well evaluated by Forced swim test. Reduced amount of GABA and GABA- A receptors in brain are connected with depression and drugs which resemble GABA nergic system have effects on depression as mentioned above[17]. It is also evident from some studies that GABAnergic deficiency can lead to depressive state as already mentioned above[18], Tannins and flavonoids present in *Citrullus lanatus* juice can lead to depressive state[24, 25]. Results obtained from forced swimming test revealed that long term use of *Citrullus lanatus* juice had no significant impact on depression, as it might be the result of tannins and flavonoids present in its juice, which could cause depression in CNS neutralizing the anti-depression action of GABA, thus no significant effect occurred in depression in treated groups when compared with control.

CONCLUSION:
It is concluded that *Citrullus lanatus* juice had excellent anxiolytic effect which was demonstrated by results of light/dark box test, but there was no significant effect on depression.

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ORIGINAL ARTICLE

Identification of Barriers in the Reintegration of Pakistan Military Amputees at the Workplace: A Cross Sectional Study

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ABSTRACT:

Objective: : To identify barriers in the reintegration of Pakistan military amputees at their workplace and to suggest remedial measures.

Methodology:A cross-sectional questionnaire-based study was planned and hospital ethics committee approval was obtained. Two part survey was constructed consisting of demographics and questions about the possible barriers at the workplace. Fifty eight military amputees (20-60 years, with disability class A and B due to major amputation of a limb) were approached and requested to fill in the questionnaire after explaining the rationale and possible benefits of the study. Response rate was 100 %.

Results: All patients were males. Most of the patients had trans-tibial amputation (41). Majority were matriculate and earned between Rs. 20,000- 40,000 (53.4%). All patients were provided with latest modular prosthesis of Ottobock (Germany) and Ossur (USA), free of cost with life time maintenance and replacement by Armed Forces Institute of Rehabilitation Medicine (AFIRM). Majority of the patients could ambulate independently, were confident after provision of prosthesis and were spared by their units for timely follow-up. Major barriers included lack of accessible washrooms in the unit, too much time off-work and lack of confidence even after provision of prosthesis.

Conclusion: Amputee rehabilitation can lead to successful and complete community re-integration. Pakistan Army is providing comprehensive amputee rehabilitation services to those who sustain a limb loss. However, certain barriers can hinder the rehabilitation process and it is important to identify and remove these barriers for better functional outcomes in amputees.

Keywords: Amputation, Pakistan, Military medicine, Barriers, Re-integration

INTRODUCTION:

Amputation is the intentional surgical removal of a limb or body part.[1] It is one of the oldest surgical procedures known to mankind.[2] Pakistan is a front line ally in the global war against terrorism since 2002.[3] More than 6600 security personnel have sacrificed their lives while many more have sustained long term permanent disabilities.[4] The most common major disability sustained in this war against terror is lower limb amputation.[5] Amputee rehabilitation for the War Wounded personals (WWP) in the West started after the world war II,[6] and lead to development of comprehensive programs for the military amputees which deliver a coordinated and advanced rehabilitation services and prosthesis.[7,8] In Pakistan WWP are evacuated to base hospitals (Combined Military Hospital [CMH]) for definitive treatment. Amputees and WWP with major long-term disabilities are then transferred to AFIRM Rawalpindi for rehabilitation services and provision for prosthesis.[2]

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All amputees are assessed on arrival by a multidisciplinary rehabilitation team lead by a physiatrist (Rehabilitation Medicine Physician) and a comprehensive amputee rehabilitation plan is devised with the aim of regaining maximum independence. This includes the recommended steps like preparation of residual limb, identification and management of complications arising from the amputation, exercise plan, psychological counseling, occupational therapy, provision of mobility aids, fabrication of modular prosthesis and gait training.[9] Multidisciplinary teams have better outcomes for prosthetic rehabilitation[10], and a physiatrist is better suited to direct and coordinate the overall care of the suited amputee.[11]

As per the 2012 GHQ policy of retention of WWP in active service, all amputees are given vocational training (a process which aims to equip them with knowledge, know-how, skills and/or competences required in particular occupations ranging from 6 weeks to 3 months)[12] during rehabilitation, according to their disability, physical capacity, education and interest in the field with an aim to make them productive and useful member of the society. Most of them during their stay at AFIRM learn to lead a modified independent life. However, they face several physical and environmental barriers in their workplace when they return to their units. This may restrict and confine them to their homes thus making rehabilitation process ineffective. Therefore, current study was done with an aim to identify barriers in the reintegration of Pakistan military amputees at their workplace and to suggest remedial measures.

METHODOLOGY:

A cross sectional questionnaire based study was planned. Study approval was obtained from Hospital

Ethics Committee of AFIRM, Rawalpindi. AFIRM is a tertiary care military rehabilitation institute, largest of its kind in the country providing multidisciplinary rehabilitation services under physiatrist (rehabilitation medicine specialist) supervision.[13] It is a military institute with 100 bed indoor, setup primarily providing services to the military personnel. Civilians can also avail services by paying the treatment charges.

STUDY QUESTIONNAIRE:

A two-part questionnaire was constructed. First part was demographic information. The second part consisted of questions about the experience and satisfaction of the amputees with the rehabilitation services being provided and the barriers they had faced in the unit and community. In the end, space was provided to describe their experience of living in the unit and community after the amputation. The questionnaire was translated into Urdu language for the Junior commissioned officers (JCOs) and other ranks while the officers filled the English questionnaire.

Fifty-eight amputees fulfilling the inclusion criteria were approached and requested to fill in the questionnaire after explaining the rationale and possible benefits of the study. These included male amputees between 20-40 years, with disability class A and B due to major amputation of a limb. Non-traumatic amputations due to vascular and oncological diseases were excluded as they have a different outcome and ongoing medical needs. We used convenient sampling technique and approached the amputees reporting to the outpatient department of AFIRM as well as those admitted in AFIRM and officers ward of CMH Rawalpindi. There was no officer with amputation admitted in CMH during the study period. Therefore, we approached the amputee officers undergoing various courses at Military College of Signals, Rawalpindi. All participants gave verbal informed consent to participate in the study.

Data was checked for omissions, errors and discrepancies. It was entered in Microsoft excel and analysis was by SPSS V.19. Descriptive statistics were calculated for variables like age, level and site of amputation and answers to individual questions.

RESULTS:

There were fifty-eight amputees enrolled with a response rate of 100%. Some patients did not answer all questions and their responses were excluded from the final analysis. All patients were males. Most of the patients had trans-tibial amputation (41) followed by trans-femoral (11) and upper limb amputation (6). Most were matriculate and earned between Rs. 20,000- 40,000 per month.(53.4%). Demographics of the patients are summarized in Table-1. All patients were provided with latest modular prosthesis of Ottobock (Germany) and Ossur (USA), free of cost with life time maintenance and replacement by AFIRM.

Majority of the patients could ambulate independently, were confident after provision of prosthesis and were spared by their units for timely follow-up. The detailed responses to the barriers in reintegration are described in Table-2.

Table: 1
Basic Demographics

Gender		
•	Males	58 (100%)
•	Females	0 (0%)
Age groups (years)		
•	21-30	44 (75.9%)
•	31-40	10 (17.3%)
•	41-50	4 (6.8 %)
Educational status		
•	Matriculate	35 (60.3 %)
•	High School/ FA/ FSc	14 (24.1%)
•	Graduates	09 (15.5 %)
Level of amputations		
•	Trans-femoral	21 (36.2 %)
•	Trans-tibial	32 (55.2 %)
•	Trans-radial	5 (8.6 %)
Side of amputation		
•	Right	26 (44.7%)
•	Left	28 (48.8%)
•	Bilateral	04 (6.5%)
Socioeconomic status (Salary per month in Rs)		
•	10,000 -20,000	8 (13.8 %)
•	20,000- 40,000	31 (53.4 %)
•	> 40,000	19 (32.8%)
Marital status		
•	Married	33 (56.9 %)
•	Single	25 (43.1 %)
Time since discharge and provision of prosthesis		
•	Less than 1 year	14 (24.1%)
•	1-2 years	05 (8.6%)
•	2-3 years	12 (20.7%)
•	More than 3 years	21 (36.2%)
•	Did not answer	06 (10.3%)

Table-2
Barriers faced by the study respondants

Is your unit accessible/ compatible with your disability?	
• Yes	35
• No	23
Do you have disable friendly washrooms in your unit?	
• Yes	27
• No	24
• Did not answer	07
What is your mobility status?	
• Can walk independently	50
• Can walk with gait aids	05
• Cannot walk	03
Do you feel confident after provision of prosthesis?	
• Yes	30
• No	17
• Did not answer	11
What is the attitude of your unit towards your placement?	
• The unit wants me to stay back in unit	39
• The unit wants me to stay at home on long leaves	02
• It is my decision to stay in the unit or remain on leaves at home	10
• Did not answer	07
Are you spared by the unit for timely follow-up?	
• Yes	47
• No	5
• Did not answer	6
How much leave have you availed after provision of prosthesis?	
• 1-3 months	14
• 4-6 months	15
• 7-9 months	11
• More than 12 months	14
• Did not answer	4

DISCUSSION:

This is the first attempt to objectively document the barriers being faced by WWP with a major amputation in Pakistan military. This is important for a number of reasons. First, amputation is a permanent lifelong disability with no cure available in the current medical practice. Although a comprehensive multidisciplinary rehabilitation allows enhanced mobility but barriers can limit the participation of the amputee in the society and workplace.[14,15] Identification of these barriers can help address these issues and improve the community reintegration of these individuals. More civilians than military personals have lost their lives and suffered from permanent injuries in the last fifteen years as a consequence of participation of Pakistan as a front line ally in the global war against terrorism. There is no central trauma registry or national level plan to collect data on these terrorism-related injuries. The rehabilitation services for civilian amputees in Pakistan are limited and they do not get the comprehensive amputee rehabilitation services as the military veterans. There are only few public centers providing prosthetic rehabilitation services (located in Karachi, Rawalpindi and Peshawar) to the public. Many of the civilians have to go to the prosthetic service providers in the private sector.

Recent advances in the medical care in the battle field, personal protection gear and improved evacuation chain have led to a reduced mortality associated with war wounds.[16,17] At the same time it has resulted in an increased number of survivors with major disabilities like amputations. These amputees can have psychological issues with readjustment in the society and community and this needs to be addressed with multifaceted interventions.[18,19] Apart from the

psychological problems, amputees can have a number of other issues as well. These include skin problems like wounds, abscess, blisters, acroangiodermatitis, allergic contact dermatitis, bullous diseases, epidermal hyperplasia, hyperhidrosis, infections, malignancies and ulcerations.[20,21] Amputees have a higher incidence of different forms of chronic pain like phantom pain, residual limb pain, and back pain.[22,23] Amputees are more prone to develop fear of fall and are at high risk of falls when they start ambulating with the prosthesis.[24,25] This data has been reported mostly from amputees in the West and the developed countries of the world. There is no comprehensive data base established in Pakistan to study amputees and their problems.

All amputees in this study were males as currently only males are employed in infantry and other fighting arms which are performing services in the conflict zones in Pakistan. Majority (75.9%) of the amputees in this cohort were in their 20s. The major barriers identified by the amputees included lack of accessibility, lack of disabled friendly washrooms, and too much time off-work. The negative attitudes faced by some amputees in the unit were reflective of the general negative attitudes prevalent in our society regarding (Persons with disability) PWDs[3] and should not be considered a discriminatory attitude towards these WWP. Similarly the lack of disabled friendly washrooms is a common issue all around the country where barring few newly constructed mega-malls, it is impossible to find a disabled friendly public washroom. More than half of the respondents reported that the unit had either modified or constructed new washrooms keeping in view their disability. Some patients (17/58) were still not confident even after provision of prosthesis. The possible reasons could be reactive depression associated with a major limb loss, fear of rejection by the society and the negative perceptions about amputees in the society.

Other problems identified by the amputees were lack of written instructions and manuals at the time of discharge and lack of structural modifications in unit to make them more accessible.

There are some limitations of the study which warrant mentioning. The study sample was restricted to military veterans which have an excellent support system for amputee rehabilitation and provision of prosthesis. Therefore the results cannot be generalized to other amputees living in the public with lack of access to quality amputee rehabilitation services. We did not correlate the levels of amputations with the barriers faced and the impact of these barriers on the quality of life and well-being of the amputees. This should be explored further. We did not explore the impact of these barriers by detailed interviews. This can be a research topic for a future qualitative study. Some of the amputee despite the reassurance about anonymity of the data did not answer some questions indicating that in the military hierarchy people sometimes are reluctant to express themselves. We did not explore further the reasons for not answering certain questions.

RECOMMENDATIONS:

We recommend following measures at different levels to facilitate successful community reintegration of the amputee of the Pakistan Army.

1. There is need to increase the trained manpower at AFIRM to cater for the increasing load of complex disabilities. In addition, the rehabilitation medicine departments in the peripheral class A CMHs particularly those located in the provincial capitals need a major upgrade. This will ensure that amputees and PWDs all around the country can avail quality rehabilitation services near to their units and homes instead of traveling all the way to AFIRM, Rawalpindi.
2. Standard and duration of vocational training at AFIRM should be enhanced. There is need to the develop department of vocational training on scientific grounds and increase the number of vocational courses being offered.
3. Multidisciplinary team approach including physiatrists for management of major disabilities like Spinal cord injury (SCI), amputations and traumatic brain injury (TBI) should be employed right from the start to reduce the length of stay, reduce complications from long-term immobility and facilitate early mobility and rehabilitation.
4. Final disability at discharge should be assessed not only based on medical diagnosis but functional assessment and mobility. Rehabilitation medicine specialists who specialize in disability assessment should do this task as per WHO model of disability.
5. Counseling and education of family members and care givers of all amputees and WWP must be carried out during the indoor stay and at the time of discharge. They should also be provided clear written instructions in Urdu for follow up plan and home-based exercise.
6. Unit administration and unit comrades should be educated to remove any bias towards the WWP with disability. They must pay special attention to facilitate, support and motivate their WWP and consider the amputees as part of their units. Efforts should be made to reintegrate them back into the units by making work environment disabled-friendly, offering sedentary jobs and tasks not requiring strenuous physical work.
7. Young amputees usually have a long life to live. If they are provided comprehensive and timely rehabilitation services it leads to better and complete re-integration and these young amputees can be a useful productive member of the society. The barriers can restrict their community re-integration and need to be identified and removed.

CONCLUSION:

Main barriers identified by the amputees in this study include lack of accessible washrooms, negative attitudes of the unit comrades toward their disability, lack of written instructions at the time of discharge and too much time off work. It is important to identify and

remove these barriers for better functional outcomes in amputees.

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ORIGINAL ARTICLE

Connotation of Oro-Dental Disorders with Food & Social Customs

Asif Ahmed[1], Kashif Ikram[2], Maaz Asad[3], Hina Masood[4], Muzna Urooj[5]

ABSTRACT:
Objective: To evaluate the existing correlation between Oro-Dental disease occurrences with dietary and social habits among the local dental patients.
Methodology: This 30-day cross sectional study was conducted at Baqai Dental College Hospital Outpatient Clinic, Karachi, using pre- designed questionnaires. During the study, age, gender, types of oral disorders (identified by calibrated dental professional), and dietary preferences were looked. After informed consent and ethical approval, prospective and consecutive data of 115 subjects was collected and 15 were excluded because of inconclusive pathological oro-dental condition.
Results: Oral lesions were reported as dental pain with bleeding, dental pain with swelling, dental pain only or dental pain with both swelling and bleeding. Only 32% participants admitted to consume Naswar/ Chalia and smoking. 21 % patients admitted to consume all types of foods. 67 % were suffering from tooth decay. Naswar/ chalia eaters and smokers presented with pain alone, and pain with swelling. Surprisingly those who claimed vegetable consumption were noted to have more dental decay as well as pain.
Conclusions: This study suggested that in the absence of dominant abnormal social habits and food, suffering from Oro-Dental disorders may be related to poor quality of vegetables, water, host's characteristics or activated HPA axis in the development of pathogenic dental process.
Keywords: Oral Disorders, Naswar, Chalia, Tooth Decay, Oral Diagnosis

INTRODUCTION:

Foods, nutrients, and dietary patterns are found to have direct relation with oral health and lesions[1-2]. Moreover, a known association is present between good oral hygiene and prevention of dental caries[3-4]. The maintenance of good oral hygiene is also dependent on type of food consumption. Various dietary components may contribute to the development of enamel defects (e.g. enamel hypoplasia, fluorosis) and periodontal disease (gum disease), caries and other causes of tooth loss in adults[5,6]. Many western nations consume naturally occurring sweet products such as fruit, honey and jam; but often take lemonades, cola, other soft drinks, and various types of confectionary items as well as smoking[7,8]. This shows that consumption of food intake is influenced by the socio-cultural values of the habitants.

In addition to oral hygiene and diet, oral disorders have strong association with the host's characteristics such as type of saliva and tooth enamel, oral micro flora, bacterial plaque, and may manifest as dental crowding, plaque retention and caries[9-13]. Therefore this study was conducted to examine the existing correlation between Oro-Dental Disease occurrence, dietary, and social habits as possible underlying causes of oral problems among the local population of dental patients visiting the university dental outpatient department.

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METHODOLOGY:

This study was conducted at Baqai Dental College Hospital Outpatient Clinic after ethical approval from the institution. It was cross sectional in design, done by random sampling, using pre- designed questionnaires filled by trained medical personnel. Oro-Dental problems were diagnosed by standardized dental personnel.

During the study, age, gender, types of oral disorders (identified by calibrated dental professional), and dietary preferences were looked. The objectives were explained to all study subjects and verbal consent was obtained. Over 115 patients were evaluated. Participants without conclusive pathological oro-dental condition were excluded from the study. Consequently by using exclusion criteria, 100 patients' data was finalized. Data was analyzed by using SPSS version 20.

RESULTS:

Main oral lesions were reported as dental pain with bleeding, dental pain with swelling, dental pain only or dental pain with both swelling and bleeding. Table-1 shows results of social habits. It showed that 68% patients denied any social consumption like smoking, pan etc. Only 32% admitted to consume such products with predominance of Naswar, Chalia and smoking. Table-2 shows results of types of food consumed. It showed that 21% patients admitted to consume all types of food; whereas 79% claimed to take different patterns of food. 67% subjects were suffering from tooth decay**.** Whereas other oral diagnosis were; oral ulcers, gingivitis and impacted teeth. Naswar/Chalia eaters and smokers presented with pain alone or pain with swelling. Moreover Naswar/Chalia eaters and smokers showed tooth decay. Those who claimed to consume vegetables only were observed to have more dental decay as well as pain with swelling compared to other food consumers. Middle-age group was the main age group suffering from oral lesions.

Table: 1

Percentage assessment of social habits among Patient Population

Social Habits				
Variables	Frequency	Percent	Valid Percent	Cumulative Percent
None	68	68.0	68.0	68.0
Smoking	8	8.0	8.0	76.0
Naswar	9	9.0	9.0	85.0
Chalia	9	9.0	9.0	94.0
Pan/ Chalia	2	2.0	2.0	96.0
Smoking & Naswar	3	3.0	3.0	99.0
Naswar & Pan /Guthka	1	1.0	1.0	100.0
Total	100	100.0	100.0	

Table: 2

Percent presentation about the diversified food choices in patients

Food Choice				
Variables	Frequency	Percent	Valid Percent	Cumulative Percent
All	21	21.0	21.0	21.0
Vegetables only	32	32.0	32.0	53.0
Meat only	5	5.0	5.0	58.0
Junk Foods only	1	1.0	1.0	59.0
Vegetable with Meat	29	29.0	29.0	88.0
Vegetable with Junk Foods	6	6.0	6.0	94.0
Meat with Junk Foods	6	6.0	6.0	100.0
Total	100	100.0	100.0	

DISCUSSION:

The dietary habits, host factors, local oral pathology, and metabolic disorders may be cumulatively responsible for oral insults. The reported data unfolded some fundamental trends regarding complex interactions that may play a role in the development of oral pathology. Gender-based analysis showed that Oro-Dental suffering was equal in both sexes. Middle-age group was suffering more from tooth decay**.** The underlying reason might have been that extreme of ages (too young or old) felt it difficult to attend the dental outpatient clinics that corresponded with western data[14, 15].

In this study, 32 % patients admitted to consume Naswar, Chalia and smoking. This finding was supported by Amin et al, who reported significant association of smoking with dental disease[16].

A special survey that was conducted in Brussels showed that type and pattern of food may also influence the development and progress of oral lesions[7]. In this study, standard diet mainly consisted of vegetable and meat rather than junk food. The results of the present study revealed an important finding that study population who had definitive oral lesions of different varieties, did not have abnormal social habits and were not consuming junk food. This has suggested that other factors such as poor quality of vegetables and water could be contributory reason in pathological dental process.

Oral health is an accumulative echo of metabolic reactions which are continuously occurring inside the human body and has strong association with the host's characteristics such as type of saliva, e.g., super saturated, tooth enamel defects, characteristics of oral micro flora, presence of bacterial plaque, and these may lead to plaque retention and caries[9-13]. Fumagalli et al and Davis et al in separate work established that emotional status and systemic influences such as GIT status/ disorders also influence oral health which showed that oral health is also dependent on what happens in other parts of body[17,18].

A number of researchers have revealed consequences of abnormal metabolic reactions which effect all parts of body including structure present inside the oral cavity[19-22]. Interestingly many metabolic reactions are dependent on various factors such as hypothalamic-pituitary adrenal axis (HPA axis). There are various elements which result in activation of HPA axis, such as external reasons of stress (food stress, that is unhealthy diet, work load, emotional upsets etc.). Activated HPA axis caused internal hemodynamical stress could play a role in the pathogenesis of oro-dental problems[23-25].

CONCLUSION:

This study has suggested that in the absence of dominant abnormal social and eating habits, suffering from Oro-Dental disorders could be related to poor quality of vegetables, water, host's characteristics or activated HPA axis in the development of pathogenic dental process.

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ORIGINAL ARTICLE

To Determine The Positive Predictive Value Of Magnetic Resonance Spectroscopy In Diagnosing Malignant Thyroid Nodules By Taking Histopathology As A Gold Standard

Zeeshan-ul-Hasnain Imdad[1], Mashkoor Ahmad[2], Faran Nasrullah[3]

ABSTRACT:

Objective: To determine the positive predictive value of magnetic resonance spectroscopy in diagnosing malignant thyroid nodules by taking histopathology as a gold standard.

Methodology: This descriptive cross-sectional study was undertaken at the department of Radiology, CMH Multan from October 2014 to March 2015. 77 patients with malignant thyroid nodules on ultrasonography between ages 30-70 years, of either gender were included. Patients with previous thyroid surgery, already biopsy proven malignant thyroid nodules and, those having contraindication to magnetic resonance spectroscopy (MRS) were excluded. All the patients then underwent MRS for choline peak and choline /creatine (Cho/Cr) ratio. Findings were correlated with histopathology.

Results: Mean age of the patients was 46.53 ± 9.15 years. Out of these 77 patients, 62 (80.52%) were female and 15 (19.48%) were males with female to male ratio of 4:1. MRS supported the diagnosis of malignant thyroid nodules in 60 patients. Histopathology confirmed malignant thyroid nodules in 49 (true positive) cases where as 11 (False Positive) had no malignant lesion on histopathology. Positive predictive value of magnetic resonance spectroscopy (MRS) in diagnosing malignant thyroid nodules was 81.67%.

Conclusion: Magnetic resonance spectroscopy (MRS) is a non-invasive modality of choice with high positive predictive value in diagnosing malignant thyroid nodules. It has not only dramatically improved our ability of diagnosing thyroid lesions pre-operatively but also helps the surgeons for proper decision making.

Keywords: Magnetic resonance spectroscopy, Thyroid malignancy, Thyroid nodules

Introduction:

Thyroid nodules are lumps arising within an otherwise normal thyroid gland. Palpable nodules are present in approximately 4 to 7% of adults, and up to 50% of adults will have non-palpable nodules discovered at the time of death[1]. Multinodular goiter is the most common benign lesion of the thyroid[2]. Although most thyroid nodules are benign but Ma et al[3] in their study found the prevalence of malignant thyroid nodule to be 55%. It is important to categorize these nodules as either benign or malignant lesions before surgery. Early detection of thyroid cancer is important as it leads to better prognosis because they are at a less advanced clinical stage[4].

Ideally, diagnostic procedures should be not only of high accuracy but also non-invasive. Most commonly performed diagnostic procedure to confirm the presence of a nodule and assess the status of the whole gland is an ultrasound. Measurement of thyroid stimulating hormone and anti-thyroid antibodies help to decide whether there is a functional thyroid disease, such as Hashimoto's thyroiditis, a known cause of a benign nodular goiter[5]. Measurement of calcitonin is necessary to exclude the presence of medullary thyroid cancer.

Fine needle aspiration (FNA) for cytology is considered the most valuable method preoperatively in differentiating malignant from benign thyroid lesions[6]. Compared with FNAC, magnetic resonance imaging (MRI) has the advantage of being non-invasive and giving immediate information[7]. Focal nodular lesion characterization with MRI is based on their morphology, signal intensity on different sequences and their behavior with para-magnetic contrast agents[8].

Magnetic resonance spectroscopy (MRS) allows biochemical characterization of scanned tissue and has been proved to be a sensitive method in identifying malignant nodules[6,9]. Malignant lesions usually have elevated choline concentrations, reflecting increased membrane synthesis and a higher cell turnover[9]. In a study by Gupta et al, positive predictive value of magnetic resonance spectroscopy (MRS) in identifying malignant thyroid nodule was found to be 89%[10].

As the available literature on the problem discussed was very scarce, this study was conducted to determine the positive predictive value (PPV) of magnetic resonance spectroscopy in diagnosing malignant thyroid nodules taking histopathology as gold standard. The results of this study could give the surgeons an accurate, non-invasive imaging modality for pre-operative assessment of thyroid malignancy so that they could plan the treatment accordingly. Grey scale ultrasonography despite having high predictive values is an operator dependent technique with wide range of positive predictive values (for characterization of thyroid nodules) ranging from 56% to 95%[11]. MR spectroscopy is more standardized technique having lower operator

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dependency and subjective variability. Thus, this study was conducted to gauge whether MR spectroscopy has the potential to fill in this diagnostic vacuum or not.

METHODOLOGY:

The study was conducted in the Radiology Department of Combined Military Hospital Multan, from October 2014 to March 2015. Sample size of 77 cases was calculated with 95% Confidence level. Non-probability, purposive sampling was done. The study was approved by institute's ethical committee.

All patients, of both genders, ages between 30–70 years, having thyroid nodules on clinical examination were included. Patients with history of thyroid surgery, diagnosed biopsy proven malignant thyroid, having any MRI incompatible metallic devices in their body and those having claustrophobia were excluded from study to overcome confounding factors and bias in results. Informed consent was obtained from every patient. All basic demographic information of each patient (name, age, sex, address and contact) was also noted. MR Spectroscopy was performed through single voxel technique. After water suppression, a point-resolved spectroscopy (PRESS) technique was used for localization and the studies were obtained with parameters including TE and TR of 135 and 1500 respectively. On MR spectroscopy, presence of elevated choline and reduced NAA peaks on MR spectrum with increased choline/creatine (Cho/Cr) ratio > 1.5 (Normal is 1.2) and decreased NAA/choline (NAA/Cho) ratio <1.2 (Normal is 1.6) was considered as positive. Each MRS report was correlated with the histopathology report and was assessed for confirmation of positive cases.

The collected data was analyzed statistically by using SPSS version 20. Effect modifiers like age, gender and duration of disease were controlled through stratification and post-stratification chi square was applied to see their effect on outcome. P-Value ≤ 0.05 was taken as significant.

RESULTS:

Age range in this study was from 30-70 years with mean age of 46.53 ± 9.15 years (Figure-1). Majority of the patients 35 (45.45%) were between 41 to 50 years of age. Out of these 77 patients, 62 (80.52%) were female and 15 (19.48%) were males with female to male ratio of 4:1 (Figure-2).MRS supported the diagnosis of malignant thyroid nodules in 60 (77.92%) patients. Histopathology confirmed malignant thyroid nodules in 49 (True Positive) cases, whereas 11 (False Positive) had no malignant lesion on histopathology (Table-1). Positive predictive value of magnetic resonance spectroscopy (MRS) in diagnosing malignant thyroid nodules was 81.67%. Stratification of positive predictive value with respect to age groups has been shown in Table-2, whereas gender stratification is shown in Table-3

Figure: 1
Distribution of patients according to Age (n=77)

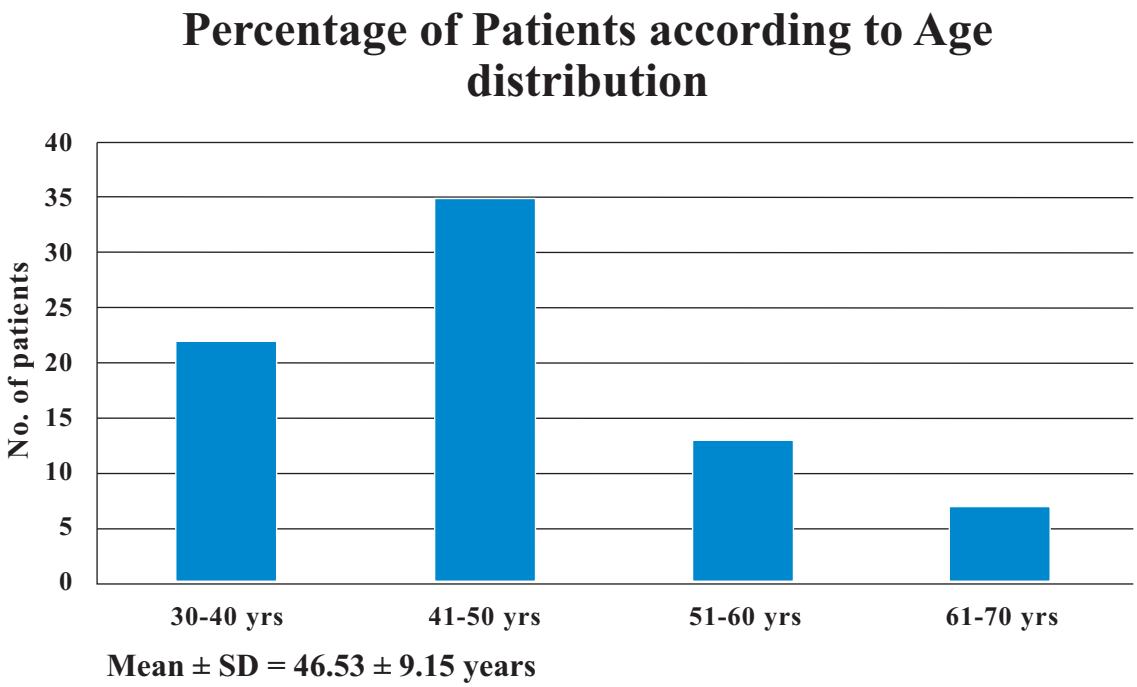

Figure: 2
Distribution of patients according to Gender (n=77)

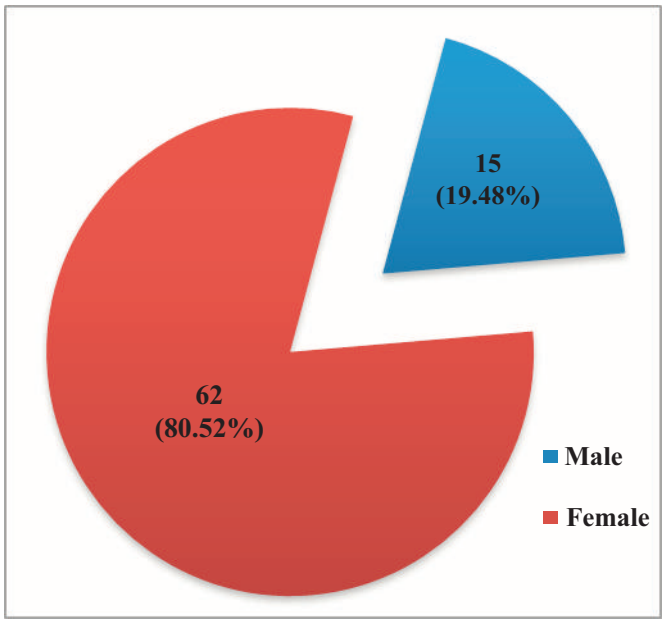

Table:1
Summary of Results (n=77)

	Positive on MRS result	Negative on MRS result	P-Value
Positive results on Histopathology	49 **(TP)***	04 **(FN)*****	**0.202**
Negative results on Histopathology	11 **(FP)****	13 **(TN)******	

*-TP=True positive **-FP=False positive ***-TN=True negative ****-FN=False negative

$$\text{Positive Predictive value} = \frac{\text{True Positive}}{\text{True Positive + False Positive}} \times 100 = \mathbf{81.67\%}$$

Table:2
Stratification of PPV with respect to age groups

Age (years)	True Positive	False Positive	P-Value
30-40	14	03	
41-50	23	05	
51-60	07	03	**0.564**
61-70	05	00	

Positive Predictive Value (PPV) for age 30-40 years: 82.35%

Positive Predictive Value (PPV) for age 41-50 years: 82.14%

Positive Predictive Value (PPV) for age 51-60 years: 70.0%

Positive Predictive Value (PPV) for age 61-70 years: 100.0%

Table: 3
Stratification of PPV with respect to Gender

Gender	True Positive	False Positive	P-Value
Male	40	09	
Female	09	02	**0.989**

Positive Predictive Value (PPV) for Male: 81.63%

Positive Predictive Value (PPV) for Female: 81.82%

DISCUSSION:

Thyroid carcinoma is the commonest endocrine malignancy and accounts for approximately 1% of all malignancies[12]. It is second only to carcinoma of the ovary, as the leading cause of death among endocrine cancers[13]. The incidence of thyroid cancer has almost tripled in the United States in the last 35 years, from 4.85 cases per 100,000 in 1975 to 12.23 cases per 100,000 in 2007[14]. This increase is mainly due to small papillary cancers, by contrast to the undifferentiated thyroid cancers that have a decreasing trend[15]. In Pakistan, thyroid cancer is responsible for 1.2 % cases of malignant tumors[16]. Papillary carcinoma is the most common and constitutes 57 to 89 % of all thyroid malignancies[17-18]. The thyroid nodules are evaluated by clinical examination, ultrasound and fine needle aspiration cytology (FNAC). Adjuncts include computed tomography (CT), magnetic resonance imaging (MRI) and more recently, fluorodeoxyglucose positron emission tomography (FDG-PET), ultrasound based elastography and magnetic resonance spectroscopy (MRS)[19-21].

Magnetic resonance spectroscopy (MRS) is a non-invasive diagnostic test that uses strong magnetic fields to measure and analyze the chemical composition of human tissues. MRS relies on the fact that chemicals in the body emit radiofrequency signals when stimulated by a strong magnetic field. By analyzing the different chemical compounds or metabolites in a diseased tissue area and comparing these with the normal metabolite composition of corresponding tissue, MRS has the potential to provide information that can assist in diagnosing pathological states and has been investigated as a feasible means of identifying malignant nodules[22]. So, this study was conducted to determine the positive predictive value (PPV) of magnetic resonance spectroscopy in diagnosing malignant thyroid nodule taking histopathology as gold standard.

A study carried out by Gupta et al[23] correlated choline peaks with the presence of malignancy with a sensitivity of 100%, specificity of 89% and positive predictive value of 90.0%. In another study[24], magnetic resonance spectroscopy was carried out in 17 benign cases, 16 follicular adenoma, and 1 colloid goiter. Of the 17 benign cases, only 1 showed choline peak; however, all 8 follicular carcinoma cases showed prominent choline peak.The sensitivity, specificity, positive predictive value and negative predictive value of magnetic resonance spectroscopy (MRS) in identifying malignant thyroid nodule was found to be 100%, 94.11%, 88.88% and 100% respectively.

Another study[22], succeeded in discriminating thyroid carcinomas from normal thyroid tissue based on the comparison of their respective MRS spectra: 8 patients with biopsy proven thyroid tumors larger than 1 cm^3 and 5 volunteers without lesions, participated in this study. MRS reported significant differences in the spectra of malignant samples. In addition to an increase of aminoacids and di- and tri-glycerides in carcinomas, the authors found that choline and creatine signals were only present in material coming from carcinomas, whereas no trace of such markers was observed in patients with normal thyroid. Therefore, choline/creatine ratio was chosen as a marker of malignancy: this ratio ranged from 1.6 (in cases of well-differentiated follicular carcinoma) to 9.4 (in thyroids with anaplastic thyroid cancer).

In the present study, MRS supported the diagnosis of malignant thyroid nodules in 60 (77.92%) patients. Histopathology confirmed malignant thyroid nodules in 49 (true positive) cases where as 11 (False Positive) had no malignant lesion on histopathology. Positive predictive value of magnetic resonance spectroscopy

(MRS) in diagnosing malignant thyroid nodules was 81.67%.

In-vivo examinations identify only two critical metabolites (choline and creatine) which have known associations with cancer. When this resonance ratio was calculated for follicular adenoma, some benign lesions also showed mildly raised values. One possible explanation was that adenoma with a malignant spectral pattern were in the process of malignant transformation. On the whole, it was concluded that MRS has high positive predictive value for diagnosing malignant thyroid lesions and method of choice for the diagnostic imaging of thyroid nodules.

CONCLUSION:

Magnetic resonance spectroscopy (MRS) is the non-invasive modality of choice with high positive predictive value in diagnosing malignant thyroid lesions. It has not only dramatically improved our ability of diagnosing thyroid lesions pre-operatively but also helps the surgeons for proper decision making. So, we recommend that magnetic resonance spectroscopy (MRS) should be done routinely in all suspected cases of malignant thyroid lesions for accurate assessment pre-operatively and opting proper surgical approach.

CONFLICT OF INTEREST

This study has no conflict of interest to declare by any author.

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ORIGINAL ARTICLE

Anti-diarrheal effects of Methanol extract of *Curcuma Longa*

Kauser Ismail[1], Moosa Khan[2], Qurrat-ul-ain Bukhari[3], Muzna Hameed Dar[4]

ABSTRACT:

Objective: To evaluate the anti-diarrheal effect of Methanol extract of *Curcuma Longa,* and to compare it with Loperamide in albino rats.

Methodology: This experimental animal study was performed in the Department of Pharmacology and Therapeutics, Basic Medical Sciences Institute (BMSI), Jinnah Postgraduate Medical Center (JPMC), Karachi, in collaboration with BMSI Animal house, from May 2013 to December 2014. Dried rhizomes of *Curcuma longa* were purchased from local market of Karachi and soaked in 100% methanol, which was later evaporated to yield a semisolid extract. Seventy-two albino rats were used, which were randomly assigned into 3 groups of 24 rats. Each group was further divided into 4 subgroups. In each group, one subgroup was control, one was standard (loperamide group) and two subgroups were given 100mg/kg and 200mg/kg of methanol extract of *Curcuma Longa* orally. Anti-diarrheal effect was assessed by counting total number of feces after castor oil-induced diarrhea, castor oil-induced enteropooling and gastrointestinal motility test.

Results: The methanol extract of *Curcuma Longa* showed significant anti-diarrheal activity evidenced by the reduction in defecation, decreased intestinal transit of charcoal meal and decreased enteropooling after castor oil-induced diarrhea.

Conclusion: *Curcuma Longa* had potent anti-diarrheal affect and can replace synthetic drugs like loperamide. These effects were related to phytochemicals present in it.

Keywords: *Curcuma Longa*, Enteropooling, Gastrointestinal motility, Phytochemicals

INTRODUCTION:

Natural products from plants are being used in pharmaceutical preparations either as pure compounds or as extracts. One example is *Curcuma Longa*[1].

Curcuma Longa is a herbaceous perennial plant of Zingiberaceae family, cultivated extensively in South East Asia, China, Indonesia and Malaysia, commonly known as "Haldi" in Urdu, and turmeric in English language. It has a large oval rhizome with orange colour inside. It has elliptical leaves, which can reach up to 1.2 meters in length and yellow flowers. It grows in temperature between 20°C to 30°C[2]. It has been in continuous use for its flavoring, and as a spice in both vegetarian and non-vegetarian food[3,4].

Curcuma longa produces different pharmacological effects and is a known anti-inflammatory agent. It has significant medicinal potential with minimal toxicity[5]. The most active component in turmeric is flavonoid curcumin, which makes up 2 to 5% of the total spice in turmeric. Curcumin is the principal curcuminoid. It is a diferuloylmethane and constitutes up to 75% of total curcuminoids. The other two curcuminoids are desmethoxycurcumin and bis-desmethoxycurcumin which make up 24% and 8% respectively[6].

Diarrhea is one of the common health problems affecting people, especially in developing countries. The burden of diarrheal disease disproportionately affects children under five years where it is a primary cause of mortality, specifically in low- and middle-income population groups who have higher incidence rates due to inadequate water and sanitation, and nutritional risk factors, such as sub-optimal breastfeeding, zinc and vitamin A deficiency etc[7]. Worldwide, there are about two billion cases of diarrheal disease every year. Diarrhea can last several days, and can leave the body without water and salts necessary for survival. Cause of death is generally severe dehydration and fluid loss. World Health Organization (WHO) has estimated that 2.5 billion episodes of diarrhea in children younger than five years of age are reported every year in developing countries, which is responsible for 1.5 million deaths every year[8]. Despite decline in mortality due to diarrhea in last decade, it remains one of the principal causes of morbidity in children[9]. There are certain opioid and non-opioid derivatives which are currently used as anti-diarrheal agents but these are not devoid of toxicity and have contraindications, like loperamide should be avoided in bloody or suspected inflammatory diarrhea, or when associated with significant abdominal pain[10]. So there is need for natural remedy which must be non-toxic and integral component of our home kitchen[11].

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METHODOLOGY:

This animal study was conducted in the Department

of Pharmacology and Therapeutics, BMSI, JPMC, Karachi, after approval from JPMC ethical committee, from May 2013 to December 2014.

A total of 72 albino rats of either sex, 2-3 months old and weighing from 150–250 gram were selected for the study. The rats were randomly assigned into 3 groups of 24. Each group was further divided into 4 subgroups, which comprised of 6 albino rats. Animals were kept in a standard natural environmental condition with the provision of standard laboratory diet.

Preparation of extract:

C*urcuma Longa* was purchased from local market of Karachi and verified from Department of Pharmacognosy, Karachi University with taxonomy no109. It was coarsely ground into very fine particles and then soaked in 99% Methanol for two weeks. This mixture was filtered via filter paper. The filtrate was passed through rotatory evaporator and thick semisolid residue was isolated. This extracted material was kept in the open bottle for about two weeks so that remaining methanol was evaporated. After fourteen days, the bottle was kept closed so that extract was ready for use.

Group A animals (n=24) were given Castor oil to induce diarrhea[12]. Rats were divided into 4 subgroups (n=6) and fasted for 24 hours before giving drugs, i.e., normal saline 3ml to 1st group (control), loperamide 5mg/kg body weight to 2nd group (standard) and *Curcuma longa* 100mg/kg and 200mg/kg to 3rd and 4th group respectively[12,13]. After 30 minutes of drug administration, 1 ml of castor oil was given to all the animals. The albino rats were then kept in cages which were lined by white blotting paper, which were changed every hour for the next 4 hours. The total number of feces excreted was counted for the next 4 hours and weight of animals was also noted before and after the procedure. The total number of diarrheal feces of the control group was considered to be 100%, and % inhibition of diarrhea was calculated by following formula:

$$\text{Percentage inhibition} = \frac{\text{Mean diarrheal count (control group-treated group)} \times 100}{\text{Mean diarrheal count of control group}}$$

In Group B, Castor oil-induced enteropooling was carried out. The rats were divided into 4 subgroups (n=6) and kept on fasting for 24 hours before giving them drugs, normal saline 3ml to 1st group (control), loperamide 5mg/kg to 2nd group (standard) and *Curcuma longa* 100mg/kg and 200mg/kg to 3rd and 4th group respectively. After 30 minutes of drug administration, 1 ml of castor oil was given to them for diarrhea induction. After one hour the rats were sacrificed by ether overdose. Abdomen was dissected and small intestine was traced and isolated from pyloric end to ilieocecal junction. The intestinal contents of each rat were collected by milking into a graduated tube and the volume as well as the weight was measured[14].

In Group C animals, gastrointestinal motility test was done. The method for testing gastrointestinal activity was modified from Gunakkunru et al[15]. The rats were divided into 4 subgroups (n=6) as in other groups, and fasted for 24 hours before the drugs were given to them in the same doses as in groups A and B. After 30 minutes of drug administration, 1 ml of castor oil was given to each. After 1 hour, all animals received 1 ml of charcoal meal (10% charcoal suspension in 5% gum tragacanth) orally. The animals were sacrificed after 30 minutes by ether overdose, abdomen was dissected and small intestine was isolated. The distance traveled by the charcoal meal from pylorus to caecum was measured and expressed as a percentage of the total distance of the intestine.

The data analysis was done on SPSS version 19. The results were expressed as mean ±SD for quantitative variables (stool weight, stool number, volume of intestinal contents and small intestinal transit). Statistical comparison between groups was done by analysis of variance (ANOVA). The student t test was performed in all quantitative variables. In all statistical analysis P-value <0.05 was considered significant.

RESULTS:

The effect of *curcuma longa* on castor oil-induced diarrhea was observed. The mean diarrheal stool count was significantly reduced in 100mg/kg (78%) and 200mg/kg (100%) doses in a dose-related manner which was comparable to loperamide group (100%) and the difference was highly significant when compared to control group. There was significantly less decrease in weight in both *curcuma* groups as compared to control group (table-1).

The affect of *curcuma longa* on intestinal transit showed significant reduction in intestinal transit of charcoal meal in dose-related manner i.e. 31% in 100mg/kg and 37% in 200mg/kg *curcuma* group as compared to control group. Delay in intestinal transit was highest in loperamide group i.e. 42% (table-2).

Effect of *curcuma longa* on enteropooling i.e. weight (gm) and volume (ml) of intestinal contents showed that both subgroups of *Curcuma longa* had significant inhibitory effect on enteropooling evidenced by decrease in both volume and weight of intestinal contents as compared to control. Loperamide group showed maximum decrease in intestinal contents (table-3).

Table: 1

Anti diarrheal effect of Methanol extract of *Curcuma Longa* on castor oil-induced dry diarrheal count in albino rats

Group-A Treatment	**No of Animals**	**No of stool count At 1st hour** mean ± SD	**No of stool count At 4th hour** mean ± SD	**Percentage Change**	**Mean weight after diarrhea** in gram
Normal saline+ Castor oil 3ml	6	2.00±0.63	1.66±0.51	-17%	160.00±18.97
Loperamide 5mg/kg + Castor oil 3ml	6	1.33±0.51	0.00±0.00*	-100%	186.66±23.16
C. longa 100mg/kg + Castor oil 3ml	6	1.50±0.54	0.33±0.51*	-78%	184.16±11.14*
C. longa 200mg/kg+ Castor oil 3ml	6	1.33±0.51	0.00±0.00*	-100%	186.66±15.05*

* P-value Significant at <0.05 level as compared to control

Table: 2

Effect of methanol extract of *Curcuma Longa* on castor oil-induced enteropooling in albino rats

Group B Treatment	**Volume of intestinal content** (ml)	**Weight of intestinal content** (gm)	**(%) Inhibition**
Normal saline (3 ml/kg) + Castor oil 3ml	8.15±0.56	3.91±0.53	--------
Loperamide (5 mg/kg)+ Castor oil 3ml	1.68±0.78*	1.08±0.58*	72.34%
C. longa Extract (100mg/kg)+ Castor oil 3ml	5.66±0.43*	2.63±0.38*	32.77%
C. longa Extract (200mg/kg) + Castor oil 3ml	2.00±1.04*	1.25±0.52*	68.09%

*P-value was highly significant as compared to control

Table: 3

Effect of methanol extract of *Curcuma Longa* on small intestinal transit in albino rats (cm)

Group C Treatment	No of Animals	Total Length mean ± SD	Transit Length mean ± SD	Percentage Change
Charcoal meal + normal saline + Castor oil 3ml	6	97.71±2.00	84.85±4.25	-19%
Charcoal meal + Loperamide + Castor oil 3ml	6	98.05±3.10	65.26±9.21*	-42%
Charcoal meal + *C. longa 100mg/kg* + Castor oil 3ml	6	97.31±3.12	55.76±14.69*	-31%
Charcoal meal+ *C. longa 200mg/kg* + Castor oil 3ml	6	99.65±2.57	63.08±6.42*	-37%

*P-value highly significant as compared to control

DISCUSSION:

Diarrhea is one of the main causes of infant mortality in developing countries, causing about nearly one in five child deaths, a loss of about 1.5 million lives each year[8]. Medicinal plants have been used traditionally as anti-diarrheal without any scientific basis[16]. To evaluate the efficacy of these herbal drugs, castor oil-induced diarrhea models in rats are useful to observe measurable changes in the number and consistency of stools. The suggested underlying mechanism is liberation of lipase enzymes from ricinoleic acid present in castor oil[17], which irritates intestinal mucosa causing inflammation and release of prostaglandins and nitric oxide[18], leading to increased epithelial permeability, gastrointestinal secretion and motility[19].

The results of present study showed that both 100 and 200 mg/kg of methanol extract of *C. longa* have significant inhibitory effects on intestinal motility which was apparent by significant decrease in dry and wet diarrheal stool counts, significant decrease in enteropooling and finally decrease in intestinal transit. Gilani et al[20] observed that crude extract of turmeric relaxed potassium-induced contractions in isolated rabbit jejunum; relaxation was mediated through blockade of Ca^{++} influx, as another study[21] described curcumin as a Ca^{++} antagonist.

The gastrointestinal model using activated charcoal as marker has been used for more than six decades as a simple and effective means to assess effects of laxatives. This method indicates maximum distance traveled by the marker in the small intestine in a given time interval after its administration[22]. According to the model, *C. longa* extracts at different concentrations significantly reduced intestinal motility, with a dose-dependent pattern when compared to the control group.

Gnanasekar and Perianayagam[23] demonstrated that sodium salt of curcumin significantly inhibited castor oil-induced diarrhea by inhibition of prostaglandin synthesis. Two different studies[24,25] showed that Curcuma increased intestinal transit time in albino rats in disorders of altered intestinal motility. Another study[26] evaluated myo-relaxant effect of *Curcuma longa* on ileum and colon in a Mouse experimental colitis. In another study, Curcumin reduced mucosal injury in mice in experimentally-induced colitis. Ten days prior to induction of colitis with 1,4,6-trinitrobenzene sulphonic acid, administration of 50 mg/kg curcumin resulted in a significant reduction of diarrhea, neutrophil infiltration and lipid peroxidation in colonic tissue[1]. Husssain et al[27] and Balekar et al[3], in two different studies evaluated anti-diarrheal activity of methanol extract of two herbal plants, *Musa sapientum* (banana) and *Malvastrum tricuspidatum* (kharenti) in which 100 and 200 mg/kg body weight methanol extract of *Musa sapientum* reduced frequency and severity of diarrhea in test animals and significantly delayed intestinal transit of charcoal meal as compared to control group. Methanol extract of *Malvastrum tricuspidatum* at the doses of 100, 250 and 500mg/kg also significantly inhibited diarrhea by 71%, 80% and 88% as compared to control. The anti-diarrheal effects of these plants was due to the presence of flavonoids and alkaloids in them. Flavonoids control diarrhea by their ability to inhibit peristaltic activity and hydroelectrolyte secretion responsible for diarrhea. A previous study[3] showed similar results and established that flavonoids were able to inhibit intestinal secretory response. As *curcuma longa* is rich in flavonoids, these flavonoids were most likely responsible for its anti-diarrheal effect.

CONCLUSION:

The study demonstrated significant antidiarrheal effect of *Curcuma longa* and justified its use in diarrhea. It can be a safe alternative to synthetic antimotility agents.

RECOMMENDATIONS:
Studies are recommended to explore the underlying detailed mechanism by which *C. longa* and its components exert antidiarrheal effects.

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ORIGINAL ARTICLE

Lateral Open Bite: Frequency and Distribution

Muhammad Azeem[1], Muhammad Imran Khan[2], Muhammad Mudassar Saleem[3], Zaheer Abbas[4], Waheed ul Hamid[5]

ABSTRACT:

Objective: This study was designed to determine the frequency of lateral open bite and its gender distribution among the patients visiting Orthodontics department of de'Montmorency College of Dentistry, Lahore.

Methodology: This cross sectional study was carried out at department of Orthodontics, de'Montmorency College of dentistry, Lahore, where orthodontic records of 200 patients were included to find out frequency of lateral open bite (LOB). The amount of LOB was confirmed by measuring vertical distance between cusp tips of posterior teeth affected by lateral open bite, with standardized digital vernier calipers on plaster models.

Results: 200 patients were included (98 boys, mean age: 19.3 ±1.3 years; 102 girls, mean age: 19.0 ± 1.5 years) The frequency of lateral open bite was found to be 1 %. Male to female ratio was 1:1.

Conclusion: It was concluded that male and female were equally affected by lateral open bite and frequency was find out to be 1 %.

Keywords: Lateral open bite, Open bite, Posterior open bite

INTRODUCTION:

Open bite is a lack of vertical overlapping between the teeth in maxillary and mandibular arches when teeth are in maximum intercuspation[1]. Open bite malocclusion is multifactorial in nature, usually caused by interaction of genetic and environmental factors.[2,3] Lateral open bite (LOB) is a lack of vertical overlapping between the maxillary and mandibular posterior teeth i.e. premolars and or molars, when teeth are in maximum intercuspation. It can be classified as dental or skeletal, and unilateral or bilateral.

Several causes of lateral open bite have been presented in literature, namely, temporomandibular disorders, lack of molar eruption, occlusal plane issues, impacted primary molar and primary failure of eruption[4-13]. There are two possible theories regarding lateral open bite: 1. mechanical hindrance to tooth eruption, either before or after it emerges from the alveolar bone, or 2. Flaw in the eruptive mechanism of the tooth leading to the failure of the expected amount of eruption to occur.

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Mechanical hindrance with eruption may be due to ankylosis of the tooth to the alveolar bone, which can happen spontaneously or as a result of injury, or by obstruction in the path of the erupting tooth. Supernumerary teeth and non-resorbing deciduous tooth roots or alveolar bone are examples of such obstacles. After the tooth comes out from the bone, pressure from the adjacent soft tissues between the teeth such as, cheek, tongue, or finger can obstruct the eruption. Ankylosed teeth are commonly in infraocclussion and are said to be submerged. The most frequently submerged tooth is retained lower deciduous second molar. The second possible cause of eruption failure is a disturbance of the eruption mechanism itself[14].

Skeletal open bite is characterized by small anterior cranial base length, increased cranial base angle, steep mandibular plane angle and increased lower anterior face height along with increased inter-labial gap. Dental open bite is characterized by deficient dentoalveolar heights, divergent planes, mesially inclined molars and flat curve of spee in mandibular arch. Severity grades of open bite are characterized as: Moderate (0-2 mm), Severe (3-4 mm) and Extreme (more than 4 mm)[15].

The prevalence of anterior open bite varies from 2% to 12% and differs between ethnic groups and, in different age and sex[16]. Frequency of LOB in different populations varies; so rationale of this study was to determine the frequency of LOB in our population, as it is the key to determine epidemiological data on all types of malocclusion, in order to find out the population's orthodontic treatment needs, the budget required and preventive steps.

METHODOLOGY:

This cross sectional study was conducted from 1st May 2016 to 1st June 2017 after institutional approval at the Orthodontics Department of de'Montmorency College of Dentistry, Lahore. Orthodontic records of 200 untreated patients, between ages of 18 and 25 years were evaluated to find out the frequency of lateral open bite.

Inclusion Criteria:
Presence of all teeth except wisdom; Patients with chronological ages between 18 and 25 years; Well maintained Pre-treatment records.
Exclusion Criteria:
History of trauma; Craniofacial disorders; Any systemic or metabolic disease.
Data Collection Procedure:
The amount of LOB was confirmed by measuring vertical distance between cusp tips of posterior teeth affected by lateral open bite, with standardized digital vernier calipers on plaster models. Dental history sheets were used to rule out any systemic disease and history of dental trauma. The mean age, gender distribution and percentage of LOB among the selected sample was analysed using Statistical Package for the Social Sciences software package (SPSS) 19.

RESULTS:
200 patients were included (98 boys, mean age: 19.3 ±1.3 years; 102 girls, mean age: 19.0 ± 1.5 years). The frequency of lateral open bite was found to be 1%. Male to female ratio was 1:1 (Table-1).

Table: 1
Frequency of LOB among patients visiting De' Montmorency College of dentistry, Lahore (N=200)

Parameter	Frequency
LOB Patients	2 (1 %)
Males having LOB	1 (50 %)
Females having LOB	1 (50 %)

DISCUSSION:
Lateral open bite is very rare, especially in adults. Causative factors commonly reported in literature include abnormalities in dental eruption, vertical maxillary excess, skeletal pattern, and tongue-thrust problems. The mechanical treatment modalities are limited in the adults. Orthognathic surgery is recommended in adult patients with severe open bite and unesthetic facial proportions. For less severe problems, effective treatment options are being searched for. Identifying the cause of posterior open bite is essential clinically, because prognosis of orthodontic treatment is determined by it[17]. The male to female ratio was 1:1 in this study. This was in accordance to the findings of certain other studies on anterior open bite, where no gender differences were found[18,19]. Frequency of open bite in the present study was found out to be 1%, which was in agreement with Cabrera et al, who concluded that prevalence of lateral open bite was low[20]. Lateral open bite in some patients is due to disruption in the eruption mechanism, so that non-ankylosed teeth stop to erupt[9]. Lateral open-bite cases reported in the literature mostly involved ankylosed teeth or there was primary failure of eruption[9,17,21-25]. To understand the probable causes of lateral open-bite, the vertical equilibrium of forces on the teeth should be considered. Each tooth is subjected to a set of forces which are applied to its occlusal surface after it emerges into the oral cavity, and they try to push the tooth back into its socket. These forces are opposed by the periodontal ligaments, alveolar bone, and the dentofacial structures. It is therefore obvious that an open-bite between posterior teeth could develop in a growing child either from increased forces applied against the occlusal surface, for example, from tongue or cheek interjected between the teeth, or from reduced normal eruption in the presence of normal occlusal loadings. It is important for orthodontists to realize that in some patients the actual problem is a failure of the eruption mechanism, and not some habit through which the patient is preventing normal eruption[14,17]. Patients with lateral open bite due to mechanical interference of tooth eruption and unilateral posterior crossbite can be successfully treated with fixed appliances and intermaxillary elastics. Myofunctional therapy is necessary to enhance the stability of the open-bite correction[20].
In both of our diagnosed patients with LOB, cause was found to be ankylosis of lower deciduous second molar with congenitally missing lower second premolar. Further large scale studies are recommended to establish the prevalence in our population; this would help in more appropriate management of the LOB malocclusion.

CONCLUSION:
Lateral open bite is equally prevalent among females and males. Frequency of LOB was found out to be 1%.

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ORIGINAL ARTICLE

Olfactory Fossa Depth Assessment Based on Keros Classification using Computed Tomography

Mubina Lakhani[1], Nuzhat Hassan[2], Arsalan Manzoor[3], Muhammad Ali[4], Madeeha Sadiq[5]

ABSTRACT:

Objective: To evaluate the olfactory fossa depth and to categorize it according to Keros classification.

Methodology: It was a cross sectional study done on 270 adults , 160 males and 110 females at Ziauddin University Hospital, Clifton, Karachi using CT Para nasal sinuses. The depth of olfactory fossa was evaluated by measuring the height of lateral lamina of cribriform plate.

Results: The mean and standard deviation(SD) of right olfactory fossa depth was greater than that of left 6.184±1.8237mm and 5.949 ±1.8003mm (p value 0.006) respectively. Mean ± (SD) for left olfactory fossa depth was greater in females (6.215±1.9271) than in males (5.766±1.6896) (p value 0.043).

Keros type II was found to be the most frequent on both right and left sides that is, in 69.26% and 72.96% individuals respectively followed by type III on right side in 18.15% and on left side in 15.19% subjects. Type I was found to be the least frequent in our population with a value of 12.59% on the right side and 11.85% on the left side.

Conclusion: Our study shows that most of the population falls in the high risk categories of Keros that is type II and type III thus emphasizing the need of preoperative radiological assessment.

Keywords: Keros classification, Paranasal sinuses, Olfactory fossa, Radiological assessment

INTRODUCTION:

Currently, functional endoscopic sinus surgery (FESS) is extensively used for the treatment of chronic rhino-sinusitis which is resistant to medical treatment. It is also used in the treatment of many conditions such as mucocele, nasal polyposis, sellar and parasellar tumors, and optic nerve decompression[1]. Due to close proximity of sinuses to important structures such as orbits and brain, surgeons should have sound knowledge of sinonasal anatomy and associated variations. Therefore, a thorough knowledge of constant anatomical landmarks and their variations along with a preoperative CT evaluation is important for surgeons to securely traverse through paranasal sinus (PNS) region with minimal risk to patients[2]. Computed tomography (CT) scan has been considered the gold standard in the preoperative evaluation of PNS[3].

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Although it is extensively performed, FESS is not devoid of complications. Some of the major complications include ocular/orbital injury, leakage of cerebrospinal fluid and intracranial injury[4], most of these complications are due to close proximity of ethmoidal cells with anterior cranial fossa. The ethmoid roof separates the ethmoidal cells from the anterior cranial fossa. It is formed by the fovea ethmoidalis (FE) of the frontal bone laterally and the cribriform plate (CP) of the ethmoid bone medially[5-7]. Ethmoid roof is critically important because it is most vulnerable to iatrogenic cerebrospinal fluid leaks. During FESS, injury can occur on the side where the position of the roof is relatively low[1,8,9]. Olfactory fossa is an interstice between the CP and the FE. CP is generally at a lower level than FE. The FE connects medially with lateral lamina of cribriform plate (LLCP). This lateral lamella (LL) is thinnest & most vulnerable in terms of complications during FESS. Also the anterior ethmoidal artery enters the olfactory fossa through LLCP. High variability exists in the relationship of anterior ethmoidal artery to the roof of the ethmoid and is at risk during FESS[10,11]. Depth of the olfactory fossa is determined by the height of the LLCP, which is part of the ethmoid bone. In 1962, Keros proposed a classification[12], which was based upon CP position in relation to the roof of ethmoid. This classification has a significant clinical relevance in FESS. As per this classification, type I ranges from 1–3mm. In this type, the LL is short and a significant portion of frontal bone is protecting the ethmoid roof thus, making the roof thick and the sinus less dangerous to operate within. Type II ranges from 4–7mm, so the

ethmoid roof is formed by a considerable portion of the LL. And lastly type III has a range of 8–16mm. The LL becomes thin forming a larger component of the ethmoid roof, which is not protected by the thick frontal bone. Keros type III is therefore considered to be the most vulnerable type and has a considerable risk for iatrogenic trauma to CP. Proper knowledge of anatomical variations of ethmoid bone has been proved to be helpful in avoiding complications that may occur during FESS. With this background, present study was undertaken to assess depth of olfactory fossa on CT.

METHODOLOGY:

This cross sectional study was undertaken at the Radiology department of Ziauddin University hospital, Clifton, Karachi . Duration of study was 5 months that is January 2017 till May 2017after approval from ethics review committee, with a sample size of 270 individuals. Males and females between 21–60 years of age were included. Patients with sinonasal tumors, chronic rhino-sinusitis, prior sinus surgery, facial fracture, nasal polyposis and congenital craniofacial anomaly were excluded.

Study population comprised of adults coming for CT head & brain who did not have bony abnormality of sphenoid & ethmoid sinuses or adjacent structures. CT scan was performed and depth of olfactory fossa was assessed by measuring height of lateral lamella of cribriform plate (LLCP) on 16 slice Toshiba Alexion in which scanner's X-ray beam was rotated around the head and created a series of images from different angles. Sequential axial images were obtained and processed to form volume data. From volume data, multiplanar reconstructions were made in axial, coronal and sagittal planes. 3D volume rendered images in bone algorithm were also constructed. All images were evaluated in both coronal and axial planes. Analysis was performed as per Keros classification to categorize the height of lateral lamella of cribriform plate[13]. The coronal views of CT films were analyzed in bony windows and the results were reported in a data sheet.

Following standard anatomical landmarks were noted and used for measuring LLCP:

• Infraorbital nerve point

• Medial ethmoid roof point (MERP) (which corresponds to the medial end of the ethmoid roof that articulates with the LLCP)

• Cribriform plate point[1,13,14]

Vertical height from MERP (MERPs height) and vertical height from CP (CP height) to the horizontal plane through infraorbital foramen was measured on each slide (Figure-1).

The LLCP was calculated by subtracting CP height from MERP height (MERP-CP = LLCP)[18]

Measurements between 1 and less than 4mm were considered as type I Keros. Measurements more than 4mm and less than 8mm were considered as type II Keros. Type III Keros subjects showed measurements of 8mm and more. This was done to overcome the limitations in original Keros classification as measurements between 3 and 4mm as well as between 7 and 8mm were not described in Keros classification[15].

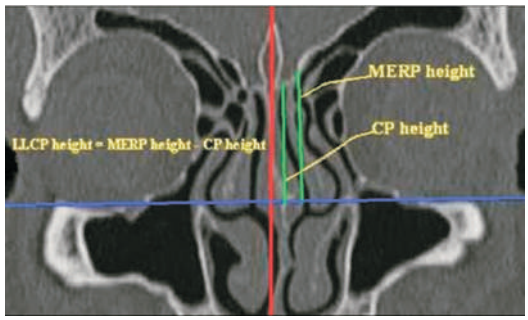


Figure-1: Showing LLCP measurement in a coronal paranasal sinus CT cross-section[1]

For statistical analysis, SPSS version 23 was used. Means ± SD were calculated for quantitative variables and compared using student t test for two groups. Qualitative variables were described as frequency and percentages, p-value less than 0.05 was taken as significant.

RESULTS:

The mean and SD of olfactory fossa depth was found to be significantly greater on right as compared to the left side (Table-1)

Table-1: Mean± Standard Deviation of Right and Left Olfactory Fossa Depth

Olfactory Fossa Depth	N	Mean (mm)	Std. Deviation (mm)	P value
Right Olfactory Fossa Depth	270	6.184	1.8237	0.006*
Left Olfactory Fossa Depth	270	5.949	1.8003	

*p ≤ 0.05 was considered significant

Olfactory fossa depth was also studied according to gender. Mean and SD for right olfactory fossa depth in females was insignificantly greater than that in males, while the result was significant on the left side (Table-2).

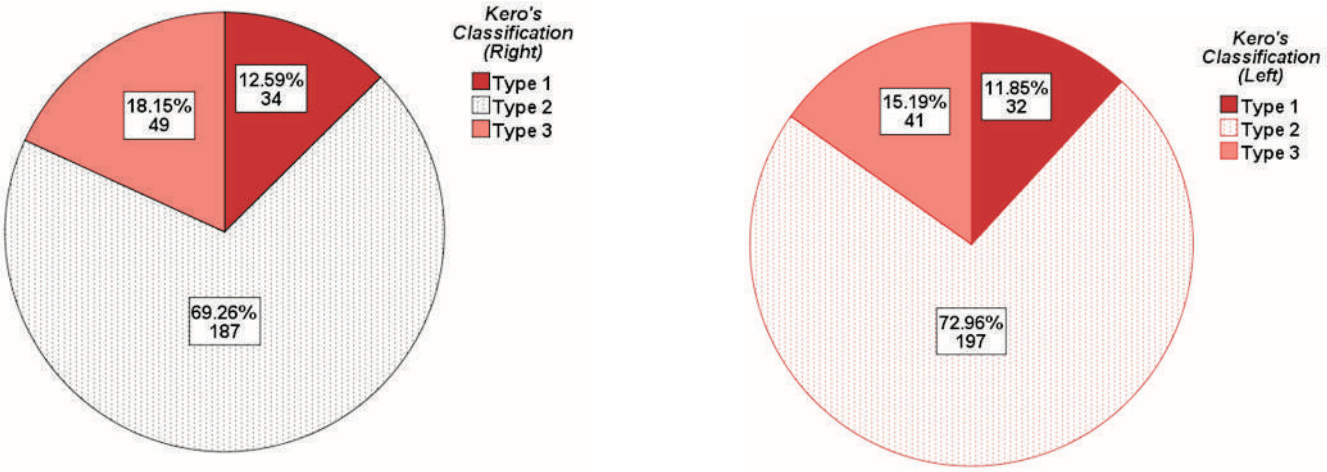
Table-2: Mean and Standard Deviation of Right and Left Olfactory Fossa Depth According to Gender

Olfactory Fossa Depth	GENDER	N	Mean(mm)	Std. Deviation	P value
Right Olfactory Fossa	Male	160	6.016	1.7804	0.069
	Female	110	6.427	1.8664	
Left Olfactory Fossa	Male	160	5.766	1.6896	0.043*
	Female	110	6.215	1.9271	

*p = 0.05 was considered significant

In the present study, the population was categorized according to Keros classification. Keros type II was found to be most frequent on both sides followed by type III. Type I was found to be the least frequent (Figure-2).

Figure-2: Frequency of subjects according to Keros classification on right and left side



DISCUSSION:

CT examination of the olfactory fossa is essential for pre-operative evaluation in FESS. Recent literature suggests that a comprehensive pre-operative radiological assessment is essential for determination of anatomic variations of paranasal sinuses to avoid possible complications[16]. Iatrogenic injuries have been linked to varying olfactory fossa depth[17]. Kero's classification is an extensively applied approach to classify olfactory fossa depth variations[3,5,15].

In our study we analyzed both right and left olfactory fossa of 270 adult males and females. The mean right and left olfactory fossa depth of our sample was comparable to that reported in some previous studies. In a study[14] from Pakistan in 2013, the mean depth of right and left olfactory fossa was reported to be 5.5±2.13 and 5.2 ±2.05 mm respectively. This retrospective study was done on a small sample size of 77 subjects and this was one of the limitations of the study. A SD of ±2.13 mm further depicted a considerable variation in a small sample size.

Our results were also in accordance with two studies on Turkish population[1,18] conducted in 2004 and 2013. However, a study from Philippines[3] and another from Egypt[15] have reported lower mean of right and left olfactory fossa depth. It is evident from literature that considerable variations in mean depths of olfactory fossa exist among different populations ranging from as low as 2.21 mm in Filipinos[3] to as high as 8.7 in Nigerians[19]. This may be attributed to the genetic variations in different populations.

On comparing the mean depths on both sides in our sample, we found a greater mean depth on the right side than on the left side, which was statistically significant. Kaplanoglu et al documented significantly greater depth on the left side as compared to the right[1]. In another retrospective study from India on 100 CT scans, a greater statistically significant mean for the left side was reported as compared to the right[20]. However, Shama and Montaser reported an insignificant difference between the two sides[15].

In the present study, the difference between the mean depths of males and females of left side was statistically significant. However, a study from India reported an insignificant depth difference between males and females[20]. This may be attributed to a smaller sample size in their study. Therefore, further studies on a larger sample size are required to elucidate the difference

between the gender.

Keros type I, II and III was found in 12.59%, 69.26%, and 18.15% subjects on the right and 11.85%, 72.96%, 15.19% subjects on the left. A review of previous literature on ethmoidal roof variation reported higher frequencies of type II[1,5,12,18,21-23]. Adeel et al from Pakistan and Rathnakar et al from India also reported highest frequency of type II Keros in their samples which was in accordance with our results[14,20]. Our sample showed the least frequency of Type I Keros. However, a few studies had reported more frequency of type I[3,15,24-26]. Literature reported that individuals falling in this low depth range were least vulnerable to iatrogenic injuries[15]. The present study showed that most of the study subjects were present in the high risk categories of Keros. The frequency of Keros type III was reported to be the least in most studies[1,3,5,12,24-26]. In addition to racial variations, this variation could also be due to the fact that Keros classification is ambiguous in the ranges of 3-4mm and 7-8mm. Standardization of Keros classification and consideration of race in its calculation is recommended.

CONCLUSION:

It is concluded that most of the studied population was present in the high risk categories of Keros, that is type II and type III thus emphasizing the need of preoperative radiological assessment.

CONFLICT OF INTEREST:

The authors declare that there are no conflicts of interest.

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COMMENTARY

Stress Among Working Women

Farhan Muhammad Qureshi

ABSTRACT:
The modern world, which is said to be a world of achievements, is also a world of stress. Nowadays, stress is a common feature in everyone's life. It is becoming a major issue and a matter of concern for the employees and the organizations. Working women are more affected as compared to their male counterparts, as their life becomes complex in order to maintain balance between home as well as work, so it becomes impossible to avoid stress. It is becoming difficult that they play the role of a perfect housewife, mother and working women at the same time. Many factors are involved in causing stress among working women at home or at workplace. Policies should originate in favour of working women to encourage them and to support them by providing a friendly, stress-free environment.
Key words: Stress, Working women, Family stress, Job stress

INTRODUCTION:

Nowadays stress has turned into a universal phenomenon. Stress is defined as the non-specific response of the body to any demand placed upon it[1]. It is a part of day to day living and wear and tear of every individual. The reason of stress differs from person to person. It causes physical and emotional changes on an effected individual and can be motivating and productive, or negative and destructive[2]. Extreme stressful conditions are detrimental to the human health, but in moderation stress is normal and in many cases, proves useful. It is a mental and physical condition which affects an individual's productivity, effectiveness, personal health and quality of work.[3] Tension and anxiety, as well as depression, are frequent emotional consequences of stress[4].

Stress is particularly common among career women at workplace. Work and family are the two important aspects in life of working women and they continue to juggle traditional responsibilities after hours. Sociologists describe them as struggling to achieve the male standard at work, while trying to maintain the perfect wife and mother standard at home[4]. Poor balances between work and family can be a major stressor for women and have a negative impact on emotional wellbeing[5]. An increasing number of articles have promoted the importance of work-life balance. They highlight the current concern within society and organizations about the impact of multiple roles on the health and well being of professional women and, implications leading to work and family performance and women's role in society. With this background, a recent five year literature searching was done on Google Scholar from 2013 to 2017 by using key words stress, working women, work and family, occupational stress. A total of 24 studies were found related to the topic, out of which 15 articles were selected after refined search.

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Working women, no matter whether they are single or married, face higher strain and contrary health effects. Working women most probably feel accented because of their diverse workload. At home, she has to take on multiple roles right from child care, looking after family members, a cook, a tutor, and a housemaid who takes care of the home, and a caretaker to fulfill the requirements at home. Hence, she has to fulfill the assorted demands of both home and workplace.

Factors of stress in working women:

Reason of stress in working women depend on various factors including type of her personality, attitude towards life, analytical skills, and co-operation from family and society. Each individual handles stress in different way; either positive or negative. There are many reasons of stress which can be at home or at workplace.

At home:

Death of husband, family member, close friend or relatives, sickness of any close one, break up from partner, noncompliance by children, children's academic performance, pregnancy or birth of a newborn.

At workplace:

Long working hours, working environment, job security, workload, salary, transfer, lack of recognition, conflict, grievance regarding problem, lack of promotion, strict policies, lack of resources, high demands of the job, relationship with colleagues, excessive work pressure, or excessive commuting time.

Sign and Symptoms of Stress:

Stress differs in degree and level of experience, and it is necessary to identify and determine the cause of stress. Some of the signs to identify the stress among working women are: disturbed eating habits, lack of patience, wrong decisions, loose temper easily, unable to achieve targets, switch job frequently, job dissatisfaction and depression, lack of concentration, poor performance, pessimistic attitude, persistent sadness and hopelessness, low self-esteem, lack of focus and energy, workplace aggression; physical complaints like headache, epigastric pain; chronic diseases like diabetes, hypertension, and heart diseases[6].

Review of Literature:

Nowadays, every individual wishes more and more for the attainment of pleasure that creates an atmosphere of competition in every aspect of life and this competition generates stress among them. In the recent years more and more women are coming to take on many jobs to

support their families or to improve their life styles[1]. Working women are stressed because they have to perform various roles. They have the pressure to manage a balance between work, home and family[1]. The cause of stress may arise either from home or organizational source. The family stresses often arise when women try to balance the multiple competing demands of their spouses, children, and elderly parents, among others[7]. In a study[8], daily home based activities, child care and looking after the family members were the personal factors that usually caused stress in working women, on the contrary, long working hours, job insecurity, lack of supervision, work load, lack of opportunity for growth and advancement, job dissatisfaction and poor relationship with colleagues affected the efficiency of the employees at work place due to stress. The significance of the work related stressors are evidently greater than those associated with the family function, although the relationship of the family functioning, stress and well-being are also significant[9]. Family stress pervades the life of working women and may impact adversely their mental and physical health and their ability to perform office work effectively[10]. Working women who experience a high level of family stress for a long time and are unable to cope with this stress, become irritable, socially withdrawn and emotionally unstable, which may lead to sickness such as hypertension, stroke and psychological problems like depression and anxiety[11].

How can women cope with stress? Stress reduction strategies:

Researchers found stress reduction strategies to help working women to cope with stressful situations such as; setting limits appropriately, working ahead of time to minimize threatening situations, embarking on guided aerobic exercises like jogging, walking, biking and skiing, keeping a positive attitude, relaxation, having enough rest and sleep, listening music etc[11]. People can live happier and healthier lives by keeping a positive attitude, accepting that there are events that one cannot control, being assertive instead of aggressive, expressing their feelings, opinion or beliefs instead of becoming angry[12]. However, individuals can fight stress better when they are fit mentally and physically, eat healthy, manage time properly and effectively, learn to say no to requests that would create excessive stress, make time for hobbies/personal interests and by having enough rest and sleep according to the requirement[13-15].

CONCLUSION:

Working women are constantly under different forms of stress as they are expected to perform multiple tasks. When they try to reduce stress levels, even then they are continuously busy in coping with their work and household responsibilities. Lack of support from spouse and family aggravates the stress level of women, which might sometimes lead to disastrous outcomes such as separation and divorce. It is recommended that seminars and workshops should be organized to teach methods to deal with, and reduce the level of stress. Government should make family-friendly policies to enable women to work in a stress-free environment.

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STUDENTS CORNER

Anatomy Model Competition 2017

Quratulain Omaeer

The department of Anatomy organized a model competition on 20th February 2017 under the supervision of head of department Prof Dr. Ambreen Usmani and senior lecturer Dr. Quratulain. The students of second year MBBS participated in this contest. Students were divided into 15 groups of 8-10 students each. The purpose of this competition was to enhance the knowledge of Anatomy through the creative task of anatomical model making, visualizing the gross anatomical structures along with their relations strengthening the conceptual understanding of human body. The whole class participated enthusiastically dedicating free time for making models. Students were encouraged to choose the subject of their models by themselves and were guided throughout the process by lecturers of Anatomy department. Each group was evaluated on the basis of accuracy of knowledge, creativity, aesthetics, team work and presentation.

Prof Dr. Talat Yasmeen from Jinnah Sindh Medical University was the chief guest. The Honorable Director General BUMDC Vice Admiral (Retd) Tahseen ullah Khan HI (M), Professor Asad Ullah Khan, Dean BUMDC and the chief guest Prof. Dr Talat were the judges for the competition. The first, second and third position holders were given certificates and the winners were awarded a shield.

Director General BUMDC asking questions about the model from the students

✉ **Dr. Quratulain Omaeer**
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Revised: 24-06-17
Accepted: 17-07-17

Director General BUMDC Vice Admiral (Retd) Tahseen ullah Khan HI (M), Principal Prof Asad Ullah Khan and Chief Guest Prof Talat Yasmeen observing the model

Model of esophagus designed by Group 6 along with its key

CASE REPORT

Cornual Ectopic Pregnancy: A Threat to the Life of Mother

Khalida Nasreen[1], Samreen Iqbal[2], Atiya Fasih[3]

ABSTRACT:
Cornual (interstitial) ectopic pregnancy, an uncommon variant of ectopic pregnancy often poses a diagnostic and therapeutic challenge with a significant risk of rupturing and bleeding. Early diagnosis and treatment of interstitial ectopic pregnancy is very crucial, as they carry a very high risk of morbidity associated with the rupture. If they continue without diagnosis, a life-threatening situation may occur even when surgical intervention with laparotomy is performed. We present a case who reported with lower abdominal pain and 2 months amenorrhea. The patient was diagnosed with a cornual ectopic pregnancy and managed timely.

Keywords: Ectopic pregnancy, Cornual ectopic pregnancy, Trans-vaginal ultrasound

INTRODUCTION:

Ectopic pregnancy, defined as the placement of an embryonic sac somewhere other than the uterine wall, is the most common life-threatening emergency seen during early pregnancy.[1] Interstitial ectopic pregnancy is a rare tubal ectopic pregnancy form, characterized by the attachment of the gestational sac to the intramural side of fallopian tubes. This type of ectopic pregnancy is seen in 1/2500-1/5000 of all pregnancies and 2-4% of all ectopic pregnancies.[2-5] The interstitial part of the fallopian tube contains more vascularized and muscular tissue. Due to this vascular and connective tissue support and anatomic localization, diagnosis and treatment is usually late. For this reason, the mortality risk is 2-5 times more than other ectopic pregnancies. Ectopic pregnancy is the second major cause of maternal mortality in the United States and a leading cause of maternal morbidity and mortality in the world[3]. The typical rupture of these ectopic pregnancies within the myometrium usually occurs later than 9 weeks and as late as 20 weeks[1]. It is difficult to diagnose an interstitial ectopic pregnancy before rupture. Due to the high risk of rupture with serious or fatal bleeding, there is no role for the expectant management. Surgery is the most common management option[2].

CASE REPORT:

A 24-year-old, married since 3 years, P0+2, last miscarriage 10 months back, presented to gynaecology OPD of National Medical Center on 2nd December, 2016 with history of 2-month amenorrhea and low backache, and pain in lower abdomen for past 1week. She looked pale, her pulse-92b/m, BP-100/60 mm Hg, while temperature was normal. On abdominal examination, lower abdomen was tender. Trans-vaginal ultrasound done 2 days back, showed impression of chronic left cornual ectopic pregnancy with both slightly enlarged ovaries (Figure-1). No free fluid in cul-de-sac was present. Initial laboratory reports included Hb: 11.0 g/dl, HCT: 35%, Platelets: 306,000/mm^3, RBS: 98 mg/dl, serum ß-hCG 21.36 mIU/ml, Hepatitis B & C: nonreactive. She had been diagnosed as a case of endometriosis on ultrasound and MRI 6 months back but proper treatment was not done. An emergency laparotomy was performed under general anesthesia. There was 200ml blood in peritoneal cavity, left cornual ectopic pregnancy of about 6 X 4cm was seen, tissues were found necrotic and only amniotic sac was intact (Figure-2 & 3), right tube was healthy, both ovaries were slightly enlarged, polycystic and had thickened capsule. Left cornual ectopic pregnancy was removed and sent for histopathology followed by cornual repair and ovarian drilling. There was no blood transfusion during operation and post-operatively, the patient's recovery was smooth. She was discharged on 3rd postoperative day in good condition. Histopathology report was collected after 10 days, which showed cornual ectopic pregnancy.

Figure: 1
Cornual ectopic pregnancy at 6-week gestation

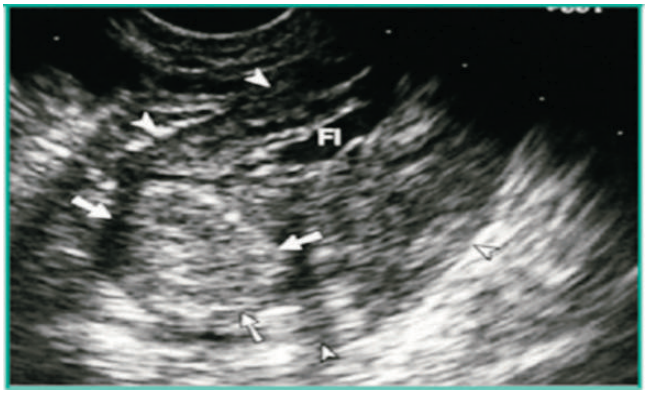

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Figure: 2
Left cornual ectopic pregnancy at 8 weeks gestation near to rupture

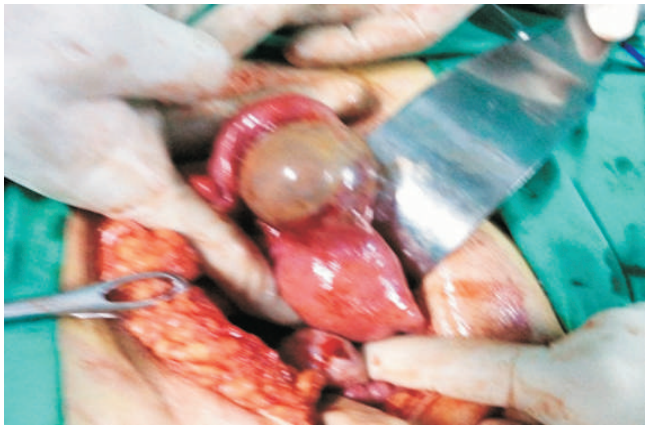

Figure: 3
Left cornual ectopic pregnancy at 8 weeks near to rupture

DISCUSSION:

Cornual pregnancy is one of the life-threatening medical situations in women, especially in developing countries. The etiologic factors for cornual pregnancy are pelvic inflammatory disease, previous ectopic pregnancy, Assisted reproductive technology, uterine abnormalities, conception after tubal ligation, history of tubal surgery and use of an IUCD; peri- and intratubular adhesions related or not related to endometriosis are an additional risk factor.[5] Despite the currently available diagnostic modalities for diagnosing pregnancy including trans-vaginal ultrasonography and beta-human chorionic gonadotropin assays, early identification of a cornual ectopic pregnancy remains a difficult task.[1] The rate of diagnosis can be improved with trans-abdominal or trans-vaginal ultrasound using three criteria[6, 7]

- An empty uterus
- A gestational sac seen separately and <1 cm from the most lateral edge of the uterine cavity
- A thin myometrial layer surrounding the sac The interstitial line sign (the echogenic line extending into the upper part of the uterine horn bordering the margins of the intrauterine gestational sac) is also helpful in diagnosing an interstitial pregnancy.[6, 7]

In experienced hands, trans-vaginal ultrasound can establish diagnosis of cornual ectopic in nearly 71% of cases with sensitivity of 80% and specificity of 99%.[4] The difference between an interstitial ectopic pregnancy and an eccentrically located intrauterine pregnancy can be ambiguous. Myometrium around the gestational sac is likely the most useful ultrasonographic feature in addressing the distinction.[6] Three dimentional ultrasound may be helpful for delineating a gestational sac's location.[7,8,9]

Various forms of ectopic pregnancy and their complications may occasionally be further evaluated with MRI or may be incidentally detected on CT or MRI when an alternative diagnosis is suspected.[7,10] Significant maternal haemorrhage leading to hypovolaemia and shock can rapidly result from cornual rupture.[6, 8] Treatment options for cornual (interstitial) ectopic pregnancy include local injection or systemic therapy with methotrexate, local injection of potassium chloride, conservative laparoscopic surgery and uterine artery embolism and, in emergency situations, cornuectomy, corneal resection or hysterectomy in case of failure of other methods. Evidence of a hemorrhagic ectopic pregnancy is an indication for laparotomy.[5-9]. As in our case, clinical findings were suggestive of ruptured ectopic so emergency laparotomy was done followed by cornual resection and repair.

CONCLUSION:

Cornual pregnancy presents a significant diagnostic and therapeutic challenge and carries a greater maternal mortality risk than tubal pregnancy. Trans-vaginal sonography can be helpful but often is not conclusive. Early clinical diagnosis aided by ultrasound or laparoscopy may help to contribute towards effective conservative management. The serious consequences of cornual pregnancy are caused mainly by rupture, leading to catastrophic haemorrhage and even death. High degree of clinical experience of operating surgeon is needed to manage these cases. Cornual excision or hysterectomy used to be the effective treatment in complicated cases. As in our case, timely diagnosis and emergency laparotomy saved the patient's life and preserved future fertility.

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LETTER TO EDITOR

The Strawberry Quick Problem: A devil in disguise

Hira Saleem[1], Saba Saleem[2], Unzela Iqbal[3]

To,
The editor,

I would like to report the recent Strawberry Quick drug scare which has now reached Pakistan, to add to its plethora of bewildering issues.

In 2017, a leading Pakistani private institution issued a circular to parents warning about the threat of a pop rock candy (a confection that fizzles and pops in the mouth), which is a disguise of a recreational drug cum intoxicant methamphetamine.[1] This has created havoc among parents, who are concerned about such products being handed out to their naive children.

The issue has been making headlines on an international level since 2007, first reported in the Western states. It was named Strawberry Quick or Quik (after 'Quik', a powder incorporated in milk drinks for adding flavor). It is dark pink in color and has a strawberry scent to it, to increase its appeal among children who perceive it as candy.[2]

It was warned that the drug was made available to school children and teenagers in school backyards and through fences, usually via strangers. Apart from strawberry, other flavors, including chocolate, peanut butter, cola, cherry, grape and orange have also been reported.[1]

Methamphetamine, a stimulant and a highly addictive drug, increases the amount of dopamine in the brain which is involved in body movement, pleasure, reward, etc. The rapid release of dopamine in the reward areas of brain creates a state of euphoria experienced by many people. It is usually taken as a powder or a pill. Methamphetamine encompasses a wide range of both short and long term effects. It causes hyperactivity, reduced appetite, faster breathing, rapid or irregular heartbeat and elevated blood pressure. Long term effects may include anxiety, confusion, paranoia, hallucinations, dental problems('meth mouth') and weight loss. An overdose can result in stroke, myocardial infarction, kidney failure and even death.[3,4]

However, law enforcing agencies have not validated the concern with sound evidences and believe that the coloring and flavoring of meth could possibly be a manufacturing process instead of a deliberate attempt to market it to children.They also conjecture the idea that children do not have the sufficient income to purchase such products.[5] It is imperative to note, however, that drug dealers consider teenagers as easy targets. Hence, it is vital to take the threat of drug scare into consideration and to provide effective awareness to both students and parents in order to prevent dire consequences.

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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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6. Acknowledgment

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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Authorship credit is based only on the criteria laid down by International committee of Medical Journal Editors (http://www.icmje.org/recommendations/browse/roles-and-responsibilibies/defining-the-role-of-authore-and-contributors.html).1) substantial contributions to conception and design, or acquisition of data, or analysis and interpretation of data; 2) drafting the article or revising it critically for important intellectual content; and 3) final approval of the version to be published. 4) Agreement to be Accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. All Conditions must be met. Authors should provide a description of what each contributed.

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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

e) Newspaper

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